UNIVERSITY OF MUMBAI
No. UG/ 74 of 2018-19

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office circular No. UG/17 of 2005, dated 13th January, 2005 relating to syllabus of Bachelor of Arts.

They are hereby informed that the recommendations made by the Board of Studies in History and Archaeology at its meeting held on 25th May, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.1 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.A. in History & Archaeology – Sem V & VI has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
6th ~~June~~ July, 2018

(Dr. Dinesh Kamble)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.1/14/06/2018

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No. UG/ 74 -A of 2018 MUMBAI-400 032 6th ~~June~~ July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in History & Archaeology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
6) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

AC / /2018
Item no.

UNIVERSITYOFMUMBAI

Revised Syllabus for Sem V and Sem VI

Program: B. A.

Course: History and Archaeology

(Choice Based Credit System with effect from the Academic year 2018-2019)

Revised Syallbus

Semester V and Semester VI
Programme: B.A.
Course: History and Archaeology

(Choice Based Credit System with effect from the Academic year 2018-2019)

As per University rules and guidelines for Faculty of Humanaities

Faculty of Humanities

TYBA
(Choice Based Credit System, CBCS)
Semester V and Semester VI
Guidelines
With Effect From 2018-2019

Syllabus Structure:

1. In TYBA (CBCS) in Sem V and Sem VI, the Core Courses will be Core Courses IV, V, VII and VIII.
2. The Elective Courses will be Elective Courses VI and IX which will be partially Project Based Courses. The Boards of Studies may offer choices in the Elective Courses VI and IX.
3. In Sem V and Sem VI, each Course namely Core Courses IV, V, VII and VIII and Elective Courses VI and IX will carry 4 Credits per Course per Semester.

Evaluation:

1. **Core Courses**: The Core Courses IV, V, VII and VIII will be theory based Core Courses. The University of Mumbai will conduct the Sem V and Sem VI examinations of 100 marks per Core Course. In Sem V and Sem VI for all the above Core Courses, the student will have to secure a minimum of 40% marks in aggregate per Core Course.
2. **Elective Courses**: The Elective Courses VI and IX will be Electives and Choices of Electives may be offered by the various Board of Studies. The University of Mumbai will conduct the Sem V and Sem VI examination for Elective Courses VI and IX of 80 marks per Elective Course. The Elective Courses namely Elective Courses VI and IX will be partially Project Based Courses. In Sem V and VI, for Elective Course VI and for Elective Course IX, the Colleges will conduct the evaluation of a Project of 20 marks

each and will send the marks to the University of Mumbai as per University of Mumbai guidelines.

3. The total marks of the Elective Course VI and Elective Course IX will be 100 marks each that is 80 marks for Theory Examination conducted by University of Mumbai and 20 marks for Project evaluated by the concerned college Faculty in the subject.
4. In Sem V and Sem VI, the student will have to submit a Project for Elective Course VI and Elective Course IX in the College before appearing for the University Examination. The last date of submission of the Project will be officially declared by the College.
5. In Sem V and Sem VI, the Project topic will be based on the Syllabus of the respective Elective Courses that is Elective Course VI and Elective Course IX. The students will be given the choice of choosing the topic of the project in consultation with the Faculty Member teaching the respective Elective Course. The list of students along with the topics chosen by the students will be displayed by the College in the beginning of the Semester.
6. The Project work will be carried out by the student with the guidance of the concerned Faculty Member who will be allotted to the student as the Guide for the Project.
7. In Sem V and Sem VI, for Elective Courses VI and IX, the student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 08 out of 20 marks in Internal Evaluation of Project in Elective Course VI and Elective Course IX and 32 out of 80 marks in University Examination of Elective Course VI and Elective Course IX.

   Note: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Humanities passed by the Academic Council from time to time.

Faculty of Humanities
TYBA
(Choice Based Credit System, CBCS)
Semester V and Semester VI
Question Paper Pattern for T.Y.B.A (CBCS)
for Core Courses IV,V,VII and VIII
As per University rules and guidelines
With Effect From 2018-2019

(Time: 3 Hours)

Note: 1. Attempt **all** questions (Total = 100 marks)
2. All questions carry **equal** marks

Q.1 (Based on Module I) (20 marks)
a.
or
b.
Q.2 (Based on Module II) (20 marks)
a.
or
b.
Q.3 (Based on Module III) (20 marks)
a.
or
b.
Q.4 (Based on Module IV) (20 marks)
a.
or
b.
Q.5 Attempt **any two** short notes. (Based on Module I, II, III and IV) (20 marks)
a.
b.
c.
d.

[The Question paper Pattern for the Revised Syallbus for Semester V and Semester VI, Programme: B.A; Course: History and Archaeology (Choice Based Credit System with effect from the Academic year 2018-2019) will be as per University rules and guidelines for the Faculty of Humanaities].

Faculty of Humanities
TYBA
(Choice Based Credit System, CBCS)
Semester V and Semester VI
Question Paper Pattern for T.Y.B.A (CBCS)
for Elective Courses VI and IX
As per University rules and guidelines
With Effect From 2018-2019

(Time: 2 & 1/2 Hours)

Note: 1. Attempt **all** questions (Total = 80 marks)
2. All questions carry **equal** marks

Q.1 (Based on Module I) (20 marks)
a.

or

b.

Q.2 (Based on Module II) (20 marks)
a.

or

b.

Q.3 (Based on Module III) (20 marks)
a.

or

b.

Q.4 (Based on Module IV) (20 marks)
a.

or

b.

[The Question paper Pattern for the Revised Syallbus for Semester V and Semester VI, Programme: B.A; Course: History and Archaeology (Choice Based Credit System with effect from the Academic year 2018-2019) will be as per University rules and guidelines for the Faculty of Humanaities].

SYLLABUS

SEMESTER – V		
Course	Title of the Course	Credits
Core Course IV	History of Medieval India (1000 CE – 1526 CE)	4 Credits
Core Course V	History of Modern Maharashtra (1818 CE-1960 CE)	4 Credits
Elective Course VI. A (With Project)	Introduction to Archaeology	4 Credits
Elective Course VI B (With Project)	Media and Communication	4 Credits
Core Course VII	History of the Marathas (1630 CE -1707 CE)	4 Credits
Core Course VIII	History of Contemporary World (1945 CE -2000 CE)	4 Credits
Elective Course IX A (With Project)	Research Methodology and Sources of History	4 Credits
Elective Course IX B (With Project)	Introduction to Heritage Tourism	4 Credits
		Total 24 Credits

SEMESTER – VI		
Course	Title of the Course	Credits
Core Course IV	History of Medieval India (1526 CE – 1707 CE)	4 Credits
Core Course V	History of Contemporary India (1947 CE- 2000 CE)	4 Credits
Elective Course VI A (With Project)	Introduction to Museology and Archival Science	4 Credits
Elective Course VI B (With Project)	Media and Communication	4 Credits
Core Course VII	History of the Marathas (1707 CE - 1818 CE)	4 Credits
Core Course VIII	History of Asia (1945 CE -2000 CE)	4 Credits
Elective Course IX A (With Project)	Research Methodology and Sources of History	4 Credits
Elective Course IX B (With Project)	Heritage Tourism in Maharashtra	4 Credits
		Total 24 Credits

T.Y.B.A. History

SEMESTER -V

Core Course IV- History of Medieval India (1000 CE-1526CE)

Objectives:

1. To acquaint the students with the history of early Medieval India that laid the foundation of the Sultanate in India.
2. To study the contribution of Vijayanagar and Bahamani kingdoms to Medieval Indian History.
3. To examine the administrative, socio-economic and cultural aspects of Medieval India.

Module I: Foundation, Expansion and Decline of Delhi Sultanate

(a) Socio-economic and political conditions on the eve of the Turkish Invasion
(b) Rise and Decline of Slave dynasty, Khilji Dynasty
(c) Tughlaq, Sayyid and Lodi Dynasty

Module II: Administrative Structure of the Sultanate

(a) Central Administration and Iqta system
(b) Administrative and Military Reforms of Ala-ud-din Khilji
(c) Reforms of Firozshah Tughlaq and Mohammed bin Tughlaq

Module III: Emergence of Vijaynagar and Bahamani Kingdoms

(a) Rise, Growth and Decline of Vijaynagar and Bahamani Kingdoms
(b) Administration, Socio-Economic and Cultural conditions of Vijayanagar Empire
(c) Administration, Socio-Economic and Cultural conditions of Bahamani Kingdom

Module IV: Society, Economy, Religion and Culture of Delhi Sultanate

(a) Socio-economic and religious life
(b) Education and Literature
(c) Art and Architecture

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T.Y.B.A. History

SEMESTER -V

Core Course V- History of Modern Maharashtra (1818 CE-1960 CE)

Objectives:

1. To acquaint students with regional history.
2. To understand political and socio-economic developments during the 19th and 20th centuries.
3. To create understanding of the movement that led to the formation of Maharashtra.

Module I: Beginning of the British Rule

(a) Socio-Economic conditions of Maharashtra in 19th Century
(b) Administration and Judiciary
(c) Tribal and Peasant Uprisings

Module II: Socio- Economic Awakening

(a) Mahatma Jotirao Phule - Satya Shodhak Samaj and Universal Humanism
(b) Prarthana Samaj
(c) Contribution of thinkers of Maharashtra to Economic Nationalism

Module III: Political Developments in Maharashtra (1885-1960)

(a) Moderates, Extremists and Revolutionaries in Maharashtra
(b) Response to Gandhian Movements in Maharashtra
(c) Samyukta Maharashtra Movement

Module IV: Emergence of New Forces

(a) Contribution of Reformers in Education
(b) Contribution of Reformers towards Emancipation of Women
(c) Contribution of Reformers towards Upliftment of Depressed Classes: V. R. Shinde, Rajarshi Shahu Maharaj and Dr. B.R. Ambedkar

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T.Y.B.A. History

SEMESTER -V

Core Course VI A – Introduction to Archaeology

Objectives:

1. To understand the basic facets of Archaeology.
2. To evaluate the importance of Epigraphy.
3. To study the importance of Numismatics as an important source of history.

Module I: Aims and Methods of Archaeology

(a) Definition, Aims and Development of Archaeology in India
(b) Archaeology and History; Archaeology and Other Sciences
(c) Field Archaeology: Methods of Exploration, Excavation and Dating Antiquities; Significance of Archaeology

Module II: Pre-Historic, Proto-Historic and Early Historical Periods

(a) Palaeolithic and Mesolithic Periods
(b) Neolithic and Chalcolithic Periods
(c) Megalithic and Early Historical Periods

Module III: Epigraphy

(a) Definition and History of Indian Epigraphy
(b) Types of Inscriptions and their significance
(c) Evolution of Brahmi and Kharosthi Scripts; Edicts of Ashoka

Module IV: Numismatics

(a) Definition and History of Indian Numismatics
(b) Ancient Indian Coinage: Punch-Marked, Satavahana, Western Kshatrapas, Kushana and Gupta Coins
(c) Contribution of Numismatics to Indian History

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SEMESTER -V

Elective Course: Paper VI B –Media and Communication

Objectives:

1. To inform students about the Fundamentals of Communication.
2. To introduce students to Oral Traditions in Communication and the field of Journalism.
3. To familiarize students with the various types of Audio-Visual Media.

Module I: Fundamentals of Communication

(a) Definition, Evolution and Significance of Communication
(b) Process, Types, Importance and Need of Communication
(c) Barriers to Communication

Module II: **Oral Traditions in Communication**

(a) Folk Theatre – Importance, Marathi Theatre
(b) Major Dance Forms – Folk and Classical
(c) Folk Expression – Songs, Stories and Puppetry

Module III: Journalism

(a) Definition, Evolution and Types of Journalism
(b) Role and Functions of Reporters, Sub-Editor and Editor
(c) Freedom of Press – Importance, Ethics and Current Trends

Module IV: Audio-Visual Media

(a) Photography – Types, Scope and Limitations
(b) Cinema – Growth, Development and Technical Aspects
(c) Types of Films and Global Indian Cinema

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SEMESTER -V

Core Course VII- History of the Marathas (1630 CE – 1707CE)

Objectives:

1. To introduce the students to the regional history of Maharashtra.
2. To familiarize students with the literary sources of the history of the Marathas.
3. To help students to understand the forces leading to the establishment of Maratha power under Chhatrapati Shivaji Maharaj.

Module I: Introduction to Maratha History

(a) Marathi, Persian and European Sources
(b) Deccan in the 17^{th} century – Geo-Political and Economic conditions
(c) Socio-Cultural conditions; Maharashtra Dharma

Module II: Establishment of Swarajya

(a) Shivaji's relations with Bijapur
(b) Shivaji's relations with the Mughals
(c) Shivaji's relations with the Europeans

Module III: Period of Consolidation and Crisis

(a) Coronation and its significance; Shivaji's Karnatak Campaign
(b) Sambhaji, Rajaram and Tarabai
(c) Civil War : Tarabai and Shahu

Module IV: Administration during the Royal Period

(a) Civil Administration
(b) Revenue and Judicial Administration
(c) Military Administration

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SEMESTER -V

Core Course VIII: History of Contemporary World (1945 CE – 2000 CE)

Objectives:

1. To trace some of the major events of post-World War II period.
2. To understand the significance of these events.
3. To comprehend the ways in which events of the latter half of the twentieth century have influenced the present.

Module I: Cold War (1945-1985)

(a) Meaning, Causes of Cold War and Security Pacts
(b) Conflicts in Cold War: Germany, Korea and Cuba
(c) Economic Revival of Western Europe; Soviet Union's Relations with Eastern Europe

Module II: Europe, U.S.S.R and U.S.A. (1985-2000)

(a) Disintegration of U.S.S.R
(b) Re-drawing of political borders of Germany, Yugoslavia and Czechoslovakia; Emergence of the European Union (EU) in Western Europe
(c) U.S.A as the dominant world power

Module III: Movements for Equal Rights and Challenging the Bipolar World (1945-2000)

(a) Campaigns within and outside South Africa against Apartheid
(b) Civil Rights Movement in U.S.A
(c) Non-Aligned Movement

Module IV: Major Trends

(a) Globalisation
(b) Sustainable Development
(c) Women's Liberation Movement

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SEMESTER -V

Elective Course IX A - Research Methodology and Sources of History

Objectives:

1. To teach students basics of research methodology in history with a view to promote historical research.
2. To understand the various kinds of sources of history and its interpretation.
3. To acquaint students with the new trends and approaches in history writing.

Module I: History: Definition and Scope

(a) History: Meaning, Scope and Nature
(b) Importance of History
(c) History and Auxiliary Sciences

Module II: Sources of History

(a) Sources: Nature and Types
(b) Authenticity and Credibility of Sources
(c) Importance of Archival Sources

Module III: Research Methods in History

(a) Methods of Data Collection
(b) Interpretation and Generalisation of Sources
(c) Footnotes and Bibliography

Module IV: Sources for Writing Indian History

(a) Sources for Ancient Indian History
(b) Sources for Medieval Indian and Maratha History
(c) Sources for Modern and Contemporary Indian History

References:

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SEMESTER -V

Elective Course IX B - Introduction to Heritage Tourism

Objectives:

1. To develop an understanding of Heritage Tourism amongst students.
2. To introduce the students to new trends in Heritage Tourism.
3. To prepare the students for careers in Tourism industry.

Module I -Understanding Heritage Tourism

(a) Meaning and Historical Perspective of Tourism
(b) Concept, Scope and Significance of Heritage Tourism
(c) National Policies to promote Heritage Tourism and World Heritage Sites in India

Module II - Forms of Heritage Tourism in India

(a) Natural: Beaches and Sanctuaries
(b) Built Heritage: Forts, Monuments and Public Buildings
(c) Cultural: Pilgrimage Sites, Fairs and Festivals

Module III - New Trends in Heritage Tourism

(a) Entertainment: Performing Arts and Cinema
(b) Eco-tourism and Adventure Tourism
(c) Public Private Partnership in Heritage Tourism

Module IV - Heritage Management

(a) Heritage Legislation
(b) Role of Tourism Industry
(c) Role of Museums and Heritage Conservation Societies

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SEMESTER -VI

Core Course: IV- History of Medieval India (1526 CE-1707CE)

Objectives:

1. To acquaint the students with the history of India since the emergence of the Mughal rule.
2. To understand administration of the Mughal Empire.
3. To study the rise of the Maratha Power.

Module I: Foundation, Expansion and Decline of the Mughal Rule

(a) India on the eve of Mughal Rule; Invasion of Babur
(b) Humayun, Shershah and Akbar
(c) Jahangir, Shahjahan and Aurangzeb

Module II: Administrative Structure of the Mughals

(a) Central and Provincial Administration
(b) Mansabdari System
(c) Revenue and Judicial system

Module III: Rise of the Maratha Power

(a) Shivaji and Foundation of Swarajya
(b) Administration of Shivaji
(c) Sambhaji, Rajaram and Tarabai

Module IV: Society and Economy, Religion and Culture of the Mughal Rule

(a) Society and Economy
(b) Religion, Education and Literature
(c) Art and Architecture

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SEMESTER -VI

Core Course V – History of Contemporary India (1947 CE- 2000 CE)

Objectives:

1. To understand the process of making the Constitution and the Integration and Reorganization of Indian States.
2. To acquaint the students with the political developments in India after Independence.
3. To comprehend the socio-economic changes and progress in science and technology in India.

Module I: The Nehru Era (1947 CE – 1964 CE)

(a) Features of Indian Constitution
(b) Integration and Reorganization of Indian States
(c) Socio- Economic Reforms and Foreign Policy

Module II: Political, Social and Economic Developments (1964 CE – 1984 CE)
`

(a) Political Developments after Nehru Era; Green Revolution.
(b) Abolition of Privy Purses and Titles; Nationalization of Banks; The Emergency
(c) Janata Government; Return of Congress to power ; Foreign Policy

Module III: Political, Social and Economic Developments (1984 CE – 2000 CE)

(a) Political Developments
(b) Relations with Neighboring Countries
(c) Liberalization, Privatization and Globalization

Module IV: Emerging Trends

(a) Communalism and Separatist Movements
(b) Women Empowerment and Policy of Reservation
(c) Science, Technology and Education

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SEMESTER -VI

Elective Course VI A - Introduction to Museology and Archival Science

Objectives:

1. To inform the students about the role of Museums in the preservation of Heritage.
2. To understand the importance of Archival Science in the study of History.
3. To encourage students to pursue careers in various Museums and Archives in India and abroad.

Module I: Museology

(a) Definition of Museology, Museum Movement in India
(b) Role of the Curator
(c) Types of Museums

Module II: Museums

(a) Methods of Collection and Conservation of Objects in Museums
(b) Preservation Techniques and Types of Exhibitions
(c) Changing Role of Museums: In-house and Out-reach activities of Museums

Module III: Archival Science

(a) Meaning, Scope, Objectives and Classes of Archives
(b) Importance of Archives: Value of Records as Sources of History
(c) Classification of Records

Module IV: Management of Archives

(a) Appraisal and Retention of Records
(b) Conservation and Preservation of Records
(c) Digital Archives

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SEMESTER -VI

Elective Course VI B - Media and Communication

Objectives:

1. To acquaint students with the various types of Media and Communication.
2. To inform students of the developments in Information Technology.
3. To understand the impact of Media on Society.

Module I: Radio and Television

(a) Radio - History and Current Trends
(b) Television - History and Current Trends
(c) Careers in Radio and Television

Module II: Advertising and Public Relations

(a) Definition, Functions and Responsibilities of Public Relations Officer
(b) Advertising – Definitions and Types
(c) Careers and Opportunities in Advertising and Public Relations

Module III: Revolution in Information Technology

(a) Social Media
(b) Electronic Gadgets – Uses and Misuses
(c) Cyber Crimes and Cyber Laws

Module IV: Impact of Media

(a) Impact on Society - Children, Women, Youth
(b) Challenges – Privatization, Global Competition, Moral Issues, Public Censorship
(c) Media and Global Issues – Human Rights, Environment

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SEMESTER -VI

Core Course VII: History of the Marathas (1707 CE – 1818 CE)

Objectives:

1. To enable the students to understand the processes that led to the expansion of the Maratha Power.
2. To appreciate the contribution of the Marathas in the national politics of the 18th century.
3. To develop an understanding of the society and culture in Maharashtra in the 18th century.

Module I: Expansion of the Maratha Power

(a) Rise of the Peshwas: Balaji Vishwanath
(b) Peshwa Bajirao I
(c) Maratha Confederacy

Module II: Consolidation of the Maratha Power

(a) Peshwa Balaji Bajirao (Nanasaheb)
(b) Third Battle of Panipat: causes and consequences
(c) Defeat of the Marathas and significance of the Third Battle of Panipat

Module III: Post Panipat Revival and Downfall

(a) Peshwa Madhavrao I
(b) Barbhai Council
(c) Downfall of the Maratha Power

Module IV: Administrative and Socio-Cultural Developments

(a) Peshwa Administration: Civil, Revenue and Military
(b) Society under the Peshwas – Religion, Caste and Position of Women
(c) Cultural Developments: Literature, Art and Architecture

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SEMESTER -VI

Core Course VIII - History of Asia (1945 CE-2000 CE)

Objectives:

1. To acquaint the students with some of the major changes that occurred in Asia after World War II.
2. To understand the ways in which Asian nations resisted and defied the control of the West.
3. To comprehend some of the trends that emerged in Asia.

Module I: Transformation of China

(a) Domestic Policy in People's Republic of China under Mao Zedong
(b) Economic Progress in China under Deng Xiaoping
(c) Foreign Policy of China with USSR

Module II: Reconstruction of Japan

(a) American Occupation of Japan
(b) Economic Miracle in Japan
(c) Foreign Policy of Japan with USA

Module III: South East Asia

(a) Cold War and Vietnam
(b) Guided Democracy in Indonesia
(c) Association of South East Asian Nations (ASEAN)

Module IV: Conflicts in West Asia

(a) Arab- Israel Conflict (1948-2000)
(b) Iranian Revolution of 1979
(c) Oil Politics and OPEC

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SEMESTER -VI

Elective Course IX A - Research Methodology and Sources of History

Objectives:

1. To teach students basics of research methodology in history with a view to promote historical research.
2. To understand the various kinds of sources of history and its interpretation.
3. To acquaint students with the new trends and approaches in history writing.

Madule I: Historical Research: Methods and Presentation

(a) Steps in Historical Research
(b) Methods of Critical Enquiry
(c) Presentation of Historical Research

Madule II: New Trends in History

(a) Local History
(b) Oral History
(c) Digital and E-Sources

Madule III: Approaches to History

(a) Subaltern
(b) Feminist
(c) Post-Modern

Madule IV: Indian Historiography

(a) Imperialist
(b) Nationalist
(c) Marxist

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SEMESTER -VI

Elective Course IX B - Heritage Tourism in Maharashtra

Objectives:

1. To introduce students to the Cultural Heritage of Maharashtra
2. To understand various resources of Heritage Tourism in Maharashtra
3. To acquaint the students with the relevance and scope of Heritage Tourism

Module I: Understanding Heritage Tourism of Maharashtra

(a) Government Policies and Role of Government Agencies
(b) Heritage Sites and Precincts
(c) Careers in Heritage Tourism

Module II: Natural Heritage

(a) Biodiversity of Sahyadri Range
(b) National Parks
(c) Beaches and Hill Stations

Module III: Architectural Heritage

(a) Caves
(b) Forts
(c) Monuments and Public Buildings

Module IV: Cultural Heritage

(a) Pilgrimage Sites
(b) Fairs and Festivals
(c) Folk and Tribal Culture

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Pande Pratibha, *National Parks and Sanctuaries in Maharashtra: A State Profile*, Bombay Natural History Society, 2005

Pandit Suraj, *Stories in Stone: Historic Caves of Mumbai*, INSTUCEN Trust, Mmubai, 2013

Rohatgi Pauline and Godrej Pheroja, Mehrotra Rahul, *Bombay to Mumbai*, Marg Publications, Mumbai, 1997.

Tomar Y P S, *Development of Primitive Tribes in Maharashtra: Status, Continuity, and Change,* Tribal Research and Training Institute, 2004

Marathi Books

Awalskar S.V., *Raigadachi Jeevankatha,* Maharashtra Rajya Sahitya aani Sanskruti Mandal, 1995 (Third Edition)

Dalvi Dawood, *Leni Maharashtrachi,* GranthaliPrakashan, Mumbai, 2004

Deshpande D. G., *Maharashtratil Kille,* Diamond Publication, Pune, 2009

Degalurkar G. B., *Verul Darshan,* SnehalPrakashan, Pune, 2008

Degalurkar G. B., *Gharapuri Darshan,* SnehalPrakashan, Pune, 2013

Deglurkar G B, Paithan: *Samskrutik Darshan,* Bhartiya Itihas Sankalan Samiti, Pune, 2005

Ghanekar P K, *Atha to Durgjidnyasa*, Snehal Prakashan, Pune,1999 (second edition)

Gunaji Milind, *Mazi Mulukhgiri*, Rajhans Prakashan, Pune, 2001 (Fifth Edition)

Pandit Suraj, *Maharashtratil Bauddha Leni,* Aparant, Pune, 2018

Paradkar Milind, *Prachin Bharatiya Durgashastra Aani Hindavi Swarajyachya Don Rajdhanya-Ek Tulanatmak Abhyas,* Neelchampa Prakashan, 2011.

UNIVERSITY OF MUMBAI
No. UG/53 of 2018-19

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office circular No. UG/207 of 2010, dated 21st July, 2010 relating to syllabus of Bachelor of Arts.

They are hereby informed that the recommendations made by the Board of Studies in Politics at its meeting held on 4th June, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.2 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.A. in Politics – Sem V & VI has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
4th July, 2018

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.2/14/06/2018

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No. UG/ 53 -A of 2018 MUMBAI-400 032 4th July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Politics,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
6) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

UNIVERSITY OF MUMBAI

Revised Syllabus for T.Y.B.A.

Programme: B.A.

Course : Politics

Semesters: V and VI

(Each paper has 4 credits)

As per Choice Based Credit System for the academic year 2018-19.

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4

PaperIV:InternationalRelations
SemesterV:WorldPolitics

No. of Lectures

Module 1: Concepts and approaches **12**

1.1 International Relations, International Politics – Definition, Scope and Relevance

1.2 Approaches: Realism and Liberalism

1.3 Concepts: Power, National Interest and Balance of Power

Module 2: World Order **09**

2.1 Cold War: Bipolarity

2.2 Post-Cold War: Unipolarity, Multipolarity and Non-Polarity

Module 3: Conflict, Peace and Security **12**

3.1 Types of Conflict and changing nature of Conflict

3.2 Approaches to Peace: Arms Control, Disarmament and Collective Security

3.3 Changing Idea of Security: National Security and Human Security

Module 4: International Political Economy **12**

4.1 Bretton Woods Institutions: IMF, World Bank and WTO

4.2 Regional Economic Integration: European Union

4.3 Globalisation

Paper IV: International Relations

Semester VI: India in World Politics

	No. of lectures
Module 1: Foreign Policy and Diplomacy	**12**
1.1 Definition and Objectives	
1.2 Diplomacy: Role, Types and Changing Nature	
1.3 Determinants of Foreign Policy with reference to India	
Module 2: India and the Major Powers	**12**
2.1 U.S.A.	
2.2 Russia	
2.3 China	
Module 3: India and her Neighbours	**12**
3.1 India and SAARC	
3.2 Pakistan and Bangladesh	
Module 4: India and International Organisations	**09**
4.1 India's Role in the United Nations	
4.2 India and ASEAN	

Recommended Readings

1. Bull, Hedley: *The Anarchical society: A study of order in world politics,* ColumbiaUniversity press, New York, 1977.
2. Camilleri, Joseph A. and Falk, Jim: *The end of sovereignty the politics of a shrinking and fragmenting world,* Edward Elgar Publishing Ltd., 1992.
3. Chomsky, N.: *Pirates and Emperors International terrorism in the real world,* revised edition, Black Rose Books, Montreal, 1995.
4. Claude, I.: *Power and International Relations: Power and Justice,* Prentice Hall, Englewood Cliffs, New Jersey, 1986.
5. Geiger, Theadore: *The Future of the International System,* Unwin Hyman, Boston, 1988.
6. Gilpin, Theodore: *The Political Economy of International Relations,* Princeton UniversityPress, Princeton, 1987.
7. Griffiths, Martin: *Realism, Idealism and International Politics,* Routledge, London, 1993.
8. Hughes, Barry: *Continuity and Change in World Politics,* Prentice Hall, EnglewoodCliffs, New Jersey, 1991.
9. Luard, Evan: *Types of International Society,* The Free Press, New York, 1976.
10. Pettman, Ralph: *International Politics,* Longman, 1991.
11. Spero, Joan Edelm: *The Politics of International Economic Relations,* Routledge, London, 4th Edition, 1990.
12. Waltz, Kenneth Neal: *Theory of International Politics,* Addition Wosley, Rending, Massachusetts, 1979.
13. Yarborough, B. V.: *Co-operation and Governance in World Trade,* Princeton University Press, Princeton, 1992.

5

Politics Paper V: Political Thought
Semester V: Western Political Thought

Module 1: Modern State **12**
1.1 Niccolo Machiavelli [1469-1527]
1.2 John Locke [1632-1704]

Module 2: Liberty and Justice **11**
2.1 John Stuart Mill [1806-1878]
2.2 John Rawls [1921-2002]

Module 3: Revolution and Hegemony **11**
3.1 Karl Marx [1818-1883]
3.2 Antonio Gramsci [1891-1937]

Module 4: Feminism and Multiculturalism **11**
4.1 Simone de Beauvoir [1908-1986]
4.2 Will Kymlicka [1962-till date]

Semester VI– Indian Political Thought

Module 1: Ideas on State **12**

1.1MahadevGovindRanade (1842 – 1901)
1.2 Mohandas Karamchand Gandhi (1869 – 1948)

Module 2: Nationalism **11**

2.1 Rabindranath Tagore – (1861 – 1941)
2.2 VinayakDamodarSavarkar (1883 - 1966)

Module 3: Rational and Radical Reform **11**

3.1 Gopal Ganesh Agarkar (1856 – 1895)
3.2 BhimraoRamjiAmbedkar (1891 – 1956)

Module 4 : Socialism **11**

4.1 Jawaharlal Nehru (1889 – 1964)
4.2 RammanoharLohia (1910 – 1967)

Rationale

TYBA Politics Paper V titled Political Thought is a compulsory paper consisting of Part I and II. The paper introduces students of politics to the political philosophy and ideas expounded by thinkers in their historical setting. The revised syllabus is a blend of Western and Indian political thought.

The syllabus for Semester V consists of four modules and focuses on Western Political Thought. New themes incorporated in Module III & IV to introduce the students to the writings on hegemony, feminism and multiculturalism. Module III includes the new theme viz. 'Theory of Hegemony' of Antonio Gramsci whereas Module IV covers feminist thought of Simone-de-Beauvoir and multiculturalism of Will Kymlicka . Antonio Gramsci rejected the crudest form of Marxist materialism. He stated that rule of one class over another was not just due to coercive state apparatus. It depended on hegemony. He stressed that the ruling party of a society uses cultural leadership and domination to establish their legitimacy. Simone-de-Beauvoir was a revolutionary feminist thinker of her times. She rejected the traditional role of a woman. She argued that femininity and domesticity are not natural and act as artificial barriers to prevent full expression of woman's personality. Modern political thinker Will Kymlicka insists that group-specific rights are consistent with liberalism and are particularly appropriate, if not outright demanded, in certain situations. He defines three such group-specific rights: special group representation rights, self-government rights, and polyethnic rights. It is believed that the new themes will help the students explore post Marxist thought and also provide glimpses of contemporary thought.

The syllabus for Semester VI consists of four modules and provides insight into Indian political thought. The Indian Political Thought has been dominated by a galaxy of renowned thinkers. The new themes included in Semester VI are 'Ideas on State' by MahadevGovindRanade [Module I], 'Nationalism' enunciated by Rabindranath Tagore and VinayakDamodarSavarkar [Module II], 'Rational Reform' of Agarkar [Module III], Democratic Socialism of Pandit Nehru and 'Socialism' of RammanoharLohia [Module IV]. MahadevGovindRanade held an organic conception of society and pleaded for social, economic, political and educational reform. He emphasized reorganization of rural credit, indigenous teachers, a school in every village, state support for higher education ,permanent settlement of land, reorganization of rural credit, new constitution for Bombay Legislative Council, raising the age of marriage, abolition of enforced widowhood and women's education. His phenomenal contribution to the PrarthanaSamajmoulded public opinion and awakened the body politic of Maharashtra that had gone in deep slumber. Tagore's doctrine of universal humanity was to spread spiritual values among people and create a new world culture out of multi-culturalism, diversity, and tolerance. He believed that the western concept of nation-state was coterminous with mechanical organisation of people in pursuit of material enhancement and hence aggressive and imperialist in character. The problem of the present age was whether different groups of people would go on fighting with one another or find true basis of reconciliation. Critical of the use of force he wanted man to discover his soul in the spiritual unity of human beings. India needed to discard evils of caste system, blind obedience to authority and tradition. He denounced the commercial civilization and made a fervent plea for freedom of mind. He opposed cultural nationalism and stressed that different cultures should be absorbed in constructive ways. Agarkarcriticised the prevalent method of social reform based on tradition, revivalism and social legislation. He advocated

the cause of reform based on enlightened reason. V.D Savarkar, one of the founders of the Hindu Mahasabha propounded the theory of Hindutva and advocated Hindu political and social unity. The ideology of Hindutva shaped the Hindu Nationalism in the 1920's and the term is widely employed today to describe various expressions of the Hindu nationalist movement. Pandit Nehru laid the foundation of nation-building by evolving a set of principles based on socialism, equality, freedom of the individual, secularism, scientific attitude towards life, industrialisation and piloting the much acclaimed Five Year Plans. RammanoharLohia's thought will acquaint the students with seven types of revolutions and his 'destroy caste' movement. His plea for social equality and preferential opportunity for backward classes, women, dalits, adivasis and backward amongst minorities is reflected in current political process. The new themes in Semester V and VI will provide an exposure to the rich treasure of both Western and Indian Political Thought.

Recommended Reading:

Semester V

1. Anne, Showstack Sassoon: *Gramsci and Contemporary Politics: Beyond Pessimismof the Intellect,* Routledge, London, 2000.
2. Beauvoir, Simone de: *The Second Sex*, Picador, London, 1988.
3. Gokhale, Karuna: *The Second Sex*, by Simone de Beauvoir translated into Marathi, PadmagandhaPrakashan, Pune.
4. Jones, Steves: *Antonio Gramsci*, Routledge, Oxon, 2006, First Indian Reprint 2007.
5. Kymlicka, Will: "Immigration, Multiculturalism, and the Welfare State", http://en.wikipedia.org/wiki/Ethics_%26_International_Affairs_(journal)*s*, Volume 20, Issue No. 3, Fall, 2006.
6. _____: *Multicultural Citizenship: A Liberal Theory of Minority Rights*, Oxford University Press, 1995.
7. Mukherjee, S. and Ramswamy, S.: *History of Socialist Thought*, Sage Publications, New Delhi, 2000.
8. _____: *A History of Political Thought: Plato to Marx*, Prentice Hall of India Pvt. Ltd., New Delhi, 2007. (Machiavelli, Locke, Mill, Marx)
9. Renate, Holub: *Antonio Gramsci: Beyond Marxism and Postmodernism,* Routledge, London, 1992.
10. Sheldon, Garrett Ward: *The History of Political Theory: Ancient Greece to ModernAmerica*, Peter Lang Publishing, New York, 1988. Reprint in 2003. (Machiavelli,Locke, Mill, Marx, Rawls)
11. Steve, Jones: *Antonio Gramsci,* Routledge, London, 2006.

Semester VI

1. Ahuja, M. L.: *Indian Political Thought*, Dominant Publishers and Distributors, New Delhi, 2012. (Tagore, Gandhi, Nehru, Savarkar, Lohia)
2. Arora, V. K.: *RammanoharLohia and Socialism in India*, Deep and Deep Publishers, New Delhi, 1984.
3. Bakane, Chhaya: *PrakashKirane*, (Marathi) ShrividyaPrakashan, Pune, 2007
4. Bhole, B. L.: *'AhdunikBhartatilRajkiyaVichar'*, (Marathi) Continental Prakashan,*Pune*, 1998.
5. Chakrabarty, Bidyut and Pandey, Rajendra Kumar: *Modern Indian Political Thought:Text and Context*, Sage Publication, New Delhi, 2009. (Ranade, Phule, Tilak, Tagore,Gandhi, Nehru, Ambedkar, Lohia, Gandhi, Savarkar, PanditaRamabai)
6. Chaturvedi, Archana: *Indian Political Thought*, Common Wealth Publishers, New Delhi, 2006. (Ranade, Phule, Tilak, Tagore, Gandhi)
7. Nanda, B. R.: *Three Statesmen Gokhale, Gandhi, and Nehru*, Oxford University Press, New Delhi, 2004.
8. Pantham, Thomas and Deutsch Kenneth L.: *Political Thought in Modern India*, Sage Publication, New Delhi, 1986.
9. Ray, B. N. and Mishra, B. K.: *Indian Political Thought: Readings and Reflections*, Kaveri Books, New Delhi, 2012. (Phule, Ranade, Tilak, Tagore, Nehru, Ambedkar, Lohia, Gandhi)
10. Singh, M. P. and Roy Himanshu (Ed.): *Indian Political Thought: Themes andThinkers*, Pearson, Delhi, 2011.
11. Desphande, S. V.: *'BhartiyaRajkiyaVicharvant'*, MangeshPrakashan, Nagpur, 1998.
12. Pandey, B. N.: *Nehru*, Rupa.Co., New Delhi, 2003 .
13. Ganachari, A.: *Agarkar: The Secular Rationalist Reformer*, Popular Prakashan, Mumbai, 2005.

6A

Politics Paper VI A: Political Process in Modern Maharashtra
Semester V: Politics of Modern Maharashtra
Theory – 80 marks + Project – 20 marks = Total 100 marks

No. of Lectures
(Total 45)

Module 1: Historical Background 11
1.1 Evolution of the idea of Maharashtra
1.2 Nationalist Movement and Social Reform Movement
1.3 Sanyukta Maharashtra Movement

Module 2: Sub-regionalism, Regional Disparity and Development 12
2.1 Konkan, Marathwada &Vidarbha
2.2 Dandekar Committee Report
2.3 Statutory Development Boards

Module 3: Political Institutions in Maharashtra 12
3.1 State Legislature: Composition and Functions
3.2 Chief Minister and Council of Ministers: Role
3.3 High Court and Subordinate Courts

Module 4: Caste and Politics in Maharashtra 10
4.1 Dominant Caste Politics
4.2 Dalit Politics
4.3 OBC Politics

One theory question paper of 80 marks at the end of the semester, consisting 4 compulsory questions of 20 marks each with internal options for each question – i.e. Q. 1a or Q. 1b.

Project reports – (20 marks) - will be collected and assessed at college level by respective subject teachers, on or before a fixed date, well before the beginning of semester end theory exam. The date will be decided by the Subject teachers in respective colleges. Topics for projects should be based on the semester syllabus.

List of topics for projects

(This is not a comprehensive list and teachers are free to design projects based on the syllabus)

1. Reviews of books related to politics of Maharashtra.
2. Interviews of politicians and administrators.
3. Reviews of biographies and autobiographies of influential leaders.
4. Review of social welfare schemes
5. Study of sub regions – Konkan, Marathwada, Vidarbha, Western Maharashtra
6. Legislative process

Explanatory notes :Semester V

Module 1: **Historical Background**

Under 1.1 it is expected that the students should know, how the idea of Maharashtra (mainly as cultural aspect) has been evolved, from the regime of Shivaji, the British rule, till the movement for Samyukta Maharashtra.

Module 3: Political Institutions in Maharashtra

In the earlier syllabus (prior to the present) this topic was included. Again it is added to the new revised syllabus. The students should know the institutional as well as the actual functioning of these institutions.

Politics Paper VIA : Political Process in Modern Maharashtra
Semester VI: Determinants of Politics of Maharashtra
Theory – 80 marks + Project – 20 marks = Total 100 marks

No. of Lectures
(Total 45)

Module 1 : Political Economy of Maharashtra **12**

1.1 Business and Politics
1.2 Politics of Cooperatives
1.3 Land issues: Urban and Rural

Module 2 : Political Parties **12**

2.1 Indian National Congress (I), Nationalist Congress Party and BharatiyaJanata Party
2.2 Republican Party of India, Peasants and Workers Party, Shiv Sena and Maharashtra NavNirmanSena
2.2 Coalition Politics

Module 3 : Contemporary issues and movements **10**

3.1 Tribal issues
3.2 Farmers movements and agitations

Module 4 : Civil society initiatives and alternative models of development **11**

4.1 Civil society - Concept and nature
4.2 Movements for the right to information in Maharashtra
4.3 Initiatives for protection of environment

One theory question paper of 80 marks at the end of the semester, consisting 4 compulsory questions of 20 marks each with internal options for each question – i.e. Q. 1a or Q. 1b.

Project reports – (20 marks) - will be collected and assessed at college level by respective subject teachers, on or before a fixed date, well before the beginning of semester end theory exam. The date will be decided by the Subject teachers in respective colleges. Topics for projects should be based on the semester syllabus.

List of topics for projects

(This is not a comprehensive list and teachers are free to design projects based on the syllabus)

1. Studying electoral performances on the basis of statistical data available on the website of Election Commission of India.
2. Campaigning to register voters from your area.
3. Projects related to the activities of non-governmental organisations.
4. Projects about the right to information – which may include conducting workshops for people to make them aware about their rights.

5. Collecting information about small business units and business organisations, trade unions, cooperative institutions etc.
6. Collecting information about tribal lifestyle.

Explanatory Notes :Semester VI

Module 1: Political Economy of Maharashtra

1.3: Land Issues at Rural and Urban areas

Land is the most sensational issue, both at urban and rural level in Maharashtra. The issue mainly has concerns with

(1) Growing urbanization and problems of urban housing

(2)Drought prone Land of Marathwada and Vidarbha

(3)Conservation of Agricultural land for SEZ or some other purposes.

Module 4: Civil Society Initiatives and Alternative Models of Development

4.3 Initiative for Protection of Environment

Specific mention of any movement is not mentioned in the syllabus. It is expected that minimum two urban and two from rural should be taught to the students for eg:– Vanrai, Ralegaon Siddhi, HivareBajar, MadhavGadgil Committee' report on The Western Ghats Ecology Expert Panel (WGEEP) headed by MadhavGadgil.

Recommended Reading

1. Lele, Jayant: *One Party Dominance in Maharashtra Resilience and Change;* Popular Prakashan, Mumbai, 1982

2. Phadke, Y D: *Politics and Language;* Himalaya Publishing House, Mumbai, 1975

3. _____: *Social Reformers of Maharashtra;* Maharashtra Information Center, New Delhi, 1975

4. Phatak, Anagha: *Political Process of Maharashtra;*PrachiPrakashan

5. Sirsikar, V.M.: *Politics of Modern Maharashtra;* Orient Longman, 1994

6. Teltumbde, Anand: *Ambedkar in and for the post – Ambedkar Dalit Movement;* SugawaPrakashan, Pune, 1997

7. Thakkar, Usha and Kulkarni, Mangesh: *Politics in Maharashtra;* Himalaya Publishing House, Bombay, 1995.

8.Tikekar, S. R.: *Maharashtra The Land, Its People and their Culture;* Ministry of Information and Broadcasting, New Delhi ,1966

Books in Marathi

1. Kulkarni, Bhimrao: *AsmitMaharashtrachi*, Maratha MandirPrakashan, 1971

2.Mungekar, S. G. (Sampadak): *ParivartanacheParivaha- Maharashtra, 1932-1981,* Continental Prakashan, Pune, 1982

3.Nimbale, Arunkumar: *DalitPanther,*SugawaPrakashan, Pune, 1989

4.Pandit, Nalini: *JativadaniVargavad,*SadhanaPrakashan, Pune, 1971

5. _____: *MaharashtratilRashtriyatvacha Vikas,* Modern Book DepotPrakashan, Pune, 1972

6.Pannalal, Surana and Bedkihal, Kishore (Sampadak): *Aajacha Maharashtra,*SrividyaPrakashan, Pune, 1988

7.Panse, Ramesh (Sampadak): *MahashtratilSamajParivartanachyaDisha*, Majestic Prakashan, Mumbai, 1989

8.Phadke, Y. D.: *VisavyaShatakatil Maharashtra: Khanda 1 to 6*, SrividyaPrakashan, Pune, 1990

9.Vora, Rajendra and Palshikar, Suhas: *MaharashtratilSattantar,*Granthali, Mumbai, 1996

Magazines and Journals (Also for Local Self Government – Paper VII)

Agrotech

Andolan

Bayaja

ChanakyaMandalParivar

Lokarajya

ParivartanachaVatsaru

Sadhana

SpardhaPariksha

StriUvacha

Yashoda

Yojana

6 B

PAPER VI(B): PUBLIC POLICY
Semester V: Public Policy: Theoretical Framework

Module I: **Understanding Public Policy** **12**

1.1 Concept and Theories
1.2 Relevance of policy making in Public Administration
1.3 Policy formulation and implementation

Module II : Models of Policy Making **11**

2.1 Institutional Model, Rational Legal Model
2.2 Elite-Mass Model, Group Model
2.3 Systems Model, Streams and Windows Model

Module III : Three Tier Policy Making **11**

3.1 Union level
3.2 State level
3.3 Local level

Module IV : Policy Making in India : An Analysis **11**

4.1 Challenges to Public Policy Making
4.2 Reforming the Policy Making Process
4.3 Improving Competence of Policy Making Manpower

Project Topics

1. Jan DhanYojana
2. Direct Benefit Transfer
3. Indradhanush
4. New Tax Regime: GST
5. Demonetisation
6. Benami Property Act
7. Swachh Bharat
8. KaushalVikas
9. Mudra Yojana
10. Digital India

Recommended Reading

1. Anderson, James E., Public Policy-Making, Seventh Edition, Houghton Mifflin, Boston, 2010.
2. Bardach, Eugene, A Practical Guide for Policy Analysis: The Eightfold Pathto More Effective Problem Solving, Fourth Edition, CQ Press, New York, 2011.
3. Birkland, Thomas, An Introduction to the Policy Process: Theories, Concepts and Models of Public Policy Making, Third Edition, M.E.Sharpe, New York, 2010.Bevir, Mark,The Sage Handbook of Governance, Sage, New Delhi, 2013.
4. Chakrabarty, Bidyut, Public Administration in a Globalizing World: Theories and Practices, Sage India, New Delhi , 2012.
5. Dunn, William N., Public Policy Analysis An Introduction, Fifth Edition, Pearson, Delhi, 2011
6. Laxmikant, M., Governance in India, TMH, New Delhi, 2017

7. Lodge, Martin, Wegrich, Kai, Managing Regulation: Regulatory Analysis, Politics and Policy, Palgrave Macmillan, Houndmills, 2012.
8. Schedler, Kuno, Proeller, Isabella, Outcome-oriented Public Management: A Responsibility-based Approach to the New Public Management, Information Age Publishers, Charlotte, 2012.

Semester VI : Public Policy in India

Module I : Types of Public Policy in India **12**

1.1 Substantive, Regulatory
1.2 Distributive, Redistributive
1.3 Capitalisation Public Policy, Constituent Public Policy

Module II : Major Policies and Schemes in India **11**

2.1 Employment: Mahatma Gandhi National Rural Employment Guarantee Act(MGNREGA), PradhanMantri Mudra Yojana(PMMY)
2.2 Health: National Rural Health Mission
2.3 Education: SarvaShikshaAbhiyan, Mid-Day Meal

Module III : Major Policies and Schemes in India – 2 **11**

3.1 Environment: Water, Minerals, Biodiversity
3.2 Digital Governance: Service delivery, Citizens' Participation
3.3 Energy: Coal, Solar

Module IV : Major Policies in Maharashtra **11**

4.1 Urban Governance: Land, Housing
4.2 Urban Waste Management
4.3 Rural Water Conservation and Distribution

Project Topics

1. Make in India
2. National Urban Health Mission - NUHM
3. Skill India
4. Smart City
5. Soil Health Card
6. Crop Insurance
7. BetiBachaoBetiPadhao
8. UjjwalaYojana
9. PM AwasYojana
10. PM Gram SadakYojana

Recommended Reading

1. Agravala, Pramoda Kumara, Land Reforms in States and Union Territories in India, Concept, New Delhi, 2010.
2. Basu, Kaushik, and Maertens, Annemie, The New Oxford Companion to Economics in India, Oxford University Press, Oxford, 2012.

3. Bhagwati, Jagdish and Panagriya, Arvind (Eds.), Reforms and Economic Transformation in India, Oxford University Press, Oxford,2013.
4. Government of India, Second Administrative Reforms Commission, Promoting e-Governance The SMART Way Forward, 2008, available athttp://arc.gov.in/11threp/ARC_11th_report.htm
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6. Ramesh, Jairam, Green Signals: Ecology, Growth, and Democracy in India, Oxford University Press, NewDelhi, 2015.
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7A

Politics Paper VII (A): Political Sociology
Semester V: Concepts in Political Sociology

	No. of Lectures
Module 1: Understanding Political Sociology	**10**
1..1 Weberian Approach	
1..2 Marxian Approach	
1..3 Behavioral Approach	
Module 2: Basic Concepts	**10**
2.1 Power	
2.2 Legitimacy	
2.3 Hegemony	
Module 3: Stratification	**12**
3.1 Elite; Class	
3.2 Caste	
3.3 Gender	
Module 4: Social and Political Dynamics	**13**
4.1 Political Culture: Types and influencing factors	
4.2 Political Socialization- Agents	
4.3 Political Participation- Means and Levels	

Politics Paper VII (A): Political Sociology
Semester VI: Political Dynamism and Society

	No of Lectures
Module 1: Public Opinion	**12**
1.1 Concept	
1.2 Opinion Makers: a) Non-Political leaders b) Media	
1.3 Impact on Political Behavior	
Module 2: Institutional Impact	**10**
2.1 Political Parties	
2.2 Pressure groups	
Module 3: Social and Political Processes	**10**
3.1 Modernisation	
3.2 Development	
Module 4: Protest movements and change	**13**
4.1 Mainstream Liberal movements: Consumer and Anti-graft movements	
4.2 Social Movements: Old and New	

Rationale

In the revision of TYBA papers in Political Science, to be implemented from the Academic year 2013-14, Political Sociology (Paper VII of the earlier syllabus) is kept as it is. The Paper was introduced to make the students aware of society and political system. Political System is nothing else but a sub-system of the social system. By understanding the interactions between society and state, scientific political analysis is possible. State and Society are interrelated and interdependent. In fact, society is mirror of the Politics of the country. Both depend upon each other in every respect.

The paper covers theoretical concepts as well as the impact of society on Political system and vice versa. It would be useful for the students to have rational observation and logical approach towards society as well as the Political System. The syllabus is structured with a basic objective to make the students aware of the process of replacement of traditional values by modern values and the emerging conflicts between traditional institutions and their values with modern institutions and their values in the society.

Explanatory notes

Semester V
(Mainly focuses on basic concepts and approaches, social stratification)

Module 1: Understanding Political Sociology

Weberian, Marxian and Behavioral approaches may help the students understand the structural (Bureaucratic), economic and behavioral elements of the society over a Political System

Module 2 and 3: Basic Concepts and Stratification

These two modules are designed to acquaint students with different aspects and components of Society – traditional as well as modern. The social aspects of Power, Authority, Legitimacy and Hegemony, social strata like caste, Elite, class, and gender have a direct influence and impact, which determine political behavior and political culture of a society.

Module 4: Social and Political Dynamics

A study of various agents of Political Socialization help one to determine participation in the Political processes at different levels.

Semester VI

Module 1: Public Opinion

In a Democratic system, it is highly essential to know various political institutions and processes that create a long reaching impact on a society. In a dynamic social system of today, media plays a major role in forming public opinion of the people of a given society.

Module 2: Institutional Impact

In the last few decades, democracy is gaining strength across the world. Besides Elected Institutions of a state, Political Parties and Pressure Groups play a vital role in determining social and political currents of a state. Political Parties and Pressure groups effectively influence society as well as state.

Module 3: Social and Political Processes

The Modernization and development get inculcated in developing evolutionary transition from traditional to modern society. As modernization takes place within a society, change and development takes place in family and community also. Instead of being dominated by tradition, societies undergo the process of modernization and may lead to conflicts.

Module 4: Protest Movements and Change

This module deals with people's acceptance or non-acceptance of the modernization, modern trends, practices and values, that are manifested through various social movements. Old and New social movements aim at bringing change or aim at protesting against a new development.

Recommended Reading

1 Alavi, H. and Shanin. T.: *Sociology of Developing Societies*, Macmillan, London, 1982.

2 Almond, G. et.al: *Comparative Politics Today: A World View*, 7thedn., Harper/Collins, New York, 2000.

3 Ashraf, Ali and Sharma, L. N.: *Political Sociology: A new grammar of Politics*, Universities Press, Madras, 2004.

4 Biswas, Dipti Kumar: *Political Sociology- An Introduction*, Firma KLM Kolkata, 1978.

5 Chackravarti, Satyabrata, *Political Sociology*, Macmillan, New Delhi, 2011.

6 Gupta, Dipankar: *Political Sociology in India*: *Contemporary Trends*, Orient Longman, New Delhi, 1996.

7 Jangam, R. T.: *Textbook of Political Sociology*, Oxford and IBH Publication Co., New Delhi, 1988.

8 Johari, J. C., *Comparative Political Theory: New Dimensions, Basic Concepts and MajorTrends,* Sterling, New Delhi, 1987.

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13 Nash, Kate: *Readings in Contemporary Political Sociology*; Blackwell Publishers, Massachusetts, 2000.

14 Nash, Kate, Scott Alan, *Blackwell Companion to Political Sociology*, Blackwell Publishing House, New Delhi.

15 Oommen, T. K.: Nation, Civil Society and Social Movements: Essays in Political Sociology, Sage Publications, New Delhi, 2004.

16 Prakash, Louis: *Political Sociology of Dalit Assertion*, Gyan Publishing House, New Delhi, 2003.

17 Rotberg, R. I. (Ed).: 'Politics and Political Change', *A Journal of Inter - DisciplinaryHistory*, MIT Press, Massachusetts, 2001.

18 Thomas, Janosiki: *Handbook of Political Sociology: State, Civil societies andGlobalization*, Cambridge University Press.

7B

PaperVII B:UnderstandingPoliticsthroughFilms
SemesterV:PoliticsandFilms

No. of Lectures

Module1: Understanding films as an expression of popular culture. 11

1.1 Films as a medium of creating political awareness.

1.2 Filmsasatooltostudypoliticaltheory(withspecialreferencetotheconceptof power and authority.)

1.3 Filmsasatooltostudyinternationalpolitics.(withspecialreferencetotheconceptof war and futility of war)

Suggested Films—God Father (E), Sarkar (H), Rajneeti (H), Gulal (H), Simhasan (M), Haqeekat(H),BridgeontheRiverKwai(E),Noman'sLand(E),Border(H),TheDay After (E), Saving Private Ryan, Letters from Ivogima. (Minimum two films must be screened.)

Module 2: Indian Films, Documentaries and Laws regulating Films 8

2.1 Significant landmarks in Indian films

2.2 Changing nature of the documentaries in India.

Module 3: Evolution of Regional Films in India 13

3.1 Marathi

3.2 Bengali

3.3 Malayalam

Module 4: Partition and its Impact 13

4.1 Impact of Partition

4.2 Impact on women

4.3 Partition and Displacement.

SuggestedFilms: GaramHawa(H),Tamas(H),Pinjar(H),KhamoshPani(H),Earth1947 (H)

7B

PoliticsPaperVIIB:UnderstandingPoliticsThroughFilms

SemesterVILearningIndianPoliticsthroughFilms

No. of Lectures

Module 1: The Process of Nation–Building. **13**

1.1 End of Feudalism.

1.2 Democratization of Indian society and the idea of Nehruvian socialism.

SuggestedFilms: MotherIndia(H),SahebBibiaurGulam(H),Sardar(H),Ambedkar(H), NayaDaur (H), Shree 420 (H), DoBighaJameen (H).

Module 2: Politics of Development. **12**

2.1 Process of Development

2.2 Debates about Development.

SuggestedFilms: PatherPanchali(H),RotiKapadaAurMakan(H),DoBighaJameen(H), Namak Haram (H), NayaDaur (H), Satyakam(H), JagteRaho (H)

Module 3: People's Movements **10**

3.1 Environmental movements—Chipko and Narmada BachaoAndolan

3.2 Right to Information Movement.

Documentaries: EkCupChai,RighttoInformation(KamluDidi)(H),NarmadaBachaoAndola n (You Tube), A Narmada Dairy (Anand Patwardhan)

Module 4: Internal Security Challenges **10**

4.1 Terrorism

4.2 Naxalism

SuggestedFilms---Machis(H),Roja(H),AWednesday (H),Sarfarosh(H),DilSe(H), Fanna (H), Mr and Mrs Iyer (H), Tango Charlie (H), Chakravyuha (H), Mission Kashmir (H).

ThispapercannotbeofferedtoIDEstudents,asitisapracticalbased paper

8

Paper VIII (A): International and Regional Organizations
Semester V: International Organizations

No. of lectures

Module 1: Concept of International Organization 12

1.1 Meaning, Nature and Scope

1.2 Evolution and Significance

1.3 Structure of the United Nations

Module 2: Untied Nations and Security Concerns 10

2.1 Pacific Settlement of International Disputes and Peace Keeping Operations

2.2 Regulation and control of Nuclear Technology: Role of International Atomic Energy Agency (IAEA)

Module 3: United Nations and Contemporary Socio-economic Issues 14

(Poverty, Health, Food Security, Development and Environment)

3.1 Millennium Development Goals

3.2 World Health Organization (WHO), Food and Agriculture Organization (FAO)

3.3 United Nations Development Programme(UNDP) and United Nations Environment Programme (UNEP)

Module 4: International Economic/Financial Organizations 9

4.1 Organisation for Economic Cooperation and Development (OECD)

4.2 Organisation of Petroleum Exporting Countries (OPEC)

Politics Paper VIII (A): International and Regional Organizations
Semester VI: Regional Organisations and Transcontinental Groups

No. of Lectures

Module 1: Regionalism and Globalization **13**

1.1The League of Arab States/ Arab League (AL)

1.2 Mercosur -Mercado Comúndel Sur (Southern Common Market)

1.3 African Union (AU)

Module 2: Security Concerns and Regional Organizations **10**

2.1 North Atlantic Treaty Organization (NATO)

2.2 Shanghai Cooperation Organisation (SCO)

Module 3: India and Regional Organizations **10**

3.1 Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Co-operation (BIMSTEC)

3.2 Indian Ocean Rim-Association for Regional Cooperation (IOR-ARC)

Module 4: Transcontinental Forums/ Groups **12**

4.1 Group of 77 (G-77)

4.2 Group of Eight (G- 8)

4.3 BRICS (**B**razil, **R**ussia, **I**ndia, **C**hina, **S**outh Africa)

Rationale

In the revision of TYBA Politics Papers to be implemented from 2013-2014 the paper on*International Politics* which was one of the options in paper VIII in the previous syllabus hasbeen shifted to paper VI as *International Relations*. Therefore a new paper- *International andRegional Organizations* is introduced as one of the options in Paper VIII. The other optionunder Paper VIII is *American Political System* which was an option in paper VII previously.

The paper *International and Regional Organizations* is introduced with a view to familiarising students with the recent activities of the UN and other organizations, particularly Inter Governmental Organizations (IGOs) that have acquired immense prominence in world politics vis-à-vis the forces of globalization in the past decade.

The United Nations appears to have reclaimed the ground which it had lost in the 1990s in the immediate aftermath of the cessation of the Cold War, disintegration of the Soviet Union and the emergence of unipolarity in world politics. Now its role in some of the recent conflicts, say, in the Arab World or partition of Sudan, among others, and its contribution to economic and social development with a view to strengthening human security through its various programmes has been widely acknowledged. Paper for Semester V will deal with the activities of the UN and international economic and financial organizations.

Regional and Transcontinental organizations and forums have grown not only in numbers but they have been also performing a wide range of functions from providing security to member states to increasing trade and commerce and cooperation among them. Paper for Semester VI will focus on some of the regional and also the transcontinental organizations spread across the world.

This Paper is also designed to help students preparing for civil services and other competitive examinations as these examinations include topics on international and regional organizations.

Explanatory notes

General

This paper, *International and Regional Organizations* will be taught at the information level. It aims at increasing students' familiarity with the functioning of the UN and regional organizations. Therefore questions set for examination will not expect critical and in-depth answers about the functioning of these organizations. The focus is more on the evolution, the expanding membership and the successes as well as the limitations of these organizations.

Study of this paper calls for familiarity with the world map for understanding locations of countries that are members of various organizations. Use of world atlas by students and world map by teachers in the classroom is therefore, desirable, especially in Semester VI.

Organizations covered in Paper VI- *International Relations*- ASEAN, EU, IMF, SAARC, WB, WTO - are not included in this paper to avoid repetition.

Semester V

Module 1

To be taught with reference to the issue of the place of state sovereignty in international politics and to the role of international organizations as transnational actors. A brief reference to the League of Nations would be adequate. No question need be asked on the League. Structure of the UN is to be taught briefly.

Module 2

To be taught with reference to the concept of National Security. Reference to Chapter VI and VII of the UN Charter is essential. Focus is expected to be on recent peacekeeping activities.

Module 3

To be taught in the context of Non-traditional Security. This module could be assigned for 10- mark assignment in Semester V

Semester VI

At the outset a brief introduction on the relationship between regionalism and Globalisation could be provided to stress the importance of regional organisations. The origin of various organizations is to be explained with a brief reference to the global/ regional situation prevalent at the time of their establishment. Attention could be drawn to the overlapping membership of the various regional organizations. Students may submit assignments on any organization of their choice from any module.

Recommended Reading

{Authentic and up-to-date information about these organizations is available on their respective websites. A number of articles describing/ evaluating the functioning and the role of these organizations are available on the Internet. Colleges may also subscribe to UNews, a monthly newsletter of the UN Information Centre, 55 Lodi Estate, New Delhi-110003 by writing to the Centre. Price of the Newsletter is Re. 1/- (Rupee one) only.}

1. Baylis, John and Steve, Smith (Ed): *The Globalization of World Politics*, OUP, New Delhi, 3rd ed. 2005.
2. *Basic Facts about the United Nations*, The News and Media Division, UNDepartment of Public Information, New York, 2011.
3. Chaterjee, Anik (Ed): *World Politics*, Pearson, New Delhi, 2012.
4. Diehl, Paul F.: *The Politics of Global Governance: International Organizations in an Interdependent World*, Lynne Rienner Publishers; 4th edition, paperback, Boulder,2010.
5. Fawcett, Louise and Hurrell, Andrew (Ed), *Regionalism in World Politics: RegionalOrganization and International Order*, OUP, Oxford, reprint 2000 (1st ed. 1995).
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9. Karns, Margaret P. and Mingst, Karen A.: *International Organizations: The Politicsand Process of Global Governance*, 2nd edition, 2009
10. Meisler, Stanley: *United Nations: The First Fifty Years*, Atlantic Monthly Press, New York, 1995.

11. Mingst, Karen A. and Karns, Margaret P: *United Nations in the Post- Cold War Era*, Westview Press, Boulder, 2nd edition, 2000.
12. Rajan, M.S: United Nations at Fifty and Beyond, Lancers, New Delhi, 1996.
13. Rajaram, Kalpana (Ed): *International Organisations, Conferences and Treaties*, Spectrum Books Pvt. Ltd., New Delhi, 13th ed. 2012.
14. Sauderbaum, Fredrik and Shaw, Timothy M. (Ed): *Theories of New Regionalism: APalgrave Reader*, Palgrave Macmillan, Houndsmills, 2003.
15. *The United Nations Today*, United Nations Department of Public Information, NewYork, 2008.
16. Traub, James, Arbour, Louise and Arieff, Irwin: *A Global Agenda: Issues before theUN 2011-2012*, United Nations Association of the USA, 2011.
17. Weiss, Thomas and Daws, Sam (Ed): *The Oxford handbook on the United Nations*, OUP New York, paperback 2008.
18. Weiss, Thomas, Forsyth, David P. and Coate, Roger A: *The United Nations andChanging World Politics*, Westview Press, Boulder, 4thEd 2004.

Paper VIII (B): American Political System
Semester V: American Constitution and Institutions

No. of Lectures

Module 1: The American Constitution **12**

1.1 Making of the Constitution
1.2 Philosophy of the Constitution
1.3 Features of the Constitution

Module 2: Federalism **11**

2.1 Evolution and Changing Trends

2.2 Rights and Powers of State Government

2.3 Rights and Powers of Local Government

Module 3: The President and the Vice –President12

3.1 Office of the President

3.2 Powers of the President and the Vice President

Module 4 : The Congress10

4.1 Structure

4.2 Functions

Politics Paper VIII (B): American Political System
Semester VI: Political Process in the United States

No. of Lectures

Module I: The Supreme Court **12**

1.1Structure

1.2Landmark Decisions (Marbury v. Madison, Gibbons v. Ogden, Brown v. Board of Education, New York Times Co. V. Sullivan)

Module 2: Political Parties and Interest Groups **12**

2.1 Evolution and the role of Political Parties

2.2 Types of Interest Groups

2.3 Strategies of Interest Groups

Module 3: Elections and the Media **11**

3.1 Presidential Election Process

3.2 Influence of the Media on Elections (including the Internet)

Module 4: Civil Rights Movement **10**

4.1 African-American

4.2 Women

Recommended Reading

1. DiClerico, Robert and Hammock, Allan (ed.), *Points of View: Readings in AmericanGovernment and Politics*, McGraw-Hill, Boston, 2009.
2. Elowitz, Larry and Wilson, Mathew J (ed.): *Introduction to American Government*, Collins, New York, 2006.
3. Kernell, Samuel and Smith, Steven S (ed.): *Principles and Practice of AmericanPolitics: Classic and Contemporary Readings*, CQ. Press, Washington D.C, 2007.
4. Landy, Marc and Milkis, Sidney M: *American Government: Balancing Democracyand Rights*, Cambridge University Press, New York, 2008.
5. O' Connor, Karen and Sabato, Larry J: *American Government: Continuity andChange*, Pearson Longman, New York, 2008.

6. *Outline of US Government*, Office of International Information Programs, USDepartment of State, 2000.
7. Saye, Albert B and Allums, John F: *Principles of American Government*, Prentice-Hall, New York, 1990.
8. Wilson, James Q: *American Government: Institutions and Policies*, Wadsworth, Boston, 2009.

9A

Paper IX(A):Local Government with Special Reference to Maharashtra
Semester V: Rural Local Government

No of lectures

Module 1: Democratic Decentralization **12**

1.1 Meaning and nature

1.2 Importance of Rural Local Government

1.3 73rd and 74th Amendments and its interpretations

Module 2: Introduction to Panchayati Raj Institutions: Three tier system **10**

2.1 Gram Sabha and Gram Panchayat

2.2 Panchayat Samiti

2.3 ZillaParishad

Module 3: Rural Development Schemes **13**

3.1 Education

3.2 Environment- Cleanliness Drive

3.3 Water Conservation

Module 4: Contemporary Issues **10**

4.1 Empowerment of women through political reservation

4.2 Issue of autonomy in Panchayati Raj institutions

Semester VI: Urban Local Government

No. of Lectures

Module 1: Democratic Decentralization 10

1.1 Meaning and Nature

1.2 Importance of Urban Local Government

1.3 74th Amendment and its Implementation

Module 2: Introduction to Urban Local Self Government 11

2.1 Municipal Council

2.2 Municipal Corporation

2.3 Cantonment Board

Module 3: Urban Development Schemes 12

3.1 Housing

3.2 Slum development and rehabilitation

3.3 Water and Sanitation

Module 4: Contemporary Issues 12

4.1 Migration and Urban Governance

4.2 Transportation

Rationale

The second optional paper for Paper VII, is Local Self Government with special reference to Maharashtra. This paper was optional paper in the earlier syllabus too. The new syllabus consists of some additions to the earlier syllabus.

This paper is mainly useful for students, wishing to appear in MPSC examinations, and also for other competitive examinations. The wide gap between rural and urban sectors, the growing urbanization have brought a number of problems and issues. Even in the present scenario of globalization, local self-institutions have their own significance.

Explanatory notes

Local self government is the management of local affairs, by the elected local people, to resolve local problems. In recent years, Local Self Government has played a vital role as an instrument of democratic self government. The Rural and Urban Local Self Governments have their own structures, functions, powers and issues. A reference of 73rd and 74th

Constitution Amendment Acts have led to decentralization of powers and a significant change is brought in the Local Self Governments. Rural Governance is based upon Panchayati Raj System – a three tier system with the ZillaParishad, Blocks and Village Council. Various Development Schemes and issues are embodied in the syllabus to know more about local governing as well as the new emerging problems. Urban Local Self Governments are broadly classified as Municipal Corporation and Municipal Population and also cantonment areas. The urban areas have distinct problems like infrastructure, housing, health , which are included in the syllabus.

Recommended Reading

1. Arora, Ramesh: *HoojaMeenakshi, Panchayati Raj, Paticipation andDecentralization;* Volume – 3 series, Rawat Publications, Mumbai, 2009.
2. Carras, Mary: *The Dynamics of Indian Political Fashions;* Cambridge University Press, London, 1972.
3. Carter, Anthony*: Elite Politics in Rural India – Political Stratification and PoliticalAlliances in Western Maharashtra;* Cambridge University Press, London, 1974.
4. Das, P. K.: *Slums : The Continuing struggle for Housing;*Nivara Hakka SurakshaSamiti Publication, 2002
5. Gupta, M. P.: *Prabhat Kumar and BhattacharachyaJaijit, Government Online – opportunities and Challenges - Tata McGraw;*, Hill Publishing Company Ltd, NewDelhi, 2004.
6. Kamta, Prasad: *Planning of the Grass Roots;* Sterling Publishers Pvt Ltd., 1998.
7. Khandekar, V. S. and Bhagwat A .K. (Ed): *Maharashtra– A Profile;* Felicitation Volume, Kolhapur 1977.
8. Lele, Jayant: *Elite Pluralism and Class Rule Political Development in Maharashtra;*

Popular Prakashan, Mumbai, 1982.

9. *Local Governance in India – Decentralization and Beyond;* Oxford University Press,New Delhi, 2006.
10. Minimol, M. C.: *E Governance and Rural Self Government;*Sonali Publications, New Delhi, 2007.
11. Mishra, Archana: *Water Harvesting – Ecological and Economic Appraisal;*

Authorpress Global Network, New Delhi, 2006.

12. Naigail, Calder, *The Restless Earth; Penguin,* 1983.
13. Palanithurai, G: *New Panchayati Raj System – Status and Prospects;* Kanishka Publishers, New Delhi, 1996.

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15. Sareen, Shalini: *Urban Pollution and its Management;* IVY Publishing House, New Delhi, 2005.
16. Sharma, Shakuntala: *Grassroot Politics and Panchayat Raj;* Deep and Deep Publications, New Delhi, 1994.
17. Singh, U. B.: *Women in Panchayats (A Study of Role Conflict);* Serials Publications, New Delhi, 2011.
18. Tiwary, R. K.: *Training for Elected Panchayati Raj Representatives;* Shipra Publications, Delhi, 2008.

Reference Books in Marathi

1. Bang, K .R.*:BhartatilSthanikSwashasan (special ref. Maharashtra),*MangeshPrakashan, 2005.
2. Bhogle, Shantaram: *Bhartatilsthanikshasan,*Vidyaprakashan, Nagpur, 1997.
3. Daundkar, Shyam: *ApalaGaonApalaShasan – Panchayat Raj – KarbharAniYojana*, AnubandhPrakashan, Pune, 1997.
4. Devgoankar, S. G.: *Panchayatrajaanisamuhikvikas,*Sainathprakashan, Nagpur, 2009
5. Kotapalle, Laxman: *BhartattilSamajikKalyanPrakashan,*Vidya Publications, Aurangabad, 2009.
6. Nandedkar, V. G: *Panchayati Raj,*Ksagar, Pune, 2008.
7. Patil, B. B: *SthanikSwarajyaSanstha,*Prashant Publications, Jalgaon.
8. _____*: MaharashtratilPanchayat Raj AaniNargiSthanikSwarajyaSanshta*, KSagar, Pune, 2008.
9. Suresh, kaka: *Panchaytirajya,*PrachiPrakashan, Mumbai, 1990.

Semester V: Rural Local Government
Suggested List of Topics for Projects (20 Marks)

1) Attending Gramsabhas in different villages.
2) Visit to Panchayat Samiti Office.
3) Visit to ZillaParishad Office.
4) Implementation of 73rd Constitutional Amendment.
5) SarvShikshaAbhiyan.
6) Clean India Mission
7) Visit to Water Conservation Projects.

8) Issues related to Women's participation in Panchayat Raj
9) Study of various Committees of ZillaParishad.
10) Any other scheme related to the development of village
11) Issues related to Women Sarpanch.
12) Reviews of books related to the topics.
13) Reviews of Films or plays related to topics

Semester VI –Urban Local Government
Suggested Listof Topics for Projects (20 Marks)

1) Implementation of 74th Constitutional Amendment.
2) Visit to Municipal Council.
3) Visit to Municipal Corporation.
4) Comparative study of implementation of scheme / schemes in municipal councils or Municipal Corporations.
5) MHADA, CIDCO, MIDC
6) Water Conservation Schemes.
7) Rain Water Harvesting.
8) Flood Management.
9) Disaster Management Cell
10) Issues related to Slums.
11) Issues related to Sanitation.
12) Issues related to Transportation.
13) Issues in Urban Governance.
14) Any Welfare or Developmental Scheme for Urban Areas.
15) Issues related to SRA
16) Reviews of books related to the topics.
17) Reviews of Films or plays related to topics

9 B

Paper IX (B): Electoral Politics in India
Semester V: Electoral Process In India

No. of Lecture

Module 1: Election Commission **12**

1.1 Role

1.2 Ensuring free and fair elections

1.3 Maintenance of Law, Order and Security

Module 2: Electoral Process **12**

2.1 Representation of the People Act

2.2 Electoral Reforms: 61st Constitution Amendment

2.3 Proposals for Reforms

Module 3: History of General Elections **11**

3.1 General Elections: 1952

3.2 General Elections: 1977

3.3 General Elections: 1989 to the present

Module 4: Group and Electoral Participation **10**

4.1 Women, Dalits and Tribals

4.2 Minorities

Paper IX (B): Electoral Politics In India
Semester VI: Media and Electoral Processes

No of Lectures

Module 1: Election and Impact of Mass Media **15**

1.1 Print Media: Newspapers and Magazines

1.2 Audio – Visual: Radio & TV

1.3 Digital Media and Social Networking Sites, Viral Communication

Module 2: Election Campaigning / Political Marketing **12**

2.1 Propaganda and Election Manifesto

2.2 Public Relation Campaigns

2.3Advertising Campaign (after 1984)

Module 3: Psephology **10**

3.1Opinion Polls

3.2Exit Polls

3.3Electoral Surveys and Analysis

Module 4: Critique of Media in Elections **08**

4.1Objective Coverage and Paid News

4.2Accountability of Media

Rationale

Elections in India are considered to be the very backbone of Indian Democracy. Being a Parliamentary Republic, citizens of India are trusted with the responsibility to choose the head of the country as well as of the state. There are both General and State elections that are held in the country based on the Federal structure of the Indian Republic. The elections in India often transcend from being a mere political activity to a high publicized and often sensationalized national event, with clear cultural ramifications. The entire nation seems to suddenly come to life at the onset of the elections, particularly the General Elections. Even the Assembly elections, which determine the state government, are events of great significance. All state elections are closely observed throughout the nation. Often the results of the state elections are considered to be clear indications of the mood of the nation.

Elections are political events involving the behavior of politicians, ordinary people,media and pressure groups. Every election is a turning point in the history and it deserves full study to observe politicians, their party structure, their strategies, the influence of media and

involvement of voters. Elections are exciting, important and interesting. The biggest election in the world is India's Lok Sabha.

The election commission is the apex body that conducts the elections in India. Both the general and assembly elections in India are held in accordance with the clear rules laid down by the Election Commission of India. The Election Commission or the EC comprises high ranking Government officials and is formed under the guidelines of the Indian Constitution. The EC is a highly powerful body and is granted with a great degree of autonomous powers to successfully conduct the elections. Even the judiciary resists from intervening while the electoral process is on. The work of the Election Commission typically starts with the announcement of various important dates and deadlines related to the election, including the dates for voter registration, for filing of nominations, counting and results. Its activities continue throughout the time period, when the elections are conducted in the country.

The Political parties are commonly brought together by the EC to lay down the lines for the common conduct that is expected to be followed by all the relevant and participating parties. The code of conduct was brought about primarily to cut down on exorbitant amount spent on the elections in the previous versions of the Indian elections.

Presently, the Electronic Voting Machines or EVMs have replaced the traditional ballot boxes in most areas. This was done to counter the great degree of booth capturing and rigging that became a common feature of elections in certain parts of the country.

It is hoped that introduction of such a subject will not be of mere academic nature but it may generate employability for the students of the subject. This discipline of knowledge will be useful for the students. This specialization will help to have better jobs and career opportunities in media houses, market research companies, political parties and so on. Psephology as a subject and a career may help the students. That is how a knowledge society in 21st century should work.

Explanatory notes

Semester V

Module 1: Election Commission

Besides the composition and functions, the role of Election Commission is necessary to understand how free and fair elections are ensured by the Constitution and how it has been implemented in the actual practice by Election Commission. How Law, Order and Security is assured by the Election Commission through various arrangements.

Module 2: Electoral Process

Right to vote is the base of democratic system. This module covers details of all these. Electoral process takes a month by publishing electoral rolls. Generally, elections are conducted phase wise, from the date of announcement till the results are not out.

Module 3: History of General Elections

The mile stones in the history of General Elections, should be studied with its distinguishing features. 1951 - 1952, the First General Election was a new experiment. The 1977 Election was the defeat of the party led by Indira Gandhi, by a new coalition of all the major other parties, which protested against the imposition of controversial emergency from 1975-77. A similar coalition led by V.P.Singh, was swept to power in 1989. Since then, one party dominant politics gave way to coalition system, wherein no single party achieved a majority in the Parliament to form a government. Since then Coalition Governments have become a feature of Indian Democracy.

Module 4: Group and Electoral Participation

Women form a sizable percentage of population. However their participation is less at all the levels from voting till positioning at the top posts. The underrepresentation of women in elections is because of social and economic settings. A reservation for women in Policy is a significant measure in this regard.

The participation of Dalits and Tribals is not significant because of discrimination on the grounds of caste. Their political participation varies from state to state. The participation of Dalits and Tribals should increase for social equality and justice.

Political participation of minorities has been a foundational issue. They should have equal opportunity to participate freely and effectively in all aspects of governance. The effective participation in relation to the right to full and effective quality and meaningful engagement in national activities is necessary to make democracy meaningful.

Semester VI

Module 1: Election and Impact of Mass Media

It is the right of voters to full and accurate information. The media plays important and essential role to conduct elections in free and fair manner, by providing adequate information of parties, policies, candidates and about the election process itself. In the recent years, the term media has become more broad, encompassing the internet in its various forms and other new forms of electronic distribution of news. It is the media that determines the political agenda. Media should play a “watchdog” role, in this technological generation.

Module 2: Election Campaigning / Political Marketing

Election Campaigning can be termed as Political Marketing because election campaigning consists of all marketing concepts and techniques in all spheres of political activity including political parties, voter's behavior, local self governments, interests and pressure groups, media and so on. A study of Political Marketing helps students understand marketing activities in Politics and a holistic approach to understand the breadth and width of Politics. Political marketing describes certain political phenomena and as a Philosophy (Theory) pursues knowledge, understanding of exchanges and the process of enhancing values.

Election campaigning is a step by step process of planning, chalking out campaigning strategy, election manifesto, promises to be made to the voters, communication strategies,

support of opinion leaders, competing with the competitors and so on. The ultimate objective is to win the election.

Module 3: Psephology

Psephology in simple words can be defined as, "Computerized analysis of voting patterns", "a science of predicting voting patterns by conducting opinion polls and understanding the swings." Psephology is that branch of Political Science, which deals with the study of Statistical Analysis of Elections. Psephology has become a career opportunity, though a formal and institutional training is not yet given. Election Manifesto – Every Political party prepares election manifesto which is a strategy to win voter's mind by featuring prospective legislation after the election is over. Opinion Polls and Exit Polls – Opinion Poll is a survey of public opinion from a particular sample, consisting of a structured questionnaire and interviews. Some generalities come on the surface. Exit polls on the other hand, is a survey, held on the day of election with verbal communication with voters.

Electronic surveys and Analysis – With the advent of Science and Technology, methods and techniques of communication have changed effectively. From verbal to electronic telecommunication, communication, communication networks are established from grass root level to national levels. All the tools of communication can be widely used for surveys, systematics.

Module 4: Critique of Media in Elections

A Democratic Election with no freedom to media would be a contradiction in terms. However, in order to ensure that along with freedom, a degree of regulation is required. Government and Election Commissions regulations and other different models for regulations are necessary. Though media has a right to report freely and to scrutinize the whole election process, the scrutiny itself is additional safeguard. In this regard, electoral management body has a crucial role to play. Law or Regulations on Media during elections are necessary. The Media should be accountable to the Government and to the masses at large.

Recommended Reading

1. Ahuja, M. L.: *Electoral Politics and General Elections in India 1952-1998,* Mittal Publications, Delhi, 1998.
2. Alam, Javeed: *Who wants Democracy*, Orient Longman, Hyderabad, 2004.
3. Calmon, Leslie. J.: *Toward Empowerment of Woman and Politics in India*, Westview Press, Boulder, 1992.
4. Dikshit, R. D. (Ed): *Geography of Elections, The Indian Context*, Rawat Publications, New Delhi, 1995.
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6. Ellhu, Katz and Yael, Warshel (Ed): *Election Studies: What's their use?*, Westview Press, Boulder, 2000.

7. Kordo, N.: *Election studies in India*, <Ideas.repec.org/p/jet/dpaper/98.html>
8. Kothari, Rajni: *Politics &The People: In search of a Humane India*, Vol. I & II, Ajanta Publications, New Delhi, 1990.
9. Krishnamurthy, T. S.: *Miracle of Democracy: India's Amazing Journey*, Harper Collins, New Delhi, 2008.
10. Kumar, Venkatesh B.: *Electoral Reform in India – Current Discourses*, Rawat Publications, New Delhi, 2009.
11. Limaye, Madhu: *Janata Party Experiment*, B.R.Publishing, Delhi, 1994.
12. Lokniti, *National Election Study 2009*, <www.lokniti.org/national_election_study2009>
13. Manor, James: *Parties and Party System*, Princeton University Press, Princeton, 1986.
14. Palmer, N. D.: *Elections and Political Development – The South Indian Experience*, Vikas Publishing, Mumbai, 1976
15. Rana, M. S.: *India Votes: LokSabha and VidhanSabhaElections : 1999, 2000, PollAnalysis, Election Data, Party Manifestos*, B.R. Publishing, Delhi.
16. Roy, Meenu: *Electoral Politics in India : Election Process and Outcomes, VotingBehavior and Current Trends*, Deep and Deep Publications, New Delhi, 2000.
17. Roy, Meenu: *India Votes – Elections 1996, A Critical Analysis*, Deep and Deep Publications, Delhi, 1996.
18. _____: *Politics in India*, Orient Longman &Bostance, New Delhi, 1970.
19. Shastri, Sandeep, Suri, K.C. and Yadav, Yogendra: *Electoral Politics in Indian States,Lok Sabha elections in 2004 and beyond*, Oxford University Press.

Semester V: -List of Projects

A field visit can be conducted in either Semester with a report on it

1. Role and Functions of Election Commission of India
2. Maintenance of law, order and security during the electoral process
3. Review the Representation of People Act, 1951 & others
4. Electoral Reforms by Election Commission / Citizens / NGOs / Parliamentary Reforms
5. Review of General Elections of 1952 / 1977 / 1989 / 1994 / 1999 / 2004 / 2009 / 2014
6. Participation of Women in elections
7. Participation of Scheduled Castes in elections
8. Participation of Scheduled Tribes in elections
9. Participation of Minorities in elections

Semester VI: List of Projects

1. Role of Print Media in elections
2. Role of Audio-Visual media in elections
3. Role of Digital Media / Social Networking sites in elections
4. Election campaigning by political parties
5. Comparative analysis of election manifestos of political parties
6. Public Relation campaigns of political parties
7. Advertising campaigns by political parties
8. Opinion Polls and Exit Polls in India
9. Conduct a survey of private channels and NGOs with reference to elections
10. Make a comparative analysis of various governments with reference to development
11. Paid news in India
12. The accountability of media

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UNIVERSITY OF MUMBAI
No. UG/59 of 2018-19

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office circular No. UG/354 of 2008, dated 2nd August, 2008 relating to syllabus of Bachelor of Arts.

They are hereby informed that the recommendations made by the Board of Studies in English at its meeting held on 25th May, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.4 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.A. in English – Sem V & VI has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
6th ~~June~~ July, 2018

(Dr. Dinesh Kamble)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.4/14/06/2018

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No. UG/ 59 -A of 2018

MUMBAI-400 032

6th ~~June~~ July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in English,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
6) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

SYLLABUS

T.Y.B.A. - English

Semester V & VI

Revised Syllabus as per CBCS pattern

(w.e.f. Academic Year - 2018-19)

T.Y.B.A. – English - Semester V & VI

Revised Syllabus as per CBCS pattern

(w.e.f. Academic Year 2018-19)

Paper No.	Name of the Course	Semester	Paper Code	Name of the Paper
Paper IV	16th to 18th Century English Literature	Sem - V	UAENG501	16th to 18th Century English Literature - I
		Sem - VI	UAENG601	16th to 18th Century English Literature - II
Paper V	Literary Criticism	Sem - V	UAENG502	Literary Criticism - I
		Sem - VI	UAENG602	Literary Criticism - II
Paper VI-A	Grammar and Art of writing	Sem - V	UAENG503A	Grammar and Art of writing - I
		Sem - VI	UAENG603A	Grammar and Art of writing – II
Paper VI-B	Translation Studies: Theory and Practice	Sem - V	UAENG503B	Translation Studies: Theory and Practice - I
		Sem - VI	UAENG603B	Translation Studies: Theory and Practice - II
Paper VI-C	Popular Culture	Sem - V	UAENG503C	Popular Culture - I
		Sem - VI	UAENG603C	Popular Culture - II
Paper VII	19th Century English Literature	Sem - V	UAENG504	19th Century English Literature - I
		Sem - VI	UAENG604	19th Century English Literature - II
Paper VIII	20th Century British Literature	Sem - V	UAENG505	20th Century British Literature – I
		Sem - VI	UAENG605	20th Century British Literature – II
Paper IX-A	Literature and Gender	Sem - V	UAENG506A	Literature and Gender - I
		Sem - VI	UAENG606A	Literature and Gender - II
Paper IX-B	Drama and Theatre	Sem - V	UAENG506B	Drama and Theatre - I
		Sem - VI	UAENG606B	Drama and Theatre - II
Paper IX-C	Film and Literature	Sem - V	UAENG506C	Film and Literature - I
		Sem - VI	UAENG606C	Film and Literature - II
Paper IX-D	Literature of Protest	Sem - V	UAENG506D	Literature of Protest - I
		Sem - VI	UAENG606D	Literature of Protest - II

University of Mumbai

Syllabus for T.Y.B.A. English Paper IV

Semester: V & VI

Course: Core Paper

Course Title: 16th to 18th Century English Literature

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG501 & UAENG601
	iii)	Course Title :	16th to 18th Century English Literature
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	20
	viii)	No. of lectures per week :	04
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	5 Questions of 20 marks each.
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA Paper IV

Course: 16th to 18th Century English Literature

Course Codes: UAENG501& UAENG601

Objectives of the Course:

1) To introduce students to English Literature of the 16th, 17th and 18thcenturies.
2) To show them how background influences shaped the writer's thinking.
3) To present them to the literary masters who dominated the scene
4) To familiarize students with different writing styles that each age adopted.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) To understand the distinctive features of English literature of the 16th, 17th and 18th centuries
2) To comprehend how background influences shaped the writer's thinking.
3) To recognize and appreciate the literary masters who dominated the scene.
4) To grasp the different writing styles that each age adopted.

Semester V: 16th to 18th Century English Literature –I		
Course code- UAENG501	**04Credits**	**Total Lectures: 60**

Unit 1: Important Concepts & Terms: **20 Lectures**

A. <u>The Elizabethan Age (1550-1603)</u>
   i) Renaissance, Humanism and Reformation.
   ii) Elizabethan Poetry – Sonnets, Epic and Pastoral
   iii) Elizabethan Drama
   iv) University Wits.

B. <u>The Jacobean Period (1603-1650)</u>
   i) Characteristics of the Jacobean Period
   (Major influences and its impact on literature)
   ii) Metaphysical Poetry
   iii) Jacobean Drama- (Revenge Tragedy and Comedy)

Unit 2: William Shakespeare: Hamlet **20 Lectures**

OR

William Shakespeare: Comedy of Errors

Unit 3: Selected Verse from the Elizabethan and Jacobean periods.**20 Lectures**

Elizabethan Period:

a. Sir Philip Sidney from Astrophel and Stella sonnet sequence.
   Sonnet 37 "My mouth doth water and my breast doth swell".
   39 "Come Sleep! O Sleep, the certain knot of peace".

b. Edmund Spenser: from The Shepheardes Calender
   "April Eclogue".
   "November Eclogue".

c. William Shakespeare:
   Sonnet 116 "Let me not to the marriage of true minds"
   Sonnet 138 "When my love swears that she is made of truth"

Jacobean Period:

a. John Donne:"A Valediction Forbidding Mourning".
   Holy Sonnet 10 –"Death Be Not Proud".
b. George Herbert: "The Pulley".
   "Love".
c. Andrew Marvell:"The Coronet".
   "On a Drop of Dew".

Semester VI: 16th to 18th Century English Literature –II
Course code- UAENG601 **04Credits** **Total Lectures: 60**

Unit 1: Background and Important Concepts: **20 Lectures**

A. The Restoration Period (1660-1700)
   i) Characteristics of Restoration Period
      (Major events of the age and their impact on literature)
   ii) Restoration Poetry- (Epic, Mock epic, Satire)
   iii) Restoration Drama- Comedy of Manners, Heroic Tragedy
   iv) Diary Writing

B. Neo-Classical Period (1700-1798)
   i) Neo-Classical/Augustan
   ii) Age of Satire
   iii) Rise of the Periodical Essay and the Novel

Unit 2: John Dryden: All for Love **20 Lectures**
OR
Oliver Goldsmith: She Stoops to Conquer

Unit 3: Selected Verse from the Puritan Era, the Restoration Period and the 18th Century **20 Lectures**

Restoration Period:

a. John Milton: from Paradise Lost Book I

(105-124) 105- And shook his throne. What though the field he lost?
124- Sole reigning holds the tyranny of Heaven.

(242-270) 242- Is this the region, this the soil, the clime
270- Regained in Heaven, or what more lost in Hell?

(315-356) 315- Of Hell resounded: 'Princes, Potentates.
356- Forthwith, from every squadron and each band.

b. Alexander Pope: The Rape of the Lock- Canto II Lines 1-54
(1) Not with more Glories, in th' Etherial Plain,
(54) Th' impending Woe sate heavy on his Breast

c. John Dryden: "The Fire of London"

Semester End Examination Pattern: 100 Marks 03 Hours

The Semester End Examination for 100 marks will have 5 questions (with internal choice) of 20 marks each.
Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (two out of four) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)- Unit 2
Q.5 Short Notes (2 out of 4)- Unit 3

References:

1. Alpers, Paul E. Elizabethan Poetry: Modern Essays in Criticism (OUP: 1967)
2. Daiches, David. A Critical History of English Literature (Secker and Warburg: London, 1960)
3. Ford, Boris Ed. **The New Pelican Guide to English Literature:**
   The Age of Shakespeare Vol. 2 (Penguin, 1993)
   From Donne to Marvell Vol. 3 (Penguin, 1990)
4. Keast, William B. Seventeenth Century English Poetry: Modern Essays in Criticism (OUP: 1971)
5. King, Bruce. Seventeenth Century English Literature(*M*acmillan:1983).
6. Leggatt, Alexander. English Drama: Shakespeare to The Restoration 1590-1660 (Longman: Literature in English Series, 1988)
7. Perfitt, George. English Poetry of the Seventeenth Century (Longman: Literature in English Series,1992)
8. Parry, Graham.The Seventeenth Century: The Intellectual and Cultural Context of English Literature. 1603-1700 (Longman: Literature in English Series, 1989)
9. Pooley, Roger. English Prose of the Seventeenth Century (Longman: Literature in English Series, 1992)
10. Ricks, Christopher. The Penguin History of English Literature Vol.3. (Penguin, 1993)
11. Roston, Murray. Sixteenth Century English Literature (Macmillan, 1983)
12. Baugh, Albert C. A Literary History Of England, The Restoration and

Eighteenth Century (1660-1789), 2nd Edition, (London, Routledge and Kegan Paul, 1967)

13. Clifford, James L. Ed. Eighteenth Century English Literature: Modern Essays in Criticism(OUP, 1959)
14. Craig, Hardin. Ed. **A History of English Literature Series.** Literature of the Restoration and the Eighteenth Century 1660-1798.Vol III (London, Macmillan, 1969)
15. Ford, Boris. Ed. **The Pelican Guide To English Literature:** From Dryden to Johnson, Vol.4, (Penguin, 1982) & From Blake to Byron, Vol.5, (Penguin, 1982)
16. Jack, Ian. Augustan Satire: Intention and Idiom in English Poetry 1660-1750 (OUP, 1978)
17. Roger. The Penguin History of English Literature: Dryden to Johnson. Vol.4, (Penguin, 1993)
18. Probyn, Clive T.English Fiction of The Eighteenth Century 1700-1789 (Longman Literature in English Series, 1987)
19. Novak, Maximillian E. Eighteenth Century English Literature, (Macmillan, 1983)
20. Sambrook, James.The Eighteenth Century: The Intellectual and Cultural Context of English Literature 1700-1789. (Longman Literature in English Series, 1986)
21. Sutherland, James. A Preface to Eighteenth Century Poetry, (OUP, 1975).

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UNIVERSITY OF MUMBAI

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Core Paper

Course Title: Literary Criticism

Course Codes: UAENG502 & UAENG602

(Choice Based Credit System with effect from the academic year 2018-19)

1.		Syllabus as per **Choice Based Credit System**	
	i)	Name of the Programme	T. Y. B. A. English
	ii)	Course Code	UAENG502&UAENG602
	iii)	Course Title	Literary Criticism
	iv)	Semester-wise Course Contents	Enclosed the copy of syllabus
	v)	References and Additional References	Enclosed in the Syllabus
	vi)	Credit Structure No. of Credits per Semester	 04
	vii)	No. of lectures per Unit	15
	viii)	No. of lectures per week	04
	ix)	No. of Tutorials per week	--
2.		Scheme of Examination	5 Questions of 20 marks each
3.		Special notes, if any	No
4.		Eligibility, if any	No
5.		Fee Structure	As per University Structure
6.		Special Ordinances / Resolutions, if any	No

Syllabus for TYBA

Course: Literary Criticism

Course Code: UAENG502 & UAENG602

Objectives of the Course:

1) To introduce the learners to important critical terms

2) To make them aware of the nature and function of literature and criticism

3) To impart the technique of close reading of literary texts

4) To enable them to understand various literary theories and critical approaches

5) To familiarize the learners with the tenets of practical criticism

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) use some important critical terms

2) become aware the nature and function of literature and criticism

3) impart the technique of close reading of literary texts

4) understand the various literary theories and critical approaches

5) be familiar with the tenets of practical criticism

Semester V Paper V: Literary Criticism - I
Course Code: UAENG502 04 Credits Total Lectures: 60

UNIT I: Critical Terms (15 lectures)

(i) Simile, (ii) Imagery, (iii) Symbol, (iv) Paradox, (v) Ambiguity, (vi) Myth

UNIT II: Nature and Function of Literature (15 lectures)

i. Literature as Imitation (Plato-Aristotle debate)
ii. Literature and Imagination (the Romantic Idea of the Imagination)
iii. Literature as an expression of the writer's personality
iv. Function of Literature (aesthetic, moral and cognitive functions)

UNIT III: Nature and function of Literary Criticism (15 lectures)

i. Nature of Literary Criticism
ii. Functions of Literary Criticism (Explication, Analysis, Interpretation, Evaluation, Theorizing)
iii. A survey of the Role of a Critic

UNIT IV: Practical Criticism: Scansion (15 lectures)

Two short passages of poetry (6 to 10 lines each) will be set for scansion. Students should scan the poem, identify the base metre (iamb, trochee), variations (pyrrhic, spondee, anapaest, dactyl, cretic, amphibrach, etc.), rhyme scheme, stanza forms if any, and the metrical peculiarities such as end-stopped lines, run-on lines, elision, caesura and other basic concepts of versification.

(5 marks for scanning and identifying the base metre, 4 marks for identifying modulations and other metrical peculiarities and 1mark for rhyme scheme)

Semester End Examination Pattern 100 Marks 03 Hours

Semester End Examination for 100 marks will have 5 questions (with internal choice) of 20 marks each

Q.1 Short Notes (2 out of 4) – Unit I
Q.2 Essay type Question (1 out of 2) – Unit II
Q.3 Essay type Question (1 out of 2) – Unit III
Q.4 Short Notes: (2 out of 4) – Unit II and III
Q.5 Scansion of two extracts from poetry of about 6-10 lines each

Semester VI Paper V: Literary Criticism - II
Course Code: UAENG602 04 Credits Total Lectures: 60

UNIT I: Literary Movements (15 lectures)

i. Classicism, ii. Romanticism, iii. Realism, iv. Naturalism, v. Symbolism, vi. Aestheticism

UNIT II: Critical Approaches: (15 lectures)

i. New Criticism
ii. Structuralism
iii. Psychoanalytic Criticism
iv. Archetypal Criticism

UNIT III: Critical Approaches (15 lectures)

i. Marxist Criticism
ii. Feminist Criticism
iii. Postcolonial Criticism
iv. Eco Criticism

UNIT IV: Practical Criticism (15 lectures)

Critical Appreciation of an unseen poem: A short poem of about 20 lines will be set for appreciation. The title of the poem will be given. The unit will test the students' responsiveness to the poem and their linguistic ability in analysing the poem. Students are expected to mobilize the techniques of close reading and their understanding of literary devices like imagery, metaphor and other poetic devices while learning this unit.

Semester End Examination Pattern 100 Marks 3 Hours

Semester End Examination for 100 marks will have 5 questions (with internal choice) of 20 marks each
Q.1 Short Notes (2 out of 4) – Unit I
Q.2 Essay type Question (1 out of 2) – Unit II
Q.3 Essay type Question (1 out of 2) – Unit III
Q.4 Essay type Question (2 out of 4) – Unit II & III
Q.5 Critical Appreciation of an unseen poem

References:

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Ramamurthi, Lalitha. *An Introduction to Literary Theory.*Chennai: University of Madras,2006.

Richards, I. A. *Practical Criticism*. London: Kegan Paul, 1930.

Said, Edward.*Orientalism*. New York: Pantheon, 1978.

Schreiber, S. M. *Introduction to Literary Criticism*. Oxford: Pergamon Press, 1965.

Selden, Raman and Widdowson, Peter. *A Reader's Guide to Contemporary Literary Theory*.

3rd ed. Lexington: University of Kentucky Press, 1993.

Selden, Raman. *A Reader's Guide to Contemporary Literary Theory.*London: Harvester Press, 1985.

Scott, Wilbur. *Five Approaches to Literary Criticism.*London: Longman, 1984.

Wellek, Rene and Austin, Warren.*Theory of Literature*.London: Jonathan Cape, 1955.

Wolfreys, Julian. (ed.) Introducing *Literary Theories: A Guide and Glossary.*Edinburgh:Edinburgh University Press, 2003.

Syllabus Prepared by:

Dr. L.B. Patil,	A. S. P. College, Devrukh	:	Convener
Dr. Pratima Das,	C.H.M. College, Ulhasnagar	:	Member
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Ms. Shanti Polamuri,	Maharashtra College, Byculla	:	Member

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester V & VI

Course: Elective Paper

Course Title: Grammar and the Art of Writing

(Choice Based Credit System with effect from the Academic Year 2018-19)

1. Syllabus as per Credit Based Semester and Grading System:

i)	Name of the Programme	:	T.Y.B.A. English
ii)	Course Code	:	UAENG503A & UAENG603A
iii)	Course Title	:	TYBA English Paper VI -- Grammar and the Art of Writing
iv)	Semester wise Course Contents	:	Enclosed the copy of syllabus
v)	References and Additional References:		Enclosed in the Syllabus
vi)	Credit Structure	:	
No. of Credits per Semester		:	03
vii)	No. of lectures per Unit	:	15
viii)	No. of lectures per week	:	03
2.	Scheme of Examination	:	4 Questions of 20 marks each and a project of 20 marks
3.	Special notes, if any	:	No
4.	Eligibility, if any	:	No
5.	Fee Structure	:	As per University Structure
6.	Special Ordinances / Resolutions if any:		No

Syllabus for TYBA
Course: GRAMMAR AND THE ART OF WRITING
Course Codes: UAENG503A & UAENG603A

Objectives:

1. To develop amongst learners an insight into the process of word formation and transformation
2. To develop amongst them an insight into the sounds, stress patterns and intonations in the English language to improve their speaking skills
3. To develop among them an insight into the structure of the English language and to provide knowledge of the rules of grammar
4. To help them learn grammatical analysis and description and the skills of sentence transformation
5. To introduce the mechanics of writing for effective writing for various domains

Outcome of the Course:

After the completion of the course, students are expected to be able to:

1. Gain a basic understanding of phonetics, morphology and word transformation
2. Have improved speaking skills
3. Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation
4. Write effectively in various domains.

SEMESTER- V: Paper VI – Grammar and the Art of Writing – I		
Course Code: UAENG503a	**3 Credits**	**Total Lectures: 45**

Phonetics, Morphology, Grammar and the Art of Writing

Unit I: Phonetics and Morphology **15 lectures**

A. Phonetics

- Phoneme and its distinctive features
- English Vowels and Consonants (Difference between BRP and Indian English)
- Diphthongs
- Consonant Clusters
- Transcription using phonetic script

B. Morphology

- Morph, Allomorph and Vowel Mutation
- Free and Bound Morphemes
- Root and stem
- Inflection and Derivation
- Morphological Analysis

Unit 2: Grammar: Words and Phrases **15 lectures**

- Open word classes: nouns, adjectives, verbs, adverbs
- Closed word classes: pronouns, determiners, operator verbs, prepositions, conjunctions, enumerators, interjections
- Noun Phrase, Genitive Phrase, Prepositional Phrase, Adjective Phrase and Adverb Phrase
- Verb Phrase

Unit 3: Art of Writing **15 lectures**

I. Discourse Analysis

- Tenor
- Mode
- Domain

Domain and language change – journalism, advertising and literature, scientific and technical writing

II. Mechanics of Writing

- Understanding paragraph divisions and topic sentences of paragraphs

III. Writing for Print Media

- Print – News Report

Evaluation Pattern:
1) Semester End Examination: 80 Marks - 2 1/2 Hours
2) Project: 20 Marks

1) Semester End Examination (80 marks):

Q.1	a. Phrase analysis	20 marks
Q.2	a. Verb Phrases	06 marks
	b. Morphological analysis	14 marks
Q.3	a. Stress Marking and Intonation	10 marks
	b. Transcription	10 marks
Q. 4.	Writing a news report on the basis of the facts given	20 marks

2) Project work (20 marks):

Students should be tested on –

1. Breaking a passage of about 250-300 words into appropriate paragraphs, picking up the topic statement of each paragraph 10 marks

AND

2. Identifying the register of a passage about 250-300 words 10 marks

SEMESTER- VI: Grammar and the Art of Writing – II		
Course Code: UAENG603A	**3 Credits**	**Total Lectures: 45**

Grammar and the Art of Writing

Unit I: Grammar **20 lectures**

I. Clauses:

- Clause elements and subject –verb concord
- Basic clause patterns
- Types of clauses : finite – non-finite (tensed – tenseless), independent – dependent (Main – Subordinated)
- Kinds of subordinate clause : Noun clause, Prepositional Clause , Relative clause , Adverb Clause, Comparative Clause
- Co-ordinated Clauses

II. Sentences:

- Basic and Derived structures
  Following rules to be studied – Fronting, Inversion, Passive reconsideration, Substitution of PP for Indirect Object, Tag Questions, Postponement of the post-modifier, Cleft Sentence, Existential Sentence and Extraposition.

Unit 2: Art of Writing

Mechanics of Writing **05 lectures**

- Characteristics of typical writing and typical speech
- Cohesion and Coherence
- Correct use of Articles, Prepositions, Adverbs, Adjectives
- Common Errors – Grammatical, Syntactical, Lexical, Punctuation, Logical
- Writing a Thesis Statement

Rhetorical Structures **10 lectures**

- Classification, Comparison – Contrast, Cause – Effect, Chronological and Spatial Ordering, Order of Importance, Statement and Elaboration, Restatement, Exemplification, Listing
- Understanding connotations, Using bias-free language, Avoiding jargon and archaic/ outdated language, Eliminating repetition and redundancy, Content Analysis, and Rhetorical Devices

Unit 3: Types/ Domains of Writing **10 lectures**

- Argumentative/ reflective writing
- Analytical writing
- Creative / Figurative writing
- Advertisement /Body Copy writing

Evaluation Pattern:
1) Semester End Examination: 80 Marks - 2 1/2 Hours
2) Project: 20 Marks

1) Semester End Examination Pattern (80 marks)

Q 1.	Identifying elements of the Clause (SPOCA)	20 marks
Q 2.	a. Identifying MCL and SCL	10 marks
	b. Basic and Derived Structures	10 marks
Q. 3.	a. Identifying errors in the given passage.	08 marks
	b. Rewriting the passage to make it more fluent and coherent.	12 marks
Q.4.	Forming a thesis statement on the given topic (1 out of 3) and developing it in about 150 words and specifying its rhetorical structures.	20 marks

2) Project work (20 marks):

Students should be tested on

1. Writing a Literary Passage (creative/ figurative) of about 250-300 words 10 marks

AND

2. Writing an advertisement copy on the basis of facts provided 10 marks

Prescribed Text:

1. Leech, Geoffrey, Deuchar, Margaret and Hoogenraad, Robert, *English Grammar for Today: A New Introduction*. London: Macmillan, 1973

Additional Reading:

1 Quirk, R. and Greenbaum. S. *A University Grammar of English*, Longman, 1973
2 Rajimwale, Sharad. *Elements of General Linguistics, Vol. I*, New Delhi: Rama Brothers
3 Varshney, Dr. R.L. *An Introductory Text Book of Linguistics and Phonetics*, New Delhi: Prakash Book Depot

Recommended Books for Further Reading:

1. Payne, Lucile Vaughan. *The Lively Art of Writing*. New York: Mentor, 1969
2. Kleiser, Grenville. *The Art of Writing*. New Delhi: A P H, 2011
3. Trimble, John R.*Writing with Style, Conversations on the Art of Writing*. New Jersey: Prentice Hall, 1975
4. Bailey, Stephen. *Academic Writing: A Handbook for International Students*. New York: Routledge , 2011
5. Huddleson, Rodney and Pullum, Geoffrey. *A Student's Introduction to English Grammar*. New Delhi: Cambridge University Press, 2005
6. Leech, Geoffrey and Svartvik, Jan. *A Communicative Grammar of English*. New York: Routledge, 1975
7. Singh Sukhdev and Singh Balbir. *Grammar of the Modern English Language: A Resource Book*. New Delhi: Cambridge University Press India Pvt. Ltd., 2012
8. Turton, Nigel D. *A B C of Common Grammatical Errors*. New Delhi: Macmillan India Ltd., 1996
9. Sethi, J. and Dhamija, P.V. *A Course in Phonetics and Spoken English*. New Delhi: Prentice-Hall of India Private Ltd., 2006
10. Jones, Daniel. *Everyman's English Pronunciation Dictionary* The English Language Books Society, ELBS
11. Gimson, A. C. *An Introduction to the Pronunciation of English*. ELBS
12. Rahman, Tariq. *A General Introduction to Linguistics*. Orient Blackswan
13. Crystal, David. *The Cambridge Encyclopedia of Language*. Cambridge University Press
14. Crystal, David. *A Little Book of Language*. Orient Blackswan.
15. Sreedharan, V. *How to Write Correct English.* New Delhi: Goodwill Publishing House
16. Lowe, Michelle and Graham, Ben. *Language and Power: A Resource Book for Students.* Orient Longman, 1998
17. Simpson, Paul and Mayr, Andrea. *Language and Power: A Resource Book for Students.*Routledge, Taylor & Francis Group, 2010
18. Mohan, Krishna and Raman, Meenakshi. *Advanced Communicative English: A Comprehensive Course for Undergraduate Learners*. New Delhi: Tata McGraw Hill Education Private Limited, 2010
19. Gurman, Pamela J. *Strategies for Successful Writing: Written Communication in the Modern World*. Pearson Custom Publishing.
20. Grammar Handbook (Capella University) available in pdf format at http://www.capella.edu/interactivemedia/onlinewritingcenter/downloads/grammar.pdf
21. Brighton, Laurel J. *The Structure of Modern English: A Linguistic Introduction* available in pdf format at http://npu.edu.ua/!e-

book/book/djvu/A/iif_kgpm_The%20Structure%20of%20Modern%20English.pdf
22. A Course in English Phonetics for English EFL Students available in pdf format at file:///C:/ADMIN/Desktop/A_Course_in_English_Phonetics%20(1).pdf

Syllabus prepared by:

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Mrs. Susan Lobo, St. Andrews College, Bandra, Mumbai	:	Member
Mr. Vinodsinh Patil, Arts & Commerce College, Phondaghat, Dist. Sindhudurg	:	Member
Dr. Dattaguru Joshi, Banda College, Banda	:	Member

University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Paper

Course Title: Translation Studies: Theory and Practice

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG503B& UAENG603B
	iii)	Course Title :	Translation Studies : Theory and Practice
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each and a project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Translation Studies: Theory and Practice

Course Codes: UAENGUAENG503B&UAENG603B

Objectives of the Course:

1. To make students aware of various types of translation
2. To enable students to undertake translation of literary texts
3. To enable students to use translation in official contexts and mass media
4. To help students to avail of job opportunities

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Understand variety of translations
2) Able to undertake Literary Translation work at primary level.
3) Able to undertake translation in official contexts and mass media
4) Equipped to take up jobs.

Semester V: Translation Studies : Theory and Practice

Course code- UAENG503B04 CreditsTotal Lectures: 45

Unit 1: Terms & Concept: 15 Lectures

1. Translation
2. Transliteration
3. Source Language Text and Target Language Text
4. Loss and Gain in Transaction
5. Creative & Free Translation
6. Word to word & Structural Translation

Unit 2: Indian Theories of Translation: 15 Lectures

1. Bhartrhari's Sphota and Translation
2. Theory of Auchitya and Translation
3. Sri. Aurobrindo Ghosh's Theory of Translation
4. Rabindranath Tagore's Theory of Translation

Unit 3: Translated Non- Fictional texts 15 Lectures

1. Annihilation of Caste (Pages 1-5) (English to Marathi/ Hindi)

2. 1958 Literary Conference Speech by Anna Bhau Sathe (Marathi / Hindi to English)

Evaluation Pattern:1) Semester End Examination: 80 Marks - 2 1/2 Hours
2) Project: 20 Marks

Semester End Examination:

Q.1. 2 Short Notes based on Unit-I (2 out of 4)
Q.2. Essay type question based on Unit-II (One out of two)
Q.3. Essay type question based on Unit-III (One out of two)
Q.4. Translation of Unseen Non-literary passage from English into Hindi/Marathi

Project Work (20 marks):

A Non-literary passage of about 500 words from Hindi or Marathi to be translated into English by the students. It should also include the introduction of the SL text, list of the problems faced and the loss and gain in the process of translation.

Semester VI: Translation Theory and Practice

Course code- UAENG603B **04 Credits** **Total Lectures: 45**

Unit I: Terms & Concepts **15 Lectures**

1. Formal and Dynamic Equivalence
2. Interlingual and Intralingual Translation
3. Qualities and Strategies of Translator
4. Lexicography bilingual dictionaries
5. Commercial and collaborative Translation.
6. Audiovisual, Subtitling and Dubbing

Unit 2: Types of Translation-process and problems **15 Lectures**

1. Translation of Prose and fiction
2. Translation of Poetry
3. Translation of Drama

Unit 3: Translated Literary Texts **15 Lectures**

1. Premchand's short story "Gulli Danda" translated from Hindi into English (Premchand's Selected Stories 1, Translated and adapted by Anupa Lal, Ratna Sagar, P. Ltd. New Delhi 1995)

2. Nissim Ezekiel's poem "Night of the Scorpion" translated from English into Marathi (Adhunik- Stotre by Pradeep Deshpande)

Evaluation Pattern:1) Semester End Examination: 80 Marks – 2 ½ Hours
2) Project: 20 Marks

Semester End Examination for both Semesters:

Q.1. 2 Short Notes based on Unit-I (2 out of 4)

Q.2. Essay type question based on Unit-II (One out of two)

Q.3. Essay type question based on Unit-III (One out of two)

Q.4. Translation of Unseen Non-literary passage from English into Hindi/Marathi

Project Work for both semesters (20 marks):

A Literary text of about 500 words from Hindi or Marathi to be translated into English by the students. It should also include the introduction of the SL text, list of the problems faced and the loss and gain in the process of translation.

Recommended Reading:

1. Bassnett, Susan, Political Discourse, Media and Translation, Cambridge Scholars, 2010.
2. Bassnett Susan and Trivedi Harish, "Post-Colonial Writing and Literary Translation" in Post-Colonial Translation: Theory and Practice. Ed. London: Routledge, 1999.
3. Didier, Coste, The Poetics and Politics of Literary Translation, New Delhi, 2011. 71
4. Ghurye, G.S Caste, Class and Occupation: Popular Book Depot, 1961.
5. Guha, Ranjit and Spivak Gayatri Selected Subaltern Studies: Eds., Oxford University Press, New York and Oxford, 1988.
6. Lawrence, Venuti, (Edited by) Translation Studies Reader, 2012.
7. Mukherjee, Meenakshi. The Twice Born Fiction: Themes and Techniques of theIndian Novel in English New Delhi: Heinemann Educational, 1971.
8. Naikar Basavaraj, Glimpses of Indian Literature in English Translation,Authorspress, 2008.
9. Pandey, A. P. A Revolutionary Fervor in Kabir's Poetry, by Bhaskar Publications,Kanpur, 2008.

10. Rahman, Anisur. Indian Literature(s) in English Translation - The discourse of Resistance and representation in Journal Of Postcolonial Writing Vol. 43, 2007.

Websites & You Tube Videos

1. https://complit.artsci.wustl.edu/graduate/translation_studies
2. http://cw.routledge.com/textbooks/translationstudies/data/samples/9780415584890.pdf
3. https://www.youtube.com/watch?v=HZXhzP3mBsA
4. https://www.youtube.com/watch?v=gP3bheM6fmg

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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective
Course Title: Popular Culture

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG503C & UAENG603C
	iii)	Course Title :	Popular Culture
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	
2.		Scheme of Examination :	4 Questions of 20 marks each and a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA
Course: Popular Culture
Course Codes: UAENG503C& UAENG603C

Objectives of the Course:

1. To understand the nature and politics of Popular Culture.
2. To explore the interplay between Culture and Popular Culture and their influence over each other.
3. To expand existing critical thinking to enable textual analysis
4. To understand different perspectives on politics and control.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1. To articulate in writing responses to thinking critically about Popular Culture
2. To be able to assert agency over events involving their lives

Semester V: Popular Culture
Course code- UAENG503C **4 Credits** **Total Lectures: 45**

Unit 1: Understanding the Concept of Popular Culture **15 Lectures**

- Culture, Ideology and the Concept of the Popular
- Culture and Civilisation Tradition
- Culturalism
- High Culture vs Culture Debate

Unit 2 Control over Meaning through perpetuation of Myths (15 Lectures)

- Semiotics-Understanding the construction of the Sign- Saussure
- Barthes –Structuralism and post structuralism-
- Will Wright- Myth and the Western Film
- Critical terms: myth, genre, theme, language, structure, character
- To be applied to any texts/images of popular culture

Unit 3: The Politics of Culture-Hegemony and Post Marxist Perspectives (15 Lectures)

- Encoding/Decoding of Meaning
- Negotiation and Agency
- Caste/Gender Discrimination-Perpetuating Rape Culture
- Recommended study from the perspective of contemporary case studies/films

Project: Deconstructing Texts of Popular Culture 20 Marks

- Folk Tales/Fairytales/Animal fables
- Detective Fiction/Crime Fiction/Thriller/Suspense
- Comics- Tarzan, Wonderwoman, Peanuts (Marvel/Shultz)
- Identify and analyse the historical, socio-political and literary dynamics as well as themes and concerns which define genre, reflect culture, extend across cultures or appeal to a particular culture

Semester VI: Popular Culture - II
Course code- UAENG603C 4 Credits Total Lectures: 45

Unit 1 Gender and Popular Culture 15 Lectures

- Feminist Approaches to Popular Culture
- Subversions of Femininity/Masculinity in Popular Culture
- Visual Pleasure/Narrative Cinema: Scopophilia and the Male Gaze/Ignoring the Female Spectator/Bechdel Test
- Mainstream Cinema and Female Spectatorship
- Recommended Films- Films of Alfred Hitchcock from the perspective of his treatment of women/Films of MadhurBhandarkar 2011 female-centric films/any other films with strong female protagonists (Hindi and Regional Films may be studied.

Unit 2: Postmodernism and Culture: 15 Lectures

- The Global Postmodern
- Reality/Mediated Reality/Pluralism of Value
- John Storey/Francois Lyotard/Frederic Jameson/Jean Baudrillard
- Case studies from the perspective of how both Western and Indian cultural paradigms have evolved

Unit 3 Taste/Identity and Popular Culture 15 Lectures

- Culture Industry Revisited
- Frankfurt School/Consumerism
- The Politics of Popular Taste
- Privilege and Taste
- Case studies from the perspective of advertising/consumerism

Semester End Examination Pattern: 80 Marks 2 ½ Hours

The Semester End Examination for 80 marks will have 4 questions (with internal choice) of 20 marks each:
Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (02 out of 04) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)-02 each on Unit 2 & 3

Project: One project of 20 marks

- Project: Deconstructing Texts of Popular Culture (20 Marks)

Music/Music Videos/Pop Art/Dance/Reality Shows on Television; Identify and analyse the historical, socio-political and literary dynamics as well as themes and concerns which define genre, reflect culture, extend across cultures or appeal to a particular culture

Recommended Reading:

Appadurai, Arjun, and Carol A. Breckenridge."Public Modernity in India." *Consuming Modernity*.Ed. Carol A. Breckenridge. Delhi: Oxford UP, 1995. 1-17. Print.

_____. *Modernity at Large: Cultural Dimensions of Globalization*. Minneapolis, MN: U of Minnesota, 1996. Print.

Arnold, Matthew. *Culture and Anarchy*. N.p.: n.p., 1869. Print.

Barrett, Michèle. "Feminism and the Definition of Cultural Politics." *Feminism, Culture,and Politics*. Ed. Rosalind Brunt and Caroline Rowan. London: Lawrence and Wishart, 1982. 37-58. Print.

Barthes, Roland. *Mythologies*.Trans. Annette Lavers. Hertfordshire: Paladin, 1973. Print. (Essays Novels and Children: page 50, The Face of Garbo: page 56, Striptease: page 84, Accessed on the internet: 16th May, 2016)

Bartky, S. "Foucault, Femininity, and the Modernization of Patriarchal Power." *Feminismand Foucault: Reflections on Resistance*. Ed. I. Diamond and L. Quinby. Boston: Northeastern UP, 1988. 61-86. Print.

Berger, John. *Ways of Seeing*. London: British Broadcasting Corporation and Penguin, 2008. Print. (Chapter 7, Accessed on the internet: 5th May, 2016)

Butler, Judith. Gender trouble: feminism and the subversion of identity. New York:Routledge, 1990. Print.

Chatterji, Shoma A., Subject: Cinema Object: Woman: A Study of the Portrayal of Women in Indian Cinema. Calcutta: Parumita Publications, 1998.

Cook, Pam. "Masculinity in Crisis?" *Screen* 23.3-4 (1982): 39-46. Web.

Durham, Meenakshi Gigi., and Douglas Kellner. *Media and Cultural Studies: Keyworks*. Malden, MA: Blackwell, 2001. Print.

Dwyer, Rachel. *All You Want Is Money, All You Need Is Love: Sexuality and Romance in Modern India*. London: Cassell, 2000. Print.

Dwyer, R. "Bombay Ishtyle." *Fashion Cultures: Theories, Explorations, and Analysis*. Ed. S. Bruzzi and G. P. Church. New York: Routledge, 2000. 178-90. Print.

Ellis, John. *Visible Fictions: Cinema, Television, Video*. London: Routledge, 1992. Print.

Fiske, J. "Active Audiences," and "Pleasure and Play." *Television Culture*. London and NY: Methuen, 1987. N. pag. Print.

Fiske, John. *Understanding Popular Culture*. Boston: Unwin Hyman, 1989. Print.

Foucault, Michel as cited in Barrett, Michèle. *The Politics of Truth: From Marx to Foucault*. Stanford, CA: Stanford UP, 1991. Print.

Gamman, Lorraine, and Margaret Marshment. *The Female Gaze: Women as Viewers of Popular Culture*. London: Women's, 1988. Print.

Ganham, Nicholas, and Raymond Williams. "Pierre Bourdieu and the Sociology of Culture: An Introduction." *Media, Culture and Society* 2.3 (n.d.): 215. Print.

Gehlawat, Ajay. *Reframing Bollywood: Theories of Popular Hindi Cinema*.N.p.: Sage Publications, 2010. Print.

Gledhill, Christine., "Pleasurable Negotiations." *Female Spectators: Looking at Film and Television*. Ed. D. E. Pribram. London: Verso, 1988. 64-89. Print.

Gledhill, Christine., Recent Developments in Feminist Criticism in Film Theory and Criticism, Introductory Readings. Eds: Leo Braudy and Marshall Cohen, New York and Oxford: Oxford University Press, 1999

Gledhill, Christine. *Stardom: Industry of Desire*. London: Routledge, 1991. Print.

Hall, Stuart. "Encoding/Decoding." *The Cultural Studies Reader*.Ed. S. During. London and NY: Routledge, 1993. N. pag. Print.

Kaarsholm, Preben, ed. *City Flicks City Flicks: Indian Cinema and the Urban Experience*. Calcutta, New Delhi: Seagull, 2004. Print.

Kaplan, E. Ann. *Looking for the Other: Feminism, Film, and the Imperial Gaze*. New York: Routledge, 1997.Web.

Kasbekar, A. "Hidden Pleasures: Negotiating the Myth of the Female Ideal in Popular Hindi Cinema." *Pleasure and the Nation: The History, Politics, and Consumption of Public Culture in India*. Ed. C. Penney and R. Dwyer. New Delhi: Oxford UP, 2001. 286-308. Print.

Kavoori, Anandam P., and AswinPunathambekar.*Global Bollywood*. New Delhi: Oxford UP, 2009. Print.

Kuhn, A. "Women's Genres." *Screen* 25.1 (1984): 18-29. Web.

Mathur, Vrinda. "Women in Indian Cinema: Fictional Constructs." *Films and Feminism: Essays in Indian Cinema*. Ed. Jasbir Jain and SudhaRai. Jaipur and New Delhi: Rawat Publications, 2002. N. pag. Print.

McGuigan, Jim. *Cultural Populism*. London: Routledge, 1992. Print.

Modleski, Tania. *Loving with a Vengeance: Mass-produced Fantasies for Women*. Hamden, CT: Archon, 1982. N. pag. Print.

Mulvey, Laura. "Visual Pleasure and Narrative Cinema." 1975. *Visual Culture: The Reader*. Ed. Jessica Evans and Stuart Hall. London: SAGE Publications inAssociation with the Open U, 1999. 381-89. Print.

Nandy, Ashis. *The Secret Politics of Our Desires: Innocence, Culpability, and Indian Popular Cinema*. London: Zed, 1998. Print.

Nayar, Pramod K. *An Introduction to Cultural Studies*. New Delhi: Viva, 2008. Print.

Philip, Michelle. *Reel VS Real: The Portrayal of Women in Mainstream Bollywood Cinema.* Mumbai. 2014. Print.

Philip, Michelle.*Re-possessing the Female Gaze: The Woman as Active Spectator of Mainstream Bollywood Cinema.*Mumbai. 2014. Print.

Philip, Michelle.*The Indian Woman's Search for Identity Vis a Vis Mainstream Bollywood Cinema*. 2014. Print.

Philip, Michelle. *The Treatment of Women in Reel VS Real Life as Influenced by Mainstream Bollywood Cinema*. 2014. Print.

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Syllabus for T.Y.B.A. in English

Semester: V&VI

Course: Core Paper

Course Title: 19th Century English Literature

(Choice Based Credit System with effect from the Academic Year 2018-2019)

1. Syllabus as per **Choice Based Credit System**

i) Name of the Programme	:	T.Y.B.A. English
ii) Course Code	:	UAENG504 &UAENG604
iii) Course Title	:	19th Century English Literature
iv) Semester wise Course Contents	:	Copy of the syllabus Enclosed
v) References and additional references	:	Enclosed in the Syllabus
vi) Credit structure	:	
No. of Credits per Semester	:	04
vii) No. of lectures per Unit	:	20
viii) No. of lectures per week	:	04
ix) No. of Tutorial per week	:	---
2 Scheme of Examination	:	5 Questions of 20 marks each
3 Special notes, if any	:	No
4 Eligibility, if any	:	No
5 Fee Structure	:	As per University Structure
6 Special Ordinances / Resolutions, if any	:	No

Syllabus for TYBA

Course: 19th Century English Literature

Course Codes: UAENG504 &UAENG604

Objectives of the Course:

1. To introduce to students the major trends and ideas in the literature and culture of the Romantic and Victorian Eras
2. To help students understand the texts in the context of prevailing socio-cultural conditions & their historical, political location
3. To impress upon students the characteristically rebellious/ radical nature of British Romanticism and the stupendous range of changes in the socio-political conditions of Early (1837-1851), Middle (1851-1870) and Late (1870-1901) Victorian Era
4. To familiarize and highlight major representative texts, genres, thematic concerns and select key concepts/terms pertaining to the respective periods
5. To help students apply a variety of critical, historical, and theoretical approaches to prescribed literary texts
6. To sensitize students to diverse sensibilities and humanitarian concerns through literature of the nineteenth century

Course Outcomes:

After completion of the course, students are expected to be able to:

1. To view literary works in their dynamic interface with the background
2. To understand the literature of the 19th century as a complex outcome of artistic, intellectual and socio-political cross-currents
3. To appreciate poetry as mirroring private personality, protest and subsequently, public concerns
4. To view the development of the Victorian Novel as informed by Victorian morality as well as by larger democratic processes
5. To contextualize the impulses behind the significant emergence of women writing in the 19th century

Semester V:Paper VII: 19th Century English Literature I

Course Codes: UAENG504 04 Credits Total Lectures: 60

The Romantic Revival (1798-1832)

Unit I: A. Background: 20 Lectures

- Romanticism as a reaction to Neo-classicism
- Influence of Rousseau and French Revolution
- Survey of Literature: Novel, Poetry and Prose (Types, Trends and Characteristics)
- Rise of women writers in the period

B. Concepts:

- Romanticism : Features
- Romantic Imagination
- German Transcendentalism
- The Gothic Revival
- Medievalism
- Pantheism

Unit II: Poetry: Selected Verse from the Romantic Period: 20 Lectures

William Blake : 'The Divine Image' from *Songs of Innocence*

'The Human Abstract' from *Songs of Experience*

William Wordsworth : 'Lines Written in Early Spring'

'Lucy Gray'

Samuel Taylor Coleridge : 'Kubla Khan'

Lord Byron : 'Darkness'

P.B. Shelley : 'Ozymandias'

John Keats: : 'On First Looking into Chapman's Homer'

'Ode to Psyche

Unit III: 20 Lectures

A. **Novel**: Jane Austen: *Emma*

OR

B. **Essays:** Charles Lamb: From *Essays of Elia*

'Christs' Hospital Five and Thirty Years Ago'

'The Dream Children: A Reverie'

'Detached Thoughts on Books and Reading'

William Hazlitt: From *Table-Talk: Essays on Men and Manners*

'On the Pleasure of Painting' – Essay 1

'Why Distant Objects Please'

'On Going on a Journey'

Semester VI:Paper VII: 19th Century English Literature - II
Course Codes: UAENG504Total Lectures: 604 Credits

The Victorian Age (1837 -1901)

Unit I: A. Background20 Lectures

- Effects of Industrial Revolution
- Middle class complacency and the rise of the working class
- Age of Science, Age of Faith and Doubt (the Victorian Dilemma)
- Survey of Literature of the period: Types, features and development (Novel, Poetry and Prose)

B. Concepts

- Utilitarianism
- Darwinism
- Victorian Concept of Morality
- Aestheticism
- Pre-Raphaelitism
- The Oxford Movement
- Bildungsroman and the Victorian Novel

Unit II: Poetry:Selected Verse from the Victorian Period: 20 Lectures

Alfred Tennyson : From *In Memoriam*

Lyric 7: 'Dark house, by which once more I stand'

Lyric 54: 'Oh, yet we trust that somehow good'

Robert Browning :'Porphyria's Lover'

'Fra Lippo Lippi'

Elizabeth Barrett Browning: *Sonnets from the Portuguese*:

'Sonnet 21': 'Say over again, and yet once over again'

Matthew Arnold :'The Forsaken Merman'

Dante Gabrielle Rosetti :'The Cloud Confines'

Thomas Hardy :'Channel Firing'

'Dead Man Walking'

Unit III: **20 Lectures**

A. **Novel**: Charles Dickens: *David Copperfield*

OR

B. **Essays:** John Newman: From *The Idea of a University*

Discourse V 'Knowledge its Own End'

John Ruskin: From *Sesame and Lilies*

'Of Kings' Treasuries'

'From the Queens' Gardens'

Evaluation: Semester End Examination Pattern 100 Marks: 3 Hours

Question 1: A. Essay*or

Question 1: B. Essay or

Question 1.C. Short Notes (two out of four) from Unit I

Question 2: Essay on Unit II (1out of 2)

Question 3: Essay on Unit III (1 out of 2)

Question 4: Short Notes on Unit II (2 out of 4)

Question 5: Short Notes on Unit III (2 out of 4)

*In question 1 the essay questions will be based on Unit I A and Short Notes will be based on Unit I:B

Recommended Reading:

Abel, Elizabeth, et al. *The Voyage In: Fictions of Female Development*. University Press of New England.

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Crawford, Iain. 'Sex and Seriousness in "David Copperfield"' *The Journal of Narrative Technique*, Vol. 16, No. 1,Winter,1986, pp. 41-54.

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Curran, Stuart. *Poetic Form and British Romanticism*. Oxford UP, 1986.

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Whelan, Lara Baker. *Class, Culture and Suburban Anxieties in the Victorian Era.*Routledge, 2010.

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William T. Lankford '"The Deep of Time": Narrative Order in David Copperfield', *ELH*, Vol.46, No. 3, Autumn, 1979, pp. 452-467

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Wolfson, Manning, (ed). *The Longman Anthology of British Literature*, Volume 2 A. Fifth Edition. New York: Longman, 2012.

Womack Kenneth and William Baker. *A Companion to the Victorian Novel*, 2002.

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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Core paper
Course Title: 20th Century British Literature

(Choice Based Credit System with effect from the Academic Year 2018-19)

	Syllabus as per Choice Based Credit System	
i)	Name of the Program :	T.Y.B.A. English
ii)	Course Code :	UAENG505&UAENG605
iii)	Course Title :	20th Century British Literature
iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
v)	References and Additional References :	Enclosed in the Syllabus
vi)	Credit Structure : No. of Credits per Semester	04
vii)	No. of lectures per Unit :	20
viii)	No. of lectures per week :	04
ix)	No. of Tutorials per week :	--
2.	Scheme of Examination :	5 Questions of 20 marks each
3.	Special notes , if any :	No
4.	Eligibility , if any :	No
5.	Fee Structure :	As per University Structure
6.	Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: 20th Century British Literature

Course Codes: UAENG505 &UAENG605

Objectives of the Course:

1) To expose students to literary genres, trends, and literary movements of Britain in the 20th Century.

2) To enable students to create linkages between social and historical contexts and literary texts .
3) To train students to develop skills for a critical and analytical understanding of the text.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Students will be equipped with comprehensive understanding of literary genres, trends and movements in 20th Century British Literature; thereby ,enabling them to understand the valuable co –relation between the socio-cultural ,economical and historical contexts; behind the literary production.

2) Students will acquire the discipline to become reflective and imaginative thinkers through a close, critical and analytical reading of the prescribed texts.

Semester V: 20th Century British Literature – I

Course code- UAENG505 **4 Credits** **Total Lectures: 60**

Unit 1: Background Topics **20 Lectures**

1. Modernism
2. Imagism
3. Symbolism
4. War Poetry
5. Movement Poets
6. Poetic Drama
7. Social Realism and its impact on English Drama
8. The Theatre of the Absurd

Unit 2: Drama **20 Lectures**

A. JOHN OSBORNE*: Look Back in Anger* (1956)

OR

B. BERNARD SHAW: *Saint Joan* (1923)

Unit 3: Poetry **20 Lectures**

1. T.S. ELIOT: i)'The Hippopotamus' ii) 'Portrait of a Lady'
2. W. B. YEATS: i) 'The Second Coming' ii) 'A Prayer for My Daughter'
3. W.H. AUDEN : i) 'The Shield of Achilles' ii) 'In Memory of W.B. Yeats'
4. WILFRED OWEN : i) 'Insensibility' ii) 'Strange Meeting'

Semester VI: 20th Century British Literature – II

Course code-UAENG605 **4 Credits** **Total Lectures: 60**

Unit 1: Background Topics: **20 Lectures**

1. Feminism in Modern Literature
2. Psychological Novel
3. The rise of Science Fiction
4. Post World War II Novel
5. Political Satire/Allegory as rising literary trends
6. Imperialism and Post colonialism in Modern British Fiction
7. Existentialism and Modern British Literature

Unit 2: Novel: **20 Lectures**

A. GEORGE ORWELL: *1984* (1949)

OR

B. IRIS MURDOCH: *The Black Prince* (1973)

Unit 3: Short stories **:** **20 Lectures**

1) JAMES JOYCE: *Eveline*
2) ROALD DAHL: *Lamb to the Slaughter*
3) GRAHAM GREENE: *The Invisible Japanese Gentleman*
4) ANGELA CARTER: *The Courtship of Mr. Lyon*

Semester End Examination Pattern: 100 Marks 03 Hours

The Semester End Examination for 100marks will have 5 questions (with internal choice) of 20 marks each

Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (two out of four) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)- Unit 2
Q.5 Short Notes (2 out of 4)- Unit 3

Recommended Reading:

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- Bayley, John. *An Elegy for Iris.* New York : St. Martins's Press, 1999. Print.
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- Gibbs, A.M. *Man and Superman and Saint Joan: A Casebook.* London: Macmillan Education Ltd., 1992. Print.
- Griffith, Gareth. *Socialism and Superior Brains: The political thought of Bernard Shaw.* London: Routledge, 1993. Print.
- Head, Dominic. *The Cambridge Introduction to Modern British Fiction, 1950 – 2000.* Cambridge, New York and Cape Town: Cambridge University Press, 2002. Print.
- Heilpern, John. *John Osborne: A Patriot for Us.* London: Chatto&Windus, 2006. Print.
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- https://www.askwillonline.com/2013/06/the-courtship-of-mr-lyon-by-angela.html
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- http://sittingbee.com/the-invisible-japanese-gentlemen-graham-greene/
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- https://www.litcharts.com/lit/lamb-to-the-slaughter/summary-and-analysis
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- https://interestingliterature.com/2017/07/18/a-summary-and-analysis-of-james-joyces-eveline/
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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Paper

Course Title: Literature and Gender

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per **Choice Based Credit System**	
	i)	Name of the Program	T.Y.B.A. English
	ii)	Course Code	UAENG506A& UAENG606A
	iii)	Course Title	Literature and Gender
	iv)	Semester wise Course Contents	Enclosed the copy of syllabus
	v)	References and Additional References	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	 04
	vii)	No. of lectures per Unit	15
	viii)	No. of lectures per week	03
	ix)	No. of Tutorials per week	--
2.		Scheme of Examination	4 Questions of 20 marks each and a project of 20 marks
3.		Special notes , if any	No
4.		Eligibility , if any	No
5.		Fee Structure	As per University Structure
6.		Special Ordinances / Resolutions if any	No

Syllabus for TYBA

Course: Literature and Gender

Course Codes: UAENG506A& UAENG606A

Objectives of the Course:

1) To introduce students to the politics of gender identity
2) To enable students to analyze gender
3) To empower students to scrutinize gendering in literature
4) To appreciate popular culture and diverse gender and sexual identities
5) To discern masculinities and femininities

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Understand politics of gender identities
2) Undertake gender analysis
3) Understand the gendering in literature
4) Appreciate popular culture and gender identities
5) Interpret masculinities and femininities

Semester V: Gender and Literature
Course code- UAENG506A 04 Credits Total Lectures: 45

Unit I: 15 Lectures

Schools of Feminism: Liberal and Marxist Feminism

Concepts: Patriarchy, Masculinity Studies, Sex and Gender, The Politics of Feminism(s), Gynocriticism, Indian Feminism

Unit II: Short-Stories 15 Lectures

Anne Petry: *Like a Winding Sheet*
Katherine Mansfield: *The Fly*
Dorothy Parker: *The Waltz*
Anita Desai: *The Domestic Maid*
Nathaniel Hawthorne: *The Birthmark*
Vishwapriya Iyengar : *The Library Girl*

Unit III: Novel 15 Lectures

Khaled Hosseini: *A Thousand Splendid Suns*

OR

Jeanette Winterson: *Oranges are not the only Fruit*

Semester End Examination Pattern: 80 Marks 2 1/2 Hours

Semester End Assessment: **80 marks**

Q 1. (a) Essay type question on School of Feminism 20 marks

OR

(b) Essay type question on School of Feminism

OR

(c) Short notes on Unit I: Concepts (Two out of Four)

Q 2. Essay type question on Unit II (One out of two) 20 marks

Q 3. Essay type question on Unit III (One out of two) 20 marks

Q 4 (a) Short notes from Unit II (One out of Two) 10 marks

(b) Short notes from Unit III (One out of Two) 10 marks

Internal Assessment (Project): **20 marks**

A project of 20 marks/semester to be undertaken by the students with particular focus on the schools of feminism studied in that particular semester. Students to analyse a novel of their choice (not prescribed in the syllabus) through the lens of Liberal/Marxist Feminism in Semester V and Socialist/Radical Feminism in Semester VI

Semester VI: Gender and Literature
Course Code- UAENG606A 04 Credits Total Lectures: 45

Unit I: **15 Lectures**

Schools of Feminism: Socialist and Radical Feminism

Concepts: Ecofeminism, Queer Theory, Postcolonial Feminism, Psychoanalytic Feminism, Postmodern Feminism

Unit II: Poetry **15 Lectures**

Carol Ann Duffy: *Little Red Cap*

Imtiaz Dharker : *Purdah I*

Walt Whitman: *We Two, How Long We were Fool'd*

Amrita Pritam : *I will Meet You Again*

Audre Lorde: *Coal*

Langston Hughes : *Young Sailor*

Café: 3 am

Unit III: Drama **15 Lectures**

Mahesh Dattani: *Tara*

OR

Lorraine Hansberry: *A Raisin in the Sun*

Evaluation Pattern:1) Semester End Examination: 80 Marks – 3Hours
2) Project: 20 Marks

The Semester End Examination for 80 marks will have 4 questions of 20 marks each.

Q 1. (a) Essay type question on School of Feminism 20 marks

OR

(b) Essay type question on School of Feminism

OR

(c) Short notes on Unit I: Concepts (Two out of Four)

Q 2. Essay type question on Unit II (One out of two) 20 marks

Q 3. Essay type question on Unit III (One out of two) 20 marks

Q 4 (a) Short notes from Unit II (One out of Two) 10 marks

(b) Short notes from Unit III (One out of Two) 10 marks

Internal Assessment (Projest): 20 marks

A project of 20 marks/semester to be undertaken by the students with particular focus on the schools of feminism studied in that particular semester. Students to analyze a novel of their choice (not prescribed in the syllabus) through the lens of Socialist/Radical Feminism in Semester VI.

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2. Rai Shirin. 2008. The Gender Politics of Development. New Delhi: Zubaan.
3. Kapadia Karin. 2003. The Violence of Development. New Delhi : Zubaan.
4. Tsikata Dzodzi and Pamela Golah. 2010. Land Tenure, Gender, and Globalisation. New
5. Maithreyi Krishna Raj Women Studies in India – Some Perspectives (Bombay: Popular Prakasham, 1986).

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6. Ella Rule (Ed): Marxism and the Emancipation of Women (Great Britain Harpal Brar, 2000).
7. Reina Lewis, Sara Mills (Ed.), Feminist Postcolonial Theory – A Reader Edinburgh University Press, Edinburgh, 2003.
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9. Hasan Zoya (ed) 1994) Forging Identities: Gender Communities and State, New Delhi, Kali for Women.
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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Course

Course Title: Drama and Theatre

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG506B & UAENG606B
	iii)	Course Title :	Drama and Theatre
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Drama and Theatre

Course Codes: UAENG506B & UAENG606B

Objectives of the Course:

1) To acquaint the learners of literature with various types of drama.
2) To sensitize them to the techniques and types of theatre.
3) To identify and discuss the theoretical and practical elements of drama.
4) To introduce them to drama as a performing art.
5) To enhance their understanding of the elements of theatre.
6) To enable the learners to critically watch a play, write a review and to put up a play.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Analyse the social and artistic movements that have shaped theatre and drama.
2) Apply discipline-specific skills to the creation of drama.
3) Analyze the difference between the concepts of drama and theatre.
4) Demonstrate knowledge of the history of drama and theatre as a literature and performing art.

Semester V: Drama and Theatre
Course code- UAENG506B **4 Credits** **Total Lectures: 45**

Unit 1: Literary Terms **(15 Lectures)**

i) Sanskrit Theatre
ii) Greek Tragedy
iii) Senecan Tragedy
iv) Indian English Drama in Translation
v) Structure of Elizabethan Theatre
vi) Poetic Drama

Unit 2: A) Tendulkar Vijay: *The Vultures* **(15 Lectures)**

OR

B) AdyaRangacharya: *Sanjivani*

Unit 3: A) Aeschylus: *Prometheus Bound* **(15 Lectures)**

OR

B) Eliot T.S.: *The Cocktail Party*

Semester VI: Drama and Theatre
Course code- UAENG606B **4 Credits** **Total Lectures: 45**

Unit 1: Literary Terms (15 Lectures)

i) Problem Play
ii) Expressionism
iii) Theatre of the Absurd
iv) Angry Young Men Theatre
v) Make-up and Costume
vi) One Act Play

Unit 2: A) O'Neill Eugene: *Desire under the* Elms **(15 Lectures)**
OR
B) Ibsen Henrik: *An Enemy of the People*

Unit 3: A) Albee Edward: *The Zoo* Story **(15 Lectures)**
OR
B) Chekhov Anton: *The Proposal*

Semester End Examination Pattern: 80 Marks 2 ½ Hours

Semester End Examination Pattern:

Q.1 A. Essay type Or B. Essay type Or C. Short Notes (2 out of 4) - Unit 1 (20 Marks)
Q.2 Essay Type Question (1 out of 2) - Unit 2 (20 Marks)
Q.3 Essay Type Question (1 out of 2) - Unit 3 (20 Marks)
Q.4 Short Notes (2 out of 4) – 02 each on Unit 2 and 3 (15 Marks)

Project 20 Marks:

Writing new/original one act play. Transcreation: A short story to be adopted as a one act play. Translation of any one act play in Indian Language into English. Group performance of any one act play.

Recommended Reading:

AllardyceNicoll. *A History of English Drama* 3 Vol. Set. Cambridge: 1946.

Bentley, Eric. *The Theory of the Modern Stage: An Introduction to Theatre and Drama.* London: Penguin Books, 1968.

Beth Osnes. Santa Barbara(ed.) *Acting: an International Encyclopedia*. California; Denver Colorado : ABC-CLIO, c2001. Main Stack PN 2035 .O84 2001

Bratton, J. S. *New Readings in Theatre History: Theatre and Performance Theory*. Cambridge: Cambridge University Press, 2003.

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Taylor, Russell John: *Anger and After: Guide to the New British Drama.* London: Eyre Methune, 1977.

Williams, Raymond .*Drama from Ibsen to Brecht* .London: Penguin Books, 1973.

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Paper

Course Title: Film and Literature

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG506C & UAENG606C
	iii)	Course Title :	Film and Literature
	iv)	Semester wise Course Contents :	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure No. of Credits per Semester :	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each and a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Film and Literature

Course Codes: UAENG506C & UAENG606C

Objectives of the Course:

- To introduce the nature of film as an 'art' form.
- To explore how film as art and literature influence each other.
- To expand analytical skill towards film adaptation.
- To appreciate and evaluate different perspectives on film adaptations.
- To create responses in thinking critically about films.

Outcome of the Course:

After completion of the course, students are expected to be able to:

- To understand the nature of film as an 'art' form.
- To explore ways in which film as art and literature influence each other.
- To expand existing textual analytical skill towards an understanding of film adaptation.
- To understand different perspectives on film adaptations.
- To aid students to think critically and articulate in writing responses about films.

Semester V: Film and Literature – I
Course code- UAENG506C **4 Credits** **Total Lectures: 45**

Unit 1 Image and Art **15 Lectures**

- Early Theories of Film.
- Cinema's evolution as a distinct art form.

Unit 2 Evolving technological innovations in cinema and directorial interventions **15 Lectures**

- Movement -Lumiere Brothers
- Cinematic effects - **Georges Méliès**
- Editing -Edwin Porter and Sergei Eisenstein
- Cinematography and narrative – D.W. Griffith and Orson

Unit 3 Film and ideology **15 Lectures**

- Defining ideology in film
- Disrupting hegemony of western models of performance and cultural dominance in Shakespearean adaptations.
  Recommended Films: *Omkara* (2006), *Haider* (2014) Director: Vishal Bharadwaj adapted from William Shakespeare's *Othello* and *Hamlet*

Topics for Project:

- Application of Film Terms as Point of View, Mise-en-Scene
- Editing, Narrative in Film
- Researching on movies
- Writing a screening report
- Writing a movie review
- Comparing the earlier and later versions of the same movie

Semester VI: Film and Literature-II

Course code- UAENG606C **4 Credits** **Total Lectures: 45**

Unit 1 Critical Approaches toward Films Analysis 15 Lectures

- Gender-based Approach
- Marxist Approach
- Psychoanalytical Approach
- Post-Colonial Approach

Recommended Films: *Mirch Masala* (1987) Director: Ketan Mehta,

Metropolis (1927) Director: Fritz Lang

Vertigo (1958) Director: Alfred Hitchcock

Satya (1998) Director: Ram Gopal Varma

Chungking Express (1994) Director: Wong Kar Wai

In the Mood for Love (2000) Director: Wong Kar Wai

Unit 2 Adaptations: Definitions and Approaches 15 Lectures

Defining the concept of adaptations and understanding literal, traditional, and radical translations of the source text

Recommended Film: *Adaptation* (2002). Director Spike Jonze

Unit 3 Novel to Film 15 Lectures

- *Passage to India*. E.M. Forster (1924)

  Film: *Passage to India* (1984) dir. David Lean

  OR

- *The Hours*. Michael Cunningham (1998)

  Film: The Hours (2002) dir. Stephen Daldry

Topics for Project:

Writing a report on inter-genre adaptations

Observations on Cinema and digital culture

Transitions in adaptations of literary sources as narratives

Reviews on adaptations of identity and history

Recommended Novel and Film: *Watchmen* (1987) Alan Moore and Dave Gibbons

Watchmen (2009) Director: Zack Snyder

Evaluation Pattern:1) Semester End Examination: 80 Marks – 2 ½ Hours

2) Project: 20 Marks

The Semester End Examination for 80 marks will have 4 questions (with internal choice) of 20 marks each:

Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (two out of four) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)- Unit 2 & Unit 3

Recommended Reading:

- Austerlitz, Saul. *Black and White*. Reverse Shot Online. n.d. Web. 22 Sept 2009.
- Bharucha, Rustom. "Foriegn Asia/ Foriegn Shakespeare. Dissenting notes on New Asian Interculturality, Postcoloniality and Recolonization".*Theatre Journal*, vol 56, issue 1, 2004, pp1-28.
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- Hess, John. "*Film and Ideology"*. *Jump Cut,* no. 17, April 1978, pp. 14-16.
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- Jeong,Seung-hoon. *Cinematic Interfaces: Film Theory After New Media*, Routledge, 2013.
- Keane,Stephen.*CineTech: Film, Convergence and New Media*, Macmillan Education,2006.
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- Žižek, Slavoj. *The Fright of Real Tears: Krzysztof Kieślowski Between Theory and Post-Theory*. 2001

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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Optional Paper

Course Title: Literature of Protest

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG506D& UAENG606D
	iii)	Course Title :	Literature of Protest
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each, and a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Literature of Protest

Course Codes: UAENG506D& UAENG606D

Objectives of the Course:

1. To explore voices of discord, rhetoric and cultural contexts.
2. To compare and contrast the artistic manoeuvres.
3. To examine the protest spectrum in literature.
4. To bring in panoramic understanding of global protest literature and ideologies.
5. To learn the historical links between forms of protest and meanings of literature

Outcome of the Course: After completion of the course, students are expected to be able to:

1. Read and interpret cross cultural texts.
2. Understand protest literature.
3. Get sensitized towards global issues.
4. Learn to look into past, correlate it to present and future.
5. Understand the historicity of protest literature.

Semester V: Literature of Protest– I		
Course code- UAENG506D	**04 Credits**	**Total Lectures: 45**

Unit 1: Background Topics: **15 Lectures**

1. Literature and Protest
2. Politics and Language of Protest
3. Translation and Literature of Protest
4. Concept of Caste, Varna Theory and Division of Labor
5. Concept of Race and Discrimination
6. Protest in African American, Dalit and Tribal Literature

Unit 2: Autobiography: 15 Lectures

I Want to Destroy Myself: A Memoir- Mallika Amar Shaikh Translated by Jerry Pinto

Or

Dreams from My Father- Barack Obama

Unit 3: Short Story 15 Lectures

1. Death of a Rich Man
2. When the Sun God Refused to Set
3. Loneliness of An Ex-soldier
4. Confessions of a Graveyard Keeper

(The stories are from *Desperate Men and Women: Ten Dalits Short Stories from India*, edited by Rangrao, B., Kalpaz Publications, 2013)

Semester End Examination Pattern: 80 Marks 3 Hours

Q 1. (a) Short notes on Unit I: Concepts (Two out of Four)	20
Q 2. (a) Essay type question on Unit II(One out of Two)	20
Q 3. (a) Essay type question on Unit III (One out of Two)	20
Q 4. (a) Short notes on Unit II (One out of Two)	10
(b) Short notes on Unit III (One out of Two)	10

Internal Assessment: 20 marks

A project of 20 marks/semester (1500-2000 words) to be undertaken by the students with particular focus on the protest literature in the writings such as Aboriginal literature, Dalit literature, Tribal Literature, African American literature. Students to analyse an autobiography or 5 short stories of their choice (not prescribed in the syllabus) through the lens of protest in Semester V)

Semester VI: Literature of Protest – II
Course code- UAENG606D **03 Credits** **Total Lectures: 45**

Unit I: Protest in Contemporary Regional Writings: **15 Lectures**

1. Marathi Literature
2. Tamil Literature
3. Gujrati Literature
4. Kannada Literature
5. Hindi Literature
6. Bengali Literature

Unit 2: Novel: **15 Lectures**

Uncle Tom's Cabin- Harriet Beecher Stowe

Or

My Father Baliah- Y.B.Satyanarayana

Unit 3: Poetry **15 Lectures**

Kamala Das: 1. *The Looking Glass 2. Forest Fire*

Meena Kandasamy: 1. Advaita: The Ultimate Question, 2. The Gods Wake Up

Jyoti Lanjewar: 1. The Nameless Ones (anamikas), 2. Caves,

Semester End Examination Pattern: 80 Marks 3 Hours

Q 1. (a) Short notes on Unit I: Concepts (Two out of Four)	20
Q 2. (a) Essay type question on Unit II (One out of Two)	20
Q 3. (a) Essay type question on Unit III (One out of Two)	20
Q 4. (a) Short notes on Unit II (One out of Two)	10
(b) Short notes on Unit III (One out of Two)	10

Internal Assessment: 20 marks

A project of 20 marks/semester (1500-2000 words) to be undertaken by the students with particular focus on the protest literature in the writings such as Aboriginal literature, Dalit literature, Tribal Literature, African American literature. Students to analyse a novel or 5 poems of their choice (not prescribed in the syllabus) through the lens of protest in Semester VI)

Recommended Reading:

Ambedkar B. R., 1978, *Dr. Babasaheb Ambedkar's Writings and Speeches*, vol 1, Education Department, Government of Maharashtra, Bombay

Lohia, Rammanohar, 1964, *The Caste System*, Rammanohar Lohia Samta Vidyalaya Nyas, Hyderabad.

Dangle, Arjun. *Poisoned Bread: Translations from Modern Marathi Dalit Literature*. Orient Longman, 1992 –

Faye, Harrison. The Persistent Power of "Race" in the Cultural and Political Economy of Racism. *Annual Review of Anthropology* 24:47-74.

Nath, J.P., 2002, *Socialist Leadership in India*, Kanishka Publishers, New Delhi

Sharan Kumar Limbale and Jaydeep Sarangi, 2018. *Dalit Voice: Literature and Revolt*. Authors Press, New Delhi

Zoe, Trodd. *American Protest Literature*.2008. Belknap Press of Harvard University Press.

Drake, Kimberly. Literature of Protest.2013.Salem Press.

Patricia D. Netzley 1999, *Social Protest Literature: An Encyclopedia of Works, Characters, Authors, and Themes*. ABC-CLIO Literary Companion

Faye, Harrison.2008. *Outsider Within: Reworking Anthropology in the Global Age*. Urbana: University of Illinois Press.

Guru, Gopal, 2008. *Humiliation: Claims and Context*. Oxford University Press Delhi.

Hilliard, Nunn, 1998. Representing African Women in Movies in J. D. Hamlet (Ed.), *Afrocentric Visions: Studies in Culture and Communication*. Sage Publications. USA.

Bhowmik, Davinder & Steve Rabson. 2016. *Islands of Protest: Japanese Literature from Okinawa*

University of Hawai Press.

Reed, T.V. “Introduction” and “Reflections on the Cultural Study of Social Movements.” in *The Art of Protest: Culture and Activism from the Civil Rights Movement to the Streets of Seattle*. Minneapolis: University of Minnesota Press, 2005

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9	Dr. Madhavi Nikam	Asst. Professor, Department of English, R.K.T. College, Ulhasnagar	Member
10	Dr. B.N. Gaikwad	Asst. Professor & Head, Department of English, Acharya Marathe College, Chembur, Mumbai	Member
11	Dr. R.M. Badode	Professor (Retd.) Department of English, University of Mumbai, Mumbai	Spl. Invitee

UNIVERSITY OF MUMBAI
No. UG/02of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Sc. degree course , **vide** this office Circular No. UG/130 of 2009, dated 4th May, 2009 and the Principals of affiliated Colleges in Science and the Heads of recognized Institutions concerned are hereby informed that the revised syllabus approved in the Academic Council meeting held on 11th March, 2016 **vide** item No. 4.7 and that in accordance therewith, the revised syllabus as per the Credit Based Semester and Grading System for S.Y. B.Sc. Zoology (Sem.III & IV) degree programmes, which are available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

sd/-
MUMBAI – 400 032 REGISTRAR
21st April, 2016

To,

The Principals of the affiliated Colleges in Arts & Science and the Heads of Recognized Institutions concerned.

A.C/4.7/11.03.2016

****

No. UG/02-A of 2016 MUMBAI-400 032 21st April, 2016

Copy forwarded with Compliments for information to:-

1) The Deans, faculties of Science,
2) The Chairman, Board of Studies in Zoology,
3) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
4) The Director, Board of College and University Development,
5) The Co-Ordinator, University Computerization Centre,
6) The Controller of Examinations.

Deputy Registrar
Under Graduate Studies

...PTO

UNIVERSITY OF MUMBAI

Program: S.Y.B. Sc.

Course: Zoology

(Credit Based Semester and Grading System

with effect from the academic year 2016–2017)

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Dr Bindu Acharya	Member (Teacher)
Dr Lalna Khot	Member (Teacher)
Ms Jariya Khan	Student
Ms Pranjali Tripathi	Student
Mr Nishant Gupta	Student
Ms Tanuja Amasa	Student

Syllabus for

S.Y.B.Sc.

Course – ZOOLOGY

To be implemented from Academic year 2016-17

SEMESTER - III

COURSE CODE	UNIT	TOPIC	CREDITS	LECTURES/ WEEK
USZO301	I	Fundamentals of Genetics,	2	1
	II	Chromosomes and Heredity,		1
	III	Nucleic acids		1
USZO302	I	Study of Nutrition and Excretion	2	1
	II	Study Respiration and circulation,		1
	III	Control and coordination, Locomotion and Reproduction		1
USZO303	I	Ethology	2	1
	II	Parasitology		1
	III	Economic Zoology		1
USZOP3	Practical based on all three courses		03	**9**

SEMESTER - IV

COURSE CODE	UNIT	TOPIC	CREDITS	LECTURES/ WEEK
USZO401	I	Origin and evolution of Life,	2	1
	II	Population genetics and evolution,		1
	III	Scientific Attitude methodology , writing and ethics		1
USZO402	I	Cell Biology,	2	1
	II	Endo membrane System		1
	III	Biomolecules		1
USZO403	I	Comparative Embryology,	2	1
	II	Aspects of Human Reproduction,		1
	III	Pollution and its effect on organisms		1
USZOP4	Practical based on all three courses		03	**9**

Syllabus for
S.Y.B.Sc
Course – ZOOLOGY

1. Syllabus Semester III & IV (Theory and Practical)
2. References and Additional Reading
3. Scheme of Examination and Paper Pattern (Thoery and Practical)
4. Model Question bank

S.Y.B.Sc. ZOOLOGY UNIT WISE DISTRIBUTION

Semester III			Semester IV		
Course 5	**Course 6**	**Course 7**	**Course 8**	**Course 9**	**Course 10**
Unit 1 Fundamentals of Genetics	**Unit 1** Study of Nutrition & Excretion	**Unit 1** Ethology	**Unit 1** Origin & Evolution of Life	**Unit 1** Cell Biology	**Unit 1** Comparative Embryology
Unit 2 Chromosome & Heredity	**Unit 2** Study of Respiration & circulation	**Unit 2** Parasitology	**Unit 2** Population Genetics & Evolution	**Unit 2** Endomembrane System	**Unit 3** Aspects of human Reproduction
Unit 3 Nucleic Acids	**Unit 3** Control and Coordination Locomotion & Reproduction	**Unit 3** Economic Zoology	**Unit 3** Scientific Attitude, Methodology, Writing & Ethics	**Unit 3** Biomolecules	**Unit 3** Pollution & Effects on Animals
Practical (USZO P3)	**Practical (USZO P3)**	**Practical (USZO P3)**	**Practical (USZO P4)**	**Practical (USZO P4)**	**Practical (USZO P4)**

S.Y.B.Sc SYLLABUS DRAFT

SEMESTER III

Sr. No	USZO301 COURSE-5	No of lect allotted	Learning pleasure
	Fundamentals of Genetics, Chromosomes and Heredity, Nucleic acids		
	Unit 1: Fundamentals of Genetics	**15L**	**25hrs**
	***Objectives* :** ➢ *To Introduce basic terms of genetics* ➢ *To study Mendelian principles of inheritance and other forms pattern of inheritance*		
.	**Desired *outcomes :*** ➢ *Understand and apply the principles of inheritance.* ➢ *Understand the concept of multiple alleles, linkage and crossing over.*		
1.1	**Introduction to genetics** ➢ Definition, scope and importance of genetics. ➢ Classical and Modern concept of Gene (Cistron, muton, recon). ➢ Brief explanation of the following terms: Allele, wild type and mutant alleles, locus, dominant and recessive traits, homozygous and heterozygous, genotype and phenotype, genome.	**2L**	**2hrs**
1.2	**Mendelian Genetics** ➢ Mendelian Genetics**:** Monohybrid cross, Dihybrid cross, test cross, back cross, Mendel's laws of Inheritance, Mendelian traits in man. ➢ Exceptions to Mendelian Inheritance: Incomplete dominance, Co-dominance, Lethal alleles, Epistasis - Recessive, Double recessive, dominant and double dominant. ➢ Chromosome theory of inheritance. ➢ Pedigree analysis-Autosomal dominant and autosomal recessive, X-linked dominant, and X-linked recessive	**8L**	**12hrs**
1.3	**Multiple Alleles and Multiple Genes** ➢ Concept of multiple alleles, Coat colour in rabbit, ABO and Rh blood group systems ➢ Polygenic inheritance with reference to skin colour and eye colour in man. ➢ Concept of pleiotropy.	**3L**	**06hrs**
1.4	**Linkage and Crossing Over** ➢ Linkage and crossing over, types of crossing over, cytological basis of crossing over.	**2L**	**05hrs**
	Unit: 2: Chromosomes and Heredity	**15 L**	**26hrs**
	Learning objectives:		

	➢ *To familiarize the learners with the structure, types and classification of chromosomes.* ➢ *To introduce the concept of sex determination and its types, sex influenced and sex limited genes.*		
	Desired Outcomes: ➢ *Learners would understand the structure and types of chromosomes.* ➢ *Learners would understand mechanisms of sex determination.* ➢ *Learners would be able to correlate the disorders linked to a particular sex chromosome.*		
2.1	**Chromosomes** ➢ Types of chromosomes–Autosomes and Sex chromosomes ➢ Chromosome structure - Heterochromatin, Euchromatin ➢ Classification based on the position of centromere ➢ Endomitosis, Giant chromosomes- Polytene and Lamp brush chromosomes and significance of Balbiani rings.	**4L**	**8hrs**
2.2	**Sex- determination** ➢ Chromosomal Mechanisms: XX-XO, XX-XY, ZZ-ZW. ➢ Sex determination in honey bees- Haplodiploidy, ➢ Sex determination in *Drosophila*-Genic balance theory, intersex, gynandromorphs. ➢ Parthenogenesis. ➢ Hormonal influence on sex determination-Freemartin and sex reversal. ➢ Role of environmental factors- Bonellia and Crocodile ➢ Barr bodies and Lyon hypothesis	**7L**	**10hrs**
2.3	**Sex linked, sex influenced and sex limited inheritance.** ➢ X-Linked: Colourblindness, Haemophilia ➢ Y-linked: Hypertrichosis ➢ Sex-influenced genes ➢ Sex limited genes	**4L**	**8hrs**
	Unit: 3 Nucleic acids	**15 L**	**30hrs**
	***Objectives*:** ➢ *To introduce to the learners the classical experiments proving DNA as the genetic material.* ➢ *To make the learner understand the structure of nucleic acids and the concept of central dogma of molecular biology.* ➢ *To familiarize the learner with the concept of gene regulation.*		
	Desired Outcomes: ➢ *Learner would understand the importance of nucleic acids as genetic material.* ➢ *The learners would understand and appreciate the regulation of gene expressions.*		

3.1	**Genetic material** ➢ Griffith's transformation experiments, Avery-Macleod and McCarty, Hershey Chase experiment of Bacteriophage infection ➢ Chemical composition and structure of nucleic acids. ➢ Double helix nature of DNA, Solenoid model of DNA. ➢ Types of DNA – A, B, Z & H forms. ➢ DNA in Prokaryotes -chromosomal and plasmid. ➢ Extra nuclear DNA -mitochondria and chloroplast. ➢ RNA as a genetic material in viruses. ➢ Types of RNA: Structure and function.	**7L**	**14hrs**
3.2	**Flow of genetic information in a Eukaryotic cell** ➢ DNA Replication ➢ Transcription of mRNA ➢ Translation ➢ Genetic code	**5L**	**08hrs**
3.3	**Gene Expressions and regulation** ➢ One gene-one enzyme hypothesis /one polypeptide hypothesis ➢ Concept of operon ➢ Lac operon	**3L**	**08hrs**

Sr. No	**USZO302 COURSE-6**	**No of lect allotted**	**Learning pleasure**
	Study of Nutrition and Excretion , Respiration and circulation, Control and coordination, Locomotion and Reproduction		
	Unit: 1 Study of Nutrition and Excretion	**15L**	**23hrs**
	Objective : ➢ *To introduce the concepts of physiology* of nutrition, excretion and osmoregulation. ➢ *To expose the learners to various nutritional apparatus, excretory and osmoregulatory structures in different classes of organisms.*		
	Desired Outcome : ➢ *Learners would understand the increasing complexity of nutritional, excretory and osmoregulatory physiology in evolutionary hierarchy.* ➢ *Learners would be able to correlate the habit and habitat with nutritional, excretory and osmoregulatory structures.*		
1.1	➢ Comparative study of Nutritional Apparatus (structure and function): Amoeba, Hydra, Earthworm, Cockroach, Bivalve, Amphioxus, Pigeon, Ruminants.	5L	06hrs
1.2	➢ Physiology of digestion in man	2L	04hrs

1.3	➢ Comparative study of Excretory and Osmoregulatory structures and function a. Amoeba -contractile vacuoles b. Planaria -Flame cells c. Earthworm -Nephridia d. Cockroach-Malphigian tubules and green gland e. Bivalve -Organ of Bojanus	5L	08hrs
1.4	➢ Categorization of animals based on principle nitrogenous excretory products	1L	01hrs
1.5	➢ Structure of kidney, Uriniferous tubule and physiology of urine formation in man.	2L	04hrs
	Unit: 2 Study of Respiration and circulation	**15L**	**27hrs**
	***Objective* :** ➢ *To introduce the concepts of physiology of respiration and circulation* ➢ *To expose the learners to various respiratory and circulatory structures in different classes of organisms.*		
	Desired Outcome: ➢ *Learners would understand the increasing complexity of respiratory and circulatory physiology in evolutionary hierarchy.* ➢ *Learners would be able to correlate the habit and habitat with respiratory and circulatory structures.*		
2.1	➢ Comparative study of Respiratory organs (structure and function) Earthworm, Spider, Rohu, Frog and Pigeon.	**3L**	**06hrs**
2.2	➢ Accessory respiratory structures: Anabas /Clarius	**1L**	**02hrs**
2.3	➢ Structure of lungs and physiology of respiration in man	**2L**	**04hrs**
2.4	➢ Comparative study of circulation: Open and closed - single and double .	**1L**	**02hrs**
2.5	➢ Types of circulating fluids- Water, coelomic fluid, haemolymph, lymph and blood.	**2L**	**02hrs**
2.6	➢ Comparative study of Hearts (Structure and function) Earthworm, Cockroach, Shark, Frog, Crocodile and Pigeon.	**4L**	**07hrs**
2.7	➢ Structure and mechanism of working of heart in man	**2L**	**04hrs**
	Unit: 3 Control and coordination, Locomotion and Reproduction	**15L**	**25hrs**
	***Objective* :** ➢ *To introduce the concepts of physiology of control and coordination and locomotion and reproduction* ➢ *To expose the learners to various locomotory and reproductive structures in different classes of organisms*		
	***Desired Outcome**:*		

	➢ *Learners would understand the process of control and coordination by nervous and endocrine regulation.* ➢ *Learners would be fascinated by various locomotory structures found in the animal kingdom.* ➢ *Learners would be acquainted with various reproductive strategies present in animals.*		
3.1	**Control and coordination** ➢ Irritability –Paramoecium , Nerve net in Hydra, Nerve ring and nerve cord in earthworm ➢ Types of neurons on the basis of structure and function ➢ Conduction of nerve impulse: Resting potential, action potential and refractory period ➢ Synaptic transmission ➢ Endocrine regulation: Hormones as chemical messengers, feedback mechanisms	**5L**	**08hrs**
3.2	**Movement and Locomotion** ➢ Locomotory organs -structures and functions a. Pseudopodia in Amoeba (sol gel theory), Cilia in Paramecium b. Wings and legs in Cockroach c. Tube feet in Starfish d. Fins of fish	**4L**	**08hrs**
3.3	➢ Structure of Striated muscle fibre in human and Sliding filament theory	**2L**	**02 hrs**
3.4	**Reproduction** a. Asexual Reproduction- Fission, fragmentation, gemmule formation, budding b. Sexual reproduction i. Gametogenesis ii. Structure of male and female gametes in human iii. Types of fertilization iv. Oviparity, viviparity, ovo-viviparity	**4L**	**07hrs**
	USZO 303 COURSE-7		
	Ethology , Parasitology, Economic Zoology	**15L**	**26hrs**
	Unit: 1 Ethology		
	Objective: ➢ *To equip learners with a sound knowledge of how animals interact with one another and their environment.* ➢ *To enable the learners to understand different behavioural patterns.*		
	Desired Outcome: ➢ *Learners would gain an insight into different types of animal behaviour and their role in biological adaptations.* ➢ *Learners would be sensitized to the feelings instrumental in social behavior.*		

1.1	**Introduction to Ethology** ➢ Definition, History and Scope of Ethology ➢ Animal behaviour - Innate and Learned behaviour ➢ Types of learning -Habituation, Imprinting and types of imprinting -filial and sexual, Classical conditioning, Instrumental learning and insight learning.	**4L**	**06hrs**
1.2	**Aspects of animal behaviour** ➢ Communication in Bees and Ants ➢ Mimicry and colouration ➢ Role of hormones and pheromones in sexual behaviour ➢ Displacement activities, Ritualization ➢ Migration in fish, schooling behaviour ➢ Habitat selection, territorial behaviour, food selection and foraging behaviour in African ungulates	**6L**	**12hrs**
1.3	**Social behaviour** ➢ Social behaviour in primates -Hanuman langur ➢ Elements of Socio-biology: Selfishness, cooperation, altruism, kinship and inclusive fitness	**5L**	**08hrs**
	Unit: 2 Parasitology	**15L**	**27hrs**
	Objective: ➢ *To acquaint learners with the concepts of parasitism, their relationship with environment.* ➢ *To make learners aware about the modes of transmission of parasites.*		
	Desired Outcome: ➢ *Learners would understand the general epidemiological aspects of parasites that affect humans and apply simple preventive measures for the same.* ➢ *Learners would comprehend the life cycle of specific parasites, the symptoms of the disease and its treatment.*		
2.1	**Introduction to Parasitology and types of parasites** ➢ Definitions: parasitism, host, parasite, vector-biological and mechanical ➢ **Types of parasites-** Ectoparasites, Endoparasite and their subtypes ➢ Parasitic adaptations in Ectoparasites and Endoparasites ➢ Types of hosts: intermediate and definitive, reservoir	**2L**	**06hrs**
2.2	**Host-parasite relationship-Host specificity** ➢ Definition, structural specificity, physiological specificity and ecological specificity.	**2L**	**06hrs**
2.3	**Life cycle, pathogenicity, control measures and treatment** ➢ *Entamoeba histolytica, Fasciola hepatica, Taenia solium, Wuchereria bancrofti*	**5L**	**06hrs**

2.4	**Morphology, life cycle, pathogenicity, control measures and treatment** ➢ Head louse (*Pediculus humanus capitis*), Mite (*Sarcoptes scabei),* Bed bug (*Cimex lectularis)*	**2L**	**06hrs**
2.5	**Parasitological significance** ➢ Zoonosis- Bird flu, Anthrax, Rabies and Toxoplasmosis	**4L**	**03hrs**
	Unit 3 Economic Zoology	**15L**	**24hrs**
	Objective*:* ➢ *To disseminate information on economic aspects of zoology like apiculture, vermiculture, dairy science.* ➢ *To encourage young learners for self employment.*		
	Desired Outcome: ➢ *Learners would gain knowledge on animals useful to mankind and the means to make the most of it.* ➢ *Learners would learn the modern techniques in animal husbandry.* ➢ *Learners would be pursuing entrepreneurship as careers*		
3.1	**APICULTURE**	**5L**	**08hrs**
3.1.1	**Methods of bee keeping and management** ➢ An introduction to different species of honey bees used in apiculture. ➢ Selection of flora and bees for apiculture. ➢ Advantages and disadvantages of traditional and modern methods of apiculture. ➢ Pests and Bee enemies- Wax moth, wasp, black ants, bee eaters , king crow and disease control ➢ Bee keeping industry- Present status and recent efforts to improve and boost the industry		
3.1.2	**Economic importance** ➢ Honey- Production, Chemical composition and economic importance ➢ Bees wax- Economic importance. ➢ Role of honey bees in pollination.		
3.2	**VERMICULTURE**	**4L**	**08hrs**
3.2.1	**Rearing methods, management and economic importance** ➢ An introduction to different species of earthworms used in vermiculture. ➢ Methods of vermiculture. ➢ Maintenance and harvesting ➢ Economic importance: advantages of vermiculture, demands for worms; market for vermicompost and entrepreneurship.		
3.3	**DAIRY SCIENCE**	**6L**	**08hrs**

3.3.1	**Dairy development in India** ➢ Role of dairy development in rural economy, employment opportunities		
3.3.2	**Dairy Processing** ➢ Filtration, cooling, chilling, clarification, pasteurization, freezing		
3.3.3	**Milk and milk products** ➢ Composition of milk ➢ Types of milk: Recombined milk, Soft curd milk, Skimmed and toned milk, Artificial milk. ➢ Milk products		

	SEMESTER III
	Practical USZOP3 (Course V)
1	Extraction and detection of DNA
2	Extraction and detection of RNA.
3	Mounting of Barr bodies.
4	Study of polytene chromosome.
5	Study of mitosis- temporary squash preparation of Onion root tip
6	Detection of blood groups and Rh factor.
7	Problems in genetics a. Monohybrid/ Dihybrid cross b. X- linked inheritance c. Multiple alleles
8	Chromosome morphology: Metaphase spreadsheet (photograph to be provided)
9	Pedigree analysis
10	Problems on molecular biology
	Practical USZOP3 (Course VI)
1	Urine analysis—Normal and abnormal constituents
2	Detection of ammonia in water excreted by fish
3	Detection of uric acid from excreta of Birds
4	Study of striated and non- striated muscle fibre
5	Study of nutritional Apparatus (Amoeba, Hydra, Earthworm, Pigeon, Ruminant stomach)
6	Study of respiratory structures: a. Gills of Bony fish and Cartilaginous fish. b. Lungs of Frog c. Lungs of Mammal. d. Accessory respiratory structure in Anabas (Labyrinthine organ) e. Air sacs of Pigeon.
7	Study of locomotory organs (*Amoeba*, *Unio*, Cockroach, Starfish, Fish, and Birds)

8	Study of hearts (Cockroach, Shark, Frog, *Calotes*, Crocodile, Mammal)
9	Study of permanent slides on topic of Reproduction a. Sponge gemmules b. Hydra budding c. T.S. of mammalian testis d. T.S. of mammalian ovary
	Practical USZOP3 (Course VII)
1	Extraction of Casein from Milk and its qualitative estimation
2	Preparation of paneer from given milk sample
3	Measurement of density of milk using different samples by Lactometer
4	Study of Honey Bee : a) Life Cycle of Honey Bee and Bee Hive b) Mouthparts of Honey Bee c) Legs of Honey Bee d) Sting Apparatus of Honey Bee
5	Study of ethological aspects: a) Warning Colouration b) Instincts c) Imprinting d) Communication in animals: Chemical signals and sound signals e) Displacement activities in animals: Courtship and mating behavior in animals and ritualization
6	Study of Protozoan parasites: a. *Trypanosoma gambiense* *b. Giardia intestinanalis*
7	Study of Helminth parasites: *a) Ancylostoma duodenale* *b) Dracunculus medenensis*
8	Parasitic adaptations: Scolex and mature proglottid of Tapeworm
9	Study of Ectoparasites: a. Leech b. Tick c. Mite
10	Project- Suggested topics on economic zoology (eg Apiculture, sericulture/ lac culture / vermicompost Technique / Construction of artificial beehives /Animal husbandry/ aquaculture etc)

Note -The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.
#There shall be at least one excursion/field trip.

Semester –III

REFERENCE BOOKS AND ADDITIONAL READING

COURSE-V (USZO301)

1. Principles of Genetics. Gardner, E.J., Simmons, M.J and Snustad, D.P. John Wiley and Sons
2. Concepts of Genetics. Klug, W.S., Cummings M.R., Spencer, C.A. Benjamin Cummings.
3. Genetics- A Molecular Approach. Russell, P. J Benjamin Cummings.
4. Genetics: Analysis of Genes and Genomes. Daniel L., Hartl, Elizabeth W. Jones Jones & Bartlett Publishers
5. Introduction to Genetic Analysis. Griffiths, A.J.F., Wessler. S.R., Lewontin, R.C. and Carroll, S.B. W. H. Freeman and Co.
6. Cell Biology Genetics , Molecular Biology Evolution and Ecology Verma P.S. and Agrawal P.K., 9th edition, S. Chand Publication, New Delhi.
7. Principles of Genetics – Eight edition- Eldon john Gardner, Michael J. Simmons, D. Peter Snustad
8. Genetics- Weaver, Hedrick, third edition, Mc Graw Hill Education
9. Genetics A Mendelian approach Peter J.Russel, Pearson Benjamin Cummings
10. Genetics A conceptual approach, Benjamin A. Pierce, Southwestern University, W.H. Freeman and company, New York
11. Genetics, Third Edition, Monroe W. Strickberger
12. Genetics from gene to genome, third edition, Leeland H. Hartwell, Leeroy Hood, Michael 7. L. Goldberg, Ann E. Reynolds, Lee M. Silver, McGraw Hill Education

COURSE-VI (USZO302)

1. Vertebrate Zoology Volume I- Jordan and Verma , S. Chand and Co.
2. Invertebrate Zoology Volume II- Jordan and Verma , S. Chand and Co.
3. Invertebrate Zoology- Majupuria T. C., Nagin S.and Co.
4. Chordate Zoology- Dhami P. S. and Dhami J. K. , R. Chand and Co.
5. Invertebrate Zoology- Dhami P. S. and Dhami J. K., R. Chand and Co.
6. Introduction to Vertebrates- Moore Cambridge University- Low Priced Edition.
7. Zoology- Miller S. A. and Harley J. B., Tata McGraw Hill.
8. Modern Textbook of Zoology, Invertebrates, Kotpal R. L.
9. Biological Science, Taylor D.J., Stout G.W., Green N.P.O, Soper R.,Cambridge University Press.

COURSE-VII (USZO303)

1. Animal Behaviour- David Mc Farland
2. Animal Behaviour- Mohan Arora

3. Animal Behaviour- Reena Mathur
4. An introduction to Animal Behaviour- Dawkins
5. Animal Behaviour-Agarwal
6. Animal Behaviour- Tinbergen
7. Biology of Insects- 1992 Saxena S. C. Oxford and IBH Publishing Co New Delhi. Bombay. Calcutta
8. A Text Book of Entomology- 1974Mathur V. K. and Upadhayay K Goel Printing press, Barani.
9. Bee and Bee Keeping- Roger A. Morse, Conell University Press London
10. Vermiculture Technology - Clive A. Edwards, Norman Q. Arancon and Rhonda Sherman
11. Parasitology- Chatterjee K.D., Chatterjee Medical Publishers.
12. Medical Parasitology- Arora
13. Textbook of Medical Parasitology-. C.K Jayaram Paniker, Jaypee Brothers.
14. A text book of Parasitology- Kochhar S.K. Dominant Pub. & Dis, New Delhi.
15. Essentials of Parasitology- Gerald and Schmidt: Universal Bookstall, New Delhi.
16. Parasitology- Sharma P.N.and Ratnu L.N., Chand S & Co.Pvt.Ltd.
17. Introduction to Parasitology- Chandler and Read John Wiley & Sons
18. Economic Zoology- Biostatistics and Animal behaviour – S.Mathur, Rastogi Publicatons.
19. Economic Zoology- Shukla G.S. & Upadhyay V.B., Rastogi Publications.
20. A handbook on Economic Zoology, S.Chand & Co.

SCHEME OF EXAMINATION (THEORY)

(a) Internal assessment of twenty five (25) marks per course per semester should be conducted according to the guidelines given by University of Mumbai vide circular number UG/04 of 2014 Dated 5th June 2014 to be implemented from academic year 2015-16.
(b) External assessment of seventy five (75) marks per course per semester should be conducted as per the following skeleton question paper pattern.
(c) One practical examination of fifty (50) marks per course each should be conducted at the end of every semester.

SKELETON- EXAMINATION PATTERN FOR THE ABOVE SYLLABUS

All Questions are compulsory
Figures to the right indicate full marks

Time: 2.5 hours **Total marks: 75**

Q.1.	UNIT 1 Answer any four out of eight (5 marks each)	20 marks
Q.2.	UNIT 2 a. Answer any one of the two (10 marks) b. Answer any two out of the four (5 marks each)	20 marks
Q.3.	UNIT 3 Answer any two out of four (10 marks each)	20 marks
Q.4.	a. Unit 1 - (One note of five marks OR objective type questions) b. Unit 2 - (One note of five marks OR objective type questions) c. Unit 3- (One note of five marks OR objective type questions)	15 marks

*For Question 4 it is recommended to have objective questions such as –

(a) Match the column (b) MCQ
(c) Give one word for (d) True and False
(e) Define the term (f) Answer in one sentence etc

MODEL QUESTION BANK SEMESTER III

USZO301(COURSE V)

Question bank is suggestive. The paper setters are free to modify the questions or include new questions to the best of their perception

Unit :1 (10 Marks)

1. Define genetics and explain its scope and importance.
2. Explain Mendel's laws of inheritance.
3. Describe in detail the monohybrid cross and state the Mendelian principle of inheritance derived from it. Add a note on Co-dominance.
4. Describe in detail dihybrid cross and state the Mendelian principles of inheritance derived from it.
5. Discuss in brief inheritance of Mendelian phenotypic traits in humans.
6. Describe incomplete dominance with a suitable example.
7. Describe Co-dominance with a suitable example.
8. What is epistasis? Give a detailed account of double dominant epistasis.
9. What is epistasis? Give a detailed account of recessive epistasis.
10. What is epistasis? Give a detailed account of dominant epistasis
11. What is epistasis? Give a detailed account of double recessive epistasis.
12. Explain the pattern of inheritance of recessive and dominant lethal alleles.
13. Explain the inheritance of multiple alleles with the help of a suitable example.
14. Describe polygenic inheritance with reference to skin colour and eye colour in man.
15. Compare and contrast pleiotropy and polygenic inheritance.
16. Explain the phenomenon of linkage with respect to Morgan's Experiment. Add a note on the differences between complete and incomplete linkage.
17. Describe the pattern of inheritance of blood group and Rh factor in man.
18. Explain the cytological basis and molecular mechanisms of crossing over.
19. Explain pedigree analysis of X-linked recessive traits.

Unit :1 (5 Marks)

1. Describe the classical concept of gene.
2. Explain the modern concept of gene.
3. Differentiate between (Any two):
   (a) Genotype and phenotype of an organism
   (b) Dominant and recessive traits

(c) Gene and genome
(d) Homozygous and heterozygous
(e) Monohybrid and dihybrid cross
(f) Incomplete Dominance and co-dominance
(g) Multiple alleles and polygenes
(h) Test cross and backcross

4. Explain how probability is used to predict the results of genetic crosses.
5. Write a note on the chromosome theory of inheritance.
6. Describe co-dominance with a suitable example.
7. Give an account of the symbols used in human Pedigree analysis
8. Characteristics of autosomal dominant traits
9. Characteristics of X-linked recessive traits
10. Characteristics of autosomal recessive traits
11. Characteristics of X-linked dominant traits
12. Intermediate lethal alleles
13. Phenylketoneuria
14. Albinism
15. Explain the inheritance of skin colour in humans.
16. Write a note on pleiotropy.

Unit: 2 (10 Marks).

1. Explain the structure of eukaryotic Chromosome.
2. Classify chromosomes on the basis of position of centromere.
3. Explain any two mechanisms of chromosomal basis of sex determination.
4. Explain the inheritance of colour blindness in man.
5. Explain sex determination in man/ Honey bee/ Birds/ Drosophila.

Unit: 2 (05 Marks)

1. Describe the terms euchromatin and heterochromatin.
2. Write a note on polytene chromosomes.
3. Write a note on Lampbrush chromosomes.
4. Write a note on salivary gland chromosome of Drosophila,
5. Write a note on Balbiani rings.
6. Explain endomitosis.
7. Write a note on Gyanandromorphs
8. Explain the role of environment on sex determination.
9. Explain the role of hormones in sex determination.
10. Explain hypertrichosis.
11. Differentiate between sex linked and sex influenced genes.

12. Differentiate between human X and Y chromosome.
13. Differentiate between autosomes and sex chromosomes.
14. Write a note on Lyons hypothesis.
15. What are Barr bodies? Give a scientific reason that Barr bodies are present only in women and not in men.
16. Give a scientific reason that Y chromosome is a sex determining chromosome in man.
17. Explain parthenogenesis.
18. Give scientific reason that the X linked genes affect males more than females in human beings.
19. What is centromere? Explain its role during cell division.

Unit: 3 (10 marks)

1. Describe Griffith transformation experiment.
2. Explain Avery, Macleod, McCarty's experiment
3. Give an account of Hershey Chase experiment of bacteriophage infection.
4. Write a note on types of DNA.
5. Explain RNA as a genetic material.
6. Describe the process of DNA replication
7. Write in detail the process of transcription
8. Discuss the process of translation
9. What is gene expression? Describe the regulation of genes with Lac operon.

Unit 3: (5 Marks)

Write short notes on –

1. Chemical composition of nucleic acid
2. A and B DNA
3. Plasmid
4. Function of mRNA
5. Function of tRNA
6. Genetic code
7. One gene one enzyme hypothesis
8. Concept of operon
9. Z DNA
10. H DNA
11. Chromosomal DNA in prokaryotes
12. Mitochondrial DNA
13. DNA in chloroplast

MODEL QUESTION BANK SEMESTER III

USZO302 (COURSE VI)

Question bank is suggestive. The paper setters are free to modify the questions or include new questions to the best of their perception

Unit 1: (05 Marks)

1. Write a note on nutrition apparatus in amoeba.
2. Describe briefly gastro-vascular cavity in hydra.
3. Explain briefly digestive system of earthworm.
4. Explain briefly digestive system of cockroach.
5. Explain briefly digestive system in bivalve.
6. Write a note on Wheel organ of Amphioxus.
7. Explain briefly digestive system of pigeon.
8. Write a note on ruminant stomach.
9. Explain briefly physiology of digestion in cockroach.
10. Write short note on digestion of proteins with respect to man.
11. Write short note on digestion of carbohydrates with respect to man
12. Write short note on digestion lipids with respect to man
13. Give a brief account of enzymes involved in the process of digestion in cockroach
14. Write short note contractile vacuoles as excretory and osmoregulatory structures in protozoa.
15. Write a note on flame cells.
16. Describe the structure of septal nephridia with the help of a neat labeled diagram.
17. Write a note on nephridia as excretory organs in earthworm.
18. Describe briefly excretory and osmoregulatory structures in arthropods.
19. Write a note on Organ of Bojanus
20. Write a note on structure of kidney in fish.
21. Write a note on structure of amphibian kidney.
22. Write a note on structure of kidney in bird.
23. Write a note on structure of mammalian kidney.
24. Write a note on Ammonotelic organisms.
25. Write a note on Ureotelic organisms.
26. Write a note on Uricotelic organisms.
27. Write a note on ultrafiltration
28. Give a brief account of process of urine formation in man.

Unit 2: (10 Marks)

1. Describe briefly air sacs in pigeon.
2. Describe briefly the process of internal respiration with respect to man
3. Describe briefly the process of external respiration with respect to man
4. Give a brief account of types of circulating fluids present in animals.
5. Describe briefly mechanism of working of heart.
6. Describe briefly two chambered heart in shark.
7. Describe briefly structure of heart of frog.
8. Describe briefly heart of crocodile.
9. Give a brief account of heart of man.

Unit 2: (5 Mark)

1. Write short note on cutaneous respiration.
2. Write a note on Spiracle in cockroach.
3. Write a note on book lungs in spider.
4. Explain the structure of gills of bony fish
5. Explain the structure of gills of cartilaginous fish.
6. Describe briefly lungs as respiratory organs in frog.
7. Describe briefly lungs as respiratory organs in man.
8. Explain briefly accessory respiratory structure in *Anabas*.
9. Write short note on open circulation.
10. Write short note on closed circulation.
11. Write a note on heart of cockroach
12. Write a note on heart of earthworm.

Unit 3:(10 Marks)

1. Describe different types of neurons on the basis of structure and function.
2. Explain conduction of nerve impulse.
3. Briefly describe synaptic transmission.
4. Describe briefly hormones as chemical messenger.
5. Explain briefly feedback mechanism of hormone regulation.
6. Explain sol-gel theory of amoeboid movement.
7. Describe ciliary movement in *Paramecium*.
8. Give an account on types of wings in insects.
9. Explain types of fins in Pisces.
10. Describe sliding filament theory.
11. Describe briefly asexual reproduction in animals.
12. Describe the structure and function of tube feet.
13. Describe spermatogenesis.

14. Describe oogenesis.
15. Describe briefly the structure of mammalian gametes.
16. Give an account on types of fertilization.

Unit 3: (5 Marks)

1. Write a note on irritability in *Paramecium*
2. Write a note on resting potential of nerve membrane.
3. Write a note on action potential of nerve membrane.
4. Describe different types of neurons on the basis of structure.
5. Describe briefly different types of neurons on the basis of functions.
6. Describe the structure of synapse.
7. Write a note on striated muscle fibre.
8. Describe the structure of cilia.
9. Give an account on types of legs in insects.
10. Write a note on ovo-viviparity.
11. Write a note on viviparity.
12. Write a note on oviparity.
13. Describe the structure of mammalian egg.
14. Describe the structure of mammalian sperm.
15. Describe the formation of gemmule in sponges.
16. Write a note on budding as asexual reproduction in mammals

MODEL QUESTION BANK SEMESTER III

USZO303 (COURSE VII)

Question bank is suggestive. The paper setters are free to modify the questions or include new questions to the best of their perception

Unit 1: (5 Marks)

1. How do honey bees communicate for foraging?
2. What is classical conditioning? Explain with an example.
3. What is imprinting? Explain different types of imprinting.
4. What do you mean by learning? Describe any two types of learning.
5. Describe the various ways in which ants communicate.
6. What is the significance of mimicry and warning coloration?
7. What is mimicry? Explain different types of mimicry with examples.
8. What is displacement activity? In what situations do displacement activities occur? Explain with examples.
9. Write notes on:

i. Migration in Fish
ii. Territorial behavior
iii. Schooling behavior in fish
iv. Altruism and kinship

10. Which are the different types of social groups seen in non human primates?
11. Comment on any two aspects of non human primate social behavior.

Unit 2: (10 Marks)

1. Give an account of the life history and pathogencity of the parasite causing amoebic dysentery.
2. Describe in detail part of life cycle of *P.vivax* in mosquito.
3. Give an account of asexual cycle of *P.vivax* in man.
4. Describe the life history of *Taenia solium*.
5. Give an account of parasitic adaptive features of *Taenia solium*.
6. Give an account of the life history of *Fasciola hepatica.*
7. Give an account of the life history of filarial worm and discuss its pathogenic effects.
8. Describe the life history of bedbug and suggest some control measures.
9. Give an account of the life history of *Sarcoptes scabiei.*
10. Give an account of the life history of head louse *Pediculus.*
11. What is bird flu? How is it spread and what are its symptoms?
12. How would you control the transmission of anthrax among humans?
13. How is anthrax transmitted to man?

Unit 2: (5 Marks)

1. Describe the structure of *E. histolytica.*
2. Where is *E. histolytica* found and what disease does it cause?
3. Write a short note on pathogenecity of *E. histolytica*.
4. Briefly describe the life cycle of *E. histolytica*.
5. What are the symptoms of malaria? Write its control measures.
6. Give an account of symptoms and pathogenecity of *Plasmodium vivax.*
7. Illustrate the complete life history of *T. solium* with the help of diagram only.
8. What is the effect of *Fasciola* on the hosts?
9. What are the primary and secondary hosts of *Wuchereria bancrofti*? Which stage of *Wuchereria* is infective for man?
10. What is host specificity?
11. What are the signs and symptoms of bird flu?
12. How is rabies transmitted?
13. What are the preventive measures to be taken to prevent infection of rabies virus?
14. What is toxoplasmosis and what are its causes?
15. Write notes on:
    i. Parasitic adaptations in endoparasites

ii. Cysticercus or bladder worm.
iii. Pathogenecity of *Wuchereria*
iv. Control measures of bedbug.
v. Types of hosts

Unit 3: (10 Marks)

1. What does the modern method of apiculture include? Explain in brief.
2. How is an artificial bee hive constructed?
3. How do you select the flora and bee species for apiculture?
4. What are the benefits of vermiculture?
5. Describe any two methods of vermiculture.
6. How is raw milk processed?
7. What are the common adulterants of milk in India?

Unit 3: (5 Marks)

1. State the economic importance of honey and beeswax.
2. What are the disadvantages of the indigenous method of apiculture?
3. How does the wax moth cause damage to the honey comb?
4. Name any two bee enemies and explain how they harm the bees.
5. Give an account of the commonly found species of honey bee in India.
6. What are the advantages of the modern method of apiculture?
7. Which type of flora is beneficial for apiculture?
8. Which type of bee is suitable for apiculture?
9. What is the chemical composition of honey?
10. What is the suitable material for culturing earthworms?
11. What are the advantages of processing dairy products?
12. What is skimmed milk and toned milk? How are they prepared?
13. How is recombined milk prepared?

PRACTICAL
USZOP3 (Course V)
Skeleton-Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Major Question 15 marks

Q1. Extraction and detection of DNA
OR
Q1. Extraction and detection of RNA

Minor Question 07 marks

Q2. Mounting of Barr bodies
OR
Q2. Study of mitosis-Temporary squash preparation of Onion root tip
OR
Q2. Detection of blood groups and Rh factor

Q3. Problems on Genetics and Molecular biology (Transcription /Genetic code) 10 marks
(01 problem each)

Q4. Identification 08 marks
a. Chromosome morphology
b. Pedigree analysis

Q5. Viva and Journal 10 marks

PRACTICAL
USZOP3 (Course VI)
Skeleton-Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Major Question 15 marks

Q1. Urine analysis—Normal and abnormal constituents

Minor Question 10 marks

Q2. Detection of ammonia in water excreted by fish
OR
Q2. Detection of uric acid from excreta of Birds

Q3. Identification 15 marks
- c. Nutritional apparatus
- d. Respiratory structures
- e. Locomotory organs
- f. Study of hearts
- g. Permanent slides on reproduction

Q4. Viva 05 marks

Q5. Journal 05 marks

PRACTICAL
USZOP3 (Course VII)
Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Major Question 12 marks

Q1. Extraction of Casein from Milk and its qualitative estimation

OR

Q1. Preparation of paneer from the given milk sample.

OR

Q1. Measurement of density of milk using different samples by lactometer

Minor Question 08 marks

Q2. Life Cycle of Honey Bee and Bee Hive

OR

Q2. Mouthparts of Honey Bee

OR

Q2. Legs of Honey Bee

OR

Q2. Sting Apparatus of Honey Bee

Q3. Identifiy and describe as per instructions 15 marks

a. Ethology
b. Protozoan parasites
c. Helminth parasites
d. Ectoparasites
e. Parasitic adaptations

Q4. Project submission and Viva based on project 10 marks

Q5. Journal 05 marks

	SEMESTER IV		
	USZO401 COURSE-8		
	Origin and evolution of Life, Population genetics and evolution, Scientific Attitude methodology , writing and ethics		
	Unit 1 : Origin and evolution of Life	**15L**	**30hrs**
	Objective : ➢ *To impart scientific knowledge to the learner about how life originated and evolved on our planet.*		
	Desired Outcomes : ➢ *Learner will gain insight about origin of life.* ➢ *Learner will know about the different theories of evolution.*		
1.1	**Introduction.** ➢ Origin of universe ➢ Chemical evolution - Miller-Urey experiment, Haldane and Oparin theory ➢ Origin of life ➢ Origin of eukaryotic cell.	**5L**	**10hrs**
1.2	**Evidences in favour of organic evolution** ➢ Evidences from: Geographical distribution, Paleontology Anatomy, Embryology, Physiology and Genetics.	**4L**	**8hrs**
1.3	**Theories of organic evolution** ➢ Theory of Lamarck. ➢ Theory of Darwin and Neo Darwinism ➢ Mutation Theory ➢ Modern Synthetic theory ➢ Weismans germplasm theory ➢ Neutral theory of molecular evolution	**6L**	**12hrs**
	Unit 2: Population genetics and evolution	**15L**	**28hrs**
	Objective: ➢ *To develop learner's knowledge and understanding of genetic variability within a population and how the change in the gene pool leads to evolution of species.*		
	Desired Outcomes: ➢ *Learner would understand the forces that cause evolutionary changes in natural populations.* ➢ *Learner would comprehend the mechanisms of speciation*		

	➢ *Learner will be able to distinguish between microevolution, macroevolution and megaevolution*		
2.1	**Introduction to population genetics**	**1L**	**3hrs**
	➢ Definition		
2.1.1	**Brief explanation of the following terms:** ➢ Population, gene pool, Allele frequency, genotype frequency, phenotype frequency, microevolution		
2.2	**Population genetics**	**6L**	**10hrs**
2.2.1	➢ Hardy-Weinberg Law		
2.2.2	➢ Factors that disrupt Hardy Weinberg equilibrium- ➢ Mutation, ➢ Migration (Gene flow), ➢ Non-random mating (Inbreeding, inbreeding depression, Assortative mating-Positive and Negative, Disassortative mating), ➢ Genetic drift (Sampling error, fixation, Bottleneck effect and Founder effect) ➢ Natural Selection.		
2.2.3	**Patterns of Natural Selection** ➢ Stabilizing selection, ➢ Directional Selection (Examples: Peppered moth, Antibiotic resistance in bacteria, Pesticide resistance) ➢ Disruptive selection		
2.3	**Evolutionary genetics** ➢ **Genetic variation:** Genetic basis of variation-Mutations and Recombination (crossing over during meiosis, independent assortment of chromosomes during meiosis and random union of gametes during fertilization). ➢ Nature of genetic variations- Genetic polymorphism, Balanced polymorphism, Mechanisms that preserve balanced polymorphism-Heterozygote advantage and frequency dependent selection, ➢ Neutral variations. ➢ Geographic variation (Cline).	**8L**	**15hrs**
2.3.1	➢ **Species Concept:** Biological species concept and evolutionary species concept		

2.3.2	**Speciation and Isolating mechanisms**: ➢ Definition and Modes of speciation (Allopatric, Sympatric , Parapatric and Peripatric) ➢ Geographical isolation ➢ Reproductive isolation and its isolating mechanisms (Prezygotic and Postzygotic)		
2.3.3	**Macroevolution and Megaevolution :** ➢ Concept and Patterns of macroevolution (Stasis, Preadaptation /Exaptation, Mass extinctions, Adaptive radiation and Coevolution), ➢ Megaevolution		
	Unit 3: Scientific Attitude methodology , writing and ethics	**15L**	**32hrs**
	***Objective*:** ➢ *To inculcate scientific temperament in the learner.*		
	Desired outcome: ➢ *The learner will develop qualities such as critical thinking and analysis.* ➢ *The learner will develop the skills of scientific communication.* ➢ *Learner will understand the ethical aspects of research*		
3.1	**Process of science: A dynamic approach to investigation**	**4L**	**10hrs**
	The Scientific method ➢ Deductive reasoning and inductive reasoning, Critical thinking, Role of chance in scientific discovery		
	Scientific Research ➢ Definition, difference between method and methodology characteristics, types		
	Steps in the Scientific Method ➢ Identification of research problem, Formulation of research hypothesis, Testing the hypothesis using experiments or surveys, Preparing research/study design including methodology and execution (Appropriate controls, sample size, technically sound, free from bias, repeat experiments for consistency), Documentation of data, Data analysis and interpretation, Results and Conclusions		
	Dissemination of data ➢ Reporting results to scientific community (Publication in peer-reviewed journals, thesis, dissertation, reports, oral presentation, poster presentation)		
	Application of knowledge ➢ Basic research, Applied research, Translational research,		

	Patent		
3.2	**Scientific writing**	**4L**	**10hrs**
	Structure and components of a research paper ➢ (Preparation of manuscript for publication of research paper)- Title, Authors and their affiliations, Abstract, Keywords and Abbreviations, Introduction, Material and Methods, Results, Discussion, Conclusions, Acknowledgement, Bibliography; Figures, Tables and their legends		
3.3	**Writing a review paper**	**3L**	**5hrs**
	Structure and components of research report: ➢ Report writing, Types of report		
	Computer application ➢ Plotting of graphs, Statistical analysis of data. Internet and its application in research-Literature survey, Online submission of manuscript for publication		
3.4	**Ethics**	**3L**	**5hrs**
	Ethics in animal research ➢ The ethical and sensitive care and use of animals in research, teaching and testing, Approval from Institutional animal ethics Committee.		
	Ethics in clinical research ➢ Approval from Clinical Research Ethics Committee ➢ Informed consent		
	Approval from concerned/ appropriate authorities : ➢ National Biodiversity Authority ➢ State Biodiversity Board ➢ Forest Department		
	Conflict of interest		
3.5	**Plagiarism**	**1L**	**2hrs**
	USZO402 COURSE-9		
	Cell Biology, Endo membrane System and Biomolecules		
	Unit 1 : Cell Biology	**15L**	**26hrs**
	***Objective* :** ➢ *To study the structural and functional organization of cell with an emphasis on nucleus, plasma membrane and cytoskeleton.*		
	***Desired outcome* :** ➢ *Learner would acquire insight of transport mechanisms*		

	for maintenance and composition of cell		
1.1	**Introduction to cell biology** ➢ Definition and scope ➢ Cell theory ➢ Generalized prokaryotic , eukaryotic cell: size, shape and structure	**2L**	**4hrs**
1.2	**Nucleus** ➢ Size, shape, number and position ➢ Structure and functions of interphase nucleus ➢ Ultrastructure of nuclear membrane and pore complex ➢ Nucleolus: general organization, chemical composition and functions ➢ Nuclear sap/ nuclear matrix ➢ Nucleocytoplasmic interactions	**5L**	**6hrs**
1.3	**Plasma membrane** a. Fluid Mosaic Model b. Junctional complexes c. Membrane receptors d. Modifications: Microvilli, Desmosomes and Plasmodesmata.	**4L**	**8hrs**
1.4	**Transport across membrane** **a.** Diffusion and Osmosis **b.** Transport: Passive and Active **c.** Endocytosis and Exocytosis	**2L**	**4hrs**
1.5	**Cytoskeletal structures** ➢ Microtubules: Composition and functions ➢ Microfilaments: Composition and functions	**2L**	**4hrs**
	Unit 2 Endomembrane System	**15L**	**25hrs**
	Objective **:** ➢ *To acquaint the learner with Ultrastructure of cell organelles and their functions.*		
	Desired outcome: ➢ *Learner would appreciate the intricacy of endomembrane system.* ➢ *Learner would understand the interlinking of endomembrane system for functioning of cell.*		
2.1	**Endoplasmic reticulum** ➢ Discovery, occurrence and Types ➢ Ultrastructure and Functions	**3L**	**5hrs**

2.2	**Golgi complex** ➢ Origin, occurrence and morphology ➢ Ultra structure and functions	**3L**	**4hrs**
2.3	**Lysosomes** ➢ Origin, occurrence and polymorphism ➢ Ultrastructure and Functions	**3L**	**4hr**
2.4	**Mitochondria** ➢ Origin, occurrence and morphology ➢ Ultrastructure and functions ➢ Marker enzymes, Mitochondrial biogenesis, Semiautonomous nature of mitochondria	**6L**	**12hrs**
	Unit 3: Biomolecules	**15L**	**30hrs**
	***Objective* :** ➢ *To give learner insight into the structure of biomolecules, and their role in sustenance of life.*		
	Desired outcome: ➢ *The learner will realize the importance of biomolecules and their clinical significance.*		
3.1	**Biomolecules** ➢ Concept of Micromolecules and Macromolecules**.**	2L	5hrs
3.2	**Carbohydrates** ➢ Definition Classification, Properties and Isomerism, Glycosidic bond ➢ Structure of a. Monosaccharides- Glucose and Fructose b. Disaccharides - Lactose and Sucrose c. Polysaccharides - Cellulose, Starch, Glycogen and Chitin ➢ Biological role and their Clinical significance	4L	8hrs
3.3	**Amino Acids and Proteins** ➢ Basic structure of amino acid, classification of amino acids , Essential and Non-essential amino acids, Peptide bond ➢ Protein conformation : Primary, Secondary, Tertiary, Quaternary ➢ Types of proteins – Structural (Keratin, Collagen) and functional proteins (Hemoglobin) ➢ Biological role and their Clinical significance	5L	8hrs

3.4	**Lipids** ➢ Definition, classification of lipids with examples, Ester linkage ➢ Physical and Chemical properties of lipids ➢ Saturated and Unsaturated fatty acids , Essential fatty acids ➢ Triacylglycerols, Phospholipids (Lecithin and Cephalin) and Steroids (Cholesterol). ➢ Biological role and their Clinical significance	4L	5hrs
3.5	**Vitamins** ➢ Water soluble vitamins(e.g. Vit C, Vit B12) ➢ Lipid soluble vitamins (e.g. Vit A, Vit D) ➢ Biological role and their Clinical significance	2L	4hrs
	USZO403 COURSE-10		
	Comparative Embryology, Aspects of Human Reproduction, Pollution and its effect on organisms		
	UNIT 1: Comparative Embryology	**15L**	**25hrs**
	Objective: ➢ *To acquaint the learner with key concepts of embryology.*		
	Desired Outcomes: ➢ *Learner will be able to understand and compare the different pre- embryonic stages* ➢ *Learner will be able to appreciate the functional aspects of extra embryonic membranes and classify the different types of placentae.*		
1.1	➢ Types of Eggs- Based on amount and distribution of yolk	2L	4hrs
1.2	➢ Structure and Types of Sperms	1L	1hr
1.3	➢ Types of Cleavages.- Holoblastic and Meroblastic	1L	3hrs
1.4	➢ Types of Blastulae	1L	3hrs
1.5	➢ Gastrulation	2L	4hrs
1.6	➢ Coelom -Formation and types	2L	3hrs
1.7	➢ Extra embryonic membranes ➢ Types of Placentae -Based on histology, morphology and implantation	6L	10hrs
	UNIT 2: Aspects of Human Reproduction	**15L**	**30 hrs**
	Objectives: ➢ *To acquaint the learners with different aspects of human reproduction.* ➢ *To make them aware of the causes of infertility, techniques to overcome infertility and the concept of birth control*		
	Desired Outcome:		

	➢ *Learners will able to understand human reproductive physiology* ➢ *Learners will become familiar with advances in ART and related ethical issues.*		
2.1	**Human Reproductive system and Hormonal regulation** ➢ Anatomy of human male and female reproductive system ➢ Hormonal regulation of Reproduction and Impact of age on reproduction-Menopause and Andropause	2L	4hrs
2.2	**Contraception & birth control** ➢ Difference between contraception and birth control ➢ Natural Methods: Abstinence , Rhythm method, Temperature method, cervical mucus or Billings method, Coitus interruptus, Lactation amenorrhea ➢ Artificial methods **:** Barrier methods, Hormonal methods, Intrauterine contraceptives, Sterilization, Termination , Abortion	2L	4hrs
2.3	**Infertility** **Female infertility** ➢ **Causes -** Failure to ovulate; production of infertile eggs ; damage to oviducts (oviduct scarring and PID or Pelvic inflammatory disease, TB of oviduct), Uterus (T. B. of uterus and cervix) ➢ **Infertility associated disorders (**Endometriosis, Polycystic Ovarian syndrome (PCOS), POF (Primary ovarian failure) STDs (Gonorrhea, Chlamydia, Syphilis and Genital Herpes); Antibodies to sperm; Genetic causes-Recurrent abortions; Role of endocrine disruptors	4L	8hrs
	Male infertility **Causes :** Testicular failure, infections of epididymis, seminal vesicles or prostate, hypogonadism, cryptorchidism , congenital abnormalities ,Varicocele , Blockage, Azoospermia, Oligospermia, abnormal sperms, autoimmunity, ejaculatory disorders and Idiopathic infertility.		
2.5	**Treatment of Infertility** ➢ Removal /reduction of causative environmental factors ➢ Surgical treatment ➢ Hormonal treatment- Fertility drugs ➢ Assisted Reproductive Technology ➢ Sperm banks, cryopreservation of gametes and embryos ➢ Surrogacy	4L	8hrs

2.6	**Techniques and Ethical considerations of ART** ➢ In vitro fertilization, Embryo transfer (ET), Intra-fallopian transfer (IFT), Intrauterine transfer (IUT), Gamete intra-fallopian transfer (GIFT), intra-zygote transfer (ZIFT), Intracytoplasmic sperm injection (ICSI) with ejaculated sperm and sperm retrieved from testicular biopsies – Testicular sperm extraction (TESE), Pronuclear stage transfer (PROST).	3L	6hrs
	UNIT3: Pollution and its effect on organisms	**15L**	**27hrs**
	***Objective*:** ➢ *To provide a panoramic view of impact of human activities leading to pollution and its implications.*		
	Desired Outcome : ➢ *The learners will be sensitized about the adverse effects of pollution and measures to control it.*		
3.1	**Air Pollution** ➢ Types and sources of air pollutants ➢ Effects and control measures	3L	6hrs
3.2	**Water Pollution** ➢ Types and sources of water pollutants ➢ Effects and control measures	3L	6hrs
3.3	**Soil Pollution** ➢ Types and sources of soil pollutants ➢ Effects and control measures	3L	4hrs
3.4	**Noise pollution** ➢ Different means of noise pollution ➢ Effects and control measures	1L	3hrs
3.5	**Radioactive pollution**	1L	2hrs
3.6	**Solid waste Pollution** ➢ Types and sources, ➢ Effects and control	2L	4hrs
3.7	**Pollution – Climate change and Global warming**	2L	2hrs

	SEMESTER IV
	Practical USZOP4 (Course VIII)
1	Study of population density by Line transect method & Quadrant method and calculate different diversity indices. a. Index of Dominance. b. Index of frequency. c. Rarity Index. d. Shannon Index. e. Index of species diversity
2	Study of Prokaryotic cells (bacteria) by Crystal violet staining technique.
3	Study of Eukaryotic cells (WBCs) from blood smear by Leishman's stain.
4	Identification and study of fossils a. Arthropods : Trilobite b. Mollusca: Ammonite c. Aves : Archaeopteryx
5	Identification of a) Allopatric speciation (Cyprinodon species) b) Sympatric speciation.(hawthorn fly and apple maggot fly) c) Parapatric speciation. (Snail)
6	Bibliography/ Abstract writing.
7	Preparation of Power point presentation
	Practical USZOP4 (Course IX)
1	Study of permeability of cell through plasma membrane (Osmosis in blood cells).
2	Measurement of cell diameter by occulometer (by using permanent slide)
3	Qualitative tests for carbohydrates (Molisch's test, Benedicts test, Barfoed's test, Anthrone test)
4	Qualitative tests for protein (Ninhydrin test, Biuret test, Millon's test, Xanthoproteic test)
5	Qualitative test for lipids (solubility test, Sudan III test)
6	Study of rancidity of lipid by titrimetric method.
7	Ultra structure of cell organelles – (Electron micrographs) a. Nucleus

	b. Endoplasmic reticulum (Smooth and rough) c. Mitochondria. d. Golgi apparatus e. Lysosomes
8	Study of clinical disorders due to carbohydrates, proteins and lipids imbalance.(photograph to be provided / significance to given and disorder to be identified) a. Hyperglycemia , Hypoglycemia. b. Thalessemia, Kwashiorkar c. Obesity, Atherosclerosis
	Practical USZOP4 (Course X)
1	Estimation of Dissolved oxygen from the given water sample .
2	Estimation of Salinity by refractometer from the given water sample.
3	Estimation of conductivity by conductometer from the given water sample .
4	Determination of blood pressure by spyghmomanometer.
5	Detection of Creatinine in urine.
6	Determination of blood sugar by GOD and POD method
7	Study of bleeding time and clotting time.
8	Study of the following permanent slides, museum specimens and materials. a. Mammalian sperm and ovum. b. Egg types –Fish eggs, Frog eggs , Hen's egg. c. Cleavage , blastula and gastrula (Amphioxus, Frog and Bird).
9	Study of commercially important fishery (Catla, Rohu, Catfish, Mackerel, Pomfret, Bombay duck, Prawn/ Shrimp, Crab, Lobster, Edible oyster)
10	Review writing based on programmes telecast by Doordarshan, Discovery channel, Gyandarshan, UGC programmes, Animal planet
11	Study of natural ecosystem and field report of the visit

Note -The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.
#There shall be at least one excursion/field trip

Semester IV

REFERENCE AND ADDITIONAL READING

COURSE-VIII (USZO401)

1. Theory of Evolution- Smith, Cambridge Press, and Low price Ed.
2. Evolution - Strickberger, CBS publication
3. Evolution- P.S.Verma and Agarwal
4. Introduction to Evolution by Moody
5. Biology. E. P. Solomon, L. R. Berg, D. W. Martin, Thompson Brooks/Cole
6. Biology -The Unity and Diversity of Life**.** C. Starr, R. Taggart, C. Evers, L. Starr, Brooks/Cole Cengage learning International Edition
7. Research Methodology, Methods and Techniques- by C.R. Kothari, Wiley Eastern Ltd. Mumbai
8. Practical research planning and design 2nd edition- Paul D Leedy, Macmilan Publication

COURSE-IX (USZO402)

1. Cell Biology by Singh and Tomoar Rastogi Publication..
2. Cell and molecular Biology E.D.P De Robertis and E.M.R Robertis ,CBS Publishers and Distributors
3. The cell A molecular Approach Goeffrey M.Coper ASM Press Washington D.C.
4. A textbook of cytology Suruchi Tyagi Dominant Publishers and Distributors New Delhi.
5. Cell and molecular biology Gupta P.K , Rastogi Publication, India.
6. Cell Biology Pawar C.B. Himalaya publication
7. Molecular Biology of the cell (6th ed) by the Insertus
8. Campbell Biology (9th Ed.)
9. Principles of Biochemistry, 2005, 2nd and 3rd edn. Lehninger A.L. Nelson D.L. and Cox M.M ,
10. Biochemistry, Dushyant Kumar Shrma, 2010, Narosa Publishing house PVT.Ltd.
11. Fundamentals of Biochemistry, Dr AC Deb, 1983, New Central Book Agency Ltd.
12. A Textbook of Biochemistry, 9th edition , Dr. Rama Rao A.V.S.S and Dr A Suryalakshmi.
13. Biochemistry-G Zubay , Addison Wesley, 1983
14. Biochemistry, L Stryer, 3rd/4th/5th ed, 1989 , Freeman and Co. NY
15. Harper's Biochemistry,1996, 26th edition, Murray R.K. Granner D.K. Mayes P.A. Rodwell V.M. Hall international USA
16. Outline of Biochemistry, 1976, E.E. Conn and P.K. Stumpf. John Wiley and Sons USA

COURSE-X (USZO403)

1. Developmental Biology- 5th Edition, Scot F. Gilbert, Sinauer Associates Inc.
2. Developmental Biology- Subramoniam T., Narosa Publishers.
3. Developmental Biology- Berril N.J., Tata Mc Graw –Hill Publication.
4. Essential Reproduction-Martin H. Johnson, Wiley-Blackwell Publication.
5. Chick Embryology- Bradley M. Pattern.
6. Embryology- Mohan P. Arora.
7. Chordate Embryology- Dalela,Verma and Tyagi
8. Human Anatomy and Physiology. E. L. Marieb, Pearson Education Low Price Edition
9. Biological Science. Taylor, Green and Stout. Cambridge Publication
10. Biology. E. P. Solomon, L. R. Berg, D. W. Martin, Thompson Brooks/Cole
11. Human Biology-Daniel D Chiras Jones and Bartlett
12. The Physiology of Reproduction Vol I & II - E.K .Nobil and JU. D.Neil, Raven Press, New York.
12. Air Pollution, Kudesia V.P. Pragati Prakasan, Meerut
13. Fundamentals of Air Pollution Daniel A. Vallero,Academic press 5th Edition
14. Principles and Practices of Air Pollution Control and Analysis J.R. Mudakani I K International Pub. House Pvt. Ltd.
15. Text Book of Air Pollution and its Control, S.C.Bhatia Atlantic
16. Water Pollution, Kudesia V.P., Pragati Prakasan, Meerut
17. A text book of Environmental Chemistry and Pollution Control, S.S.Dogra, Swastic Pub, New Delhi
18. Practical Methods for water and Air Pollution Monitoring,S.K.Bhargava,New Age International
19. Hand Book of Water and waste water Analysis, Kanwaljit Kaur, Atlantic
20. Aquatic Pollution by Edward A. Laws
21. Environmental Science and Technology, Stanely E.Manahan
22. Environmental Chemistry, A.K. De, New Age International
23. A Text Book of Environmental Studies, Gurdeep R.Chatwal, Harish Sharma, Madhu Arora, Himalaya

SCHEME OF EXAMINATION (THEORY)

(a) Internal assessment of twenty five (25) marks per course per semester should be conducted according to the guidelines given by University of Mumbai vide circular number UG/04 of 2014 Dated 5th June 2014 to be implemented from academic year 2015-16.
(b) External assessment of seventy five (75) marks per course per semester should be conducted as per the following skeleton question paper pattern.
(c) One practical examination of fifty (50) marks per course each should be conducted at the end of every semester.

SKELETON- EXAMINATION PATTERN FOR THE ABOVE SYLLABUS

All Questions are compulsory
Figures to the right indicate full marks

Time: 2.5 hours **Total marks: 75**

Q.1.	UNIT 1 Answer any four out of eight (5 marks each)	20 marks
Q.2.	UNIT 2 a. Answer any one of the two (10 marks) b. Answer any two out of the four (5 marks each)	20 marks
Q.3.	UNIT 3 Answer any two out of four (10 marks each)	20 marks
Q.4.	a. Unit 1 - (One note of five marks OR objective type questions) b. Unit 2 - (One note of five marks OR objective type questions) c. Unit 3- (One note of five marks OR objective type questions)	15 marks

*For Question 4 it is recommended to have objective questions such as –

(a) Match the column (b) MCQ
(c) Give one word for (d) True and False
(e) Define the term (f) Answer in one sentence etc

MODEL QUESTION BANK SEMESTER IV

USZO401(COURSE VIII)

Question bank is suggestive. The paper setters are free to modify the questions or include new questions to the best of their perception

Unit 1: (10 Marks)

1. Write explanatory notes on;
    1. Lamarckism. 2. Darwinism and Neo Darwinism.
    3. Mutation Theory 4. Modern Synthetic theory.5.Weismans germplasm theory
2. Neutral theory of molecular evolution. (Some of them can be asked as short notes as well)
3. Discuss evidences in favor of organic evolution by giving examples of geographical distribution.
4. Discuss evidences in favor of organic evolution by giving examples of genetics, and molecular biology.
5. Discuss evidences in favor of organic evolution by giving examples of physiology and biochemistry.
6. Discuss brief account of Origin of eukaryotic cell.

Unit 1: (5 Marks)

1. Describe chemical evolution with Miller-Urey experiment.
2. Describe chemical evolution with Haldane and Oparin theory.
3. Write short notes on: 1. Mutation Theory 2. Modern Synthetic theory

Unit 2: (10 Marks)

2. Define the term ‘population genetics’. Describe in brief the various evolutionary forces that tend to disturb genetic equilibrium and introduce changes in the gene pool of a population.
3. State Hardy Weinberg’s law of equilibrium and discuss its salient features.
4. Give an account of the different factors involved in speciation.
5. Describe the different types of speciation.
6. Explain the role of geographic isolation in the development of new species.
7. Explain the role of reproductive isolation in the development of new species.
8. Discuss the pre-zygotic barriers responsible for reproductive isolation.
9. Discuss the post-zygotic barriers which lead to reproductive isolation.
10. Describe the sources of genetic variation in natural populations.
11. Explain the nature and extent of genetic variation within populations.
12. Describe the mechanisms that preserve balanced polymorphisms.

13. Describe the salient features of microevoluion.
14. Compare and contrast microevolution and macroevolution.
15. Explain the salient features of macroevolution.
16. Give an account of the different patterns of macroevolution.
17. Elaborate on the role of adaptive radiation and extinction in macroevolution.
18. What do you understand by the term natural selection? Describe the different types of natural selection with suitable examples.
19. What is megaevolution? Explain the mechanism of megaevolution using a suitable example.

Unit 2: (5 Marks)

1. Explain the term 'gene pool'. How does evolution operate via the gene pools of populations?
2. Differentiate between:
    i. Allopatric and Sympatric speciation
    ii. Biological and evolutionary species
    iii. Microevolution and macroevolution
    iv. Stabilizing selection and disruptive selection
    v. Convergent and divergent evolution
3. Explain stabilizing selection with the help of a suitable example.
4. How does the example of sickle cell allele illustrate heterozygote advantage?
5. How does frequency-dependent selection affect genetic variation within a population over time?
6. Write short notes on:
    i. Role of mutations in evolution
    ii. Role of migration in evolution
    iii. Non-random mating
    iv. Role of natural selection in evolution
    v. Genetic drift
    vi. Bottleneck effect
    vii. Founder effect
    viii. Directional evolution in peppered moth
    ix. Evolution of Antibiotic resistance in bacteria
    x. Geographic variation
    xi. Genetic polymorphism
    xii. Parapatric speciation
    xiii. Adaptive radiation
7. What is the biological species concept? What are its limitations? How does it differ from the evolutionary species concept?
8. Explain the concept of co evolution using suitable examples

Unit 3: (10 Marks)

1. Describe briefly, the steps towards preparing a research design.
2. Describe literature survey, collection of data and its analysis.
3. What is a patent and how is it obtained?
4. Write an account on application of statistics in research.

Unit 3: (5 Marks)

1. Define research. State the difference between research method and research methodology.
2. Write a note on computer application in research.
3. Describe briefly identification of research problem and formulation of research hypothesis.
4. What is abstract writing?
5. What is plagiarism?
6. What is bibliography?
7. Write a short note on ethics in animal research.
8. Write a short note on ethics in clinical research.

MODEL QUESTION BANK SEMESTER IV

USZO402(COURSE IX)

Question bank is suggestive. The paper setters are free to modify the questions or include new questions to the best of their perception

Unit 1: (10 marks)

1. Explain prokaryotic cell
2. Explain Eukaryotic cell
3. Give an account of cell theory
4. Describe ultrastructure of nuclear membrane
5. State chemical composition and functions of nucleolus
6. Describe nucleocytoplasmic reactions
7. Explain r RNA processing
8. Describe fluid mosaic model of plasma membrane
9. Give an account of active and passive transport
10. Describe various modifications of plasma membrane
11. Explain pinacocytosis, phagocytosis and secretion
12. Give an account of cell permeability
13. Differentiate prokaryotic and eukaryotic cell

Unit 1: (5 Marks)

1. Virus
2. Nuclear matrix
3. Number ad position of nucleus
4. Molecular organization of chromatin
5. Unit membrane concept
6. Nucleolus
7. Membrane receptors
8. Sandwich model
9. Cell coat
10. Cell recognition

Unit 2: (10 Marks)

1. Describe Ultrastructure of Endoplasmic Reticulum
2. Describe types of Endoplasmic Reticulum and add a note on their functions
3. Give an account of Ultrastructure and functions of Golgi complex
4. Explain Ultrastructure and morphology of lysosomes
5. Comment on Semiautonomous nature of mitochondria
6. Describe ultrastructure and function of mitochondria
7. Explain protein import in mitochondria
8. Explain ultrastructure of microtubules
9. Describe chemical composition and functions of microfilaments
10. Give an account of biochemical composition and functions of microtubules.

Unit 2: (5 Marks)

1. Occurrence of Endoplasmic Reticulum
2. Significance of Endoplasmic Reticulum
3. Occurrence and morphology of golgi complex
4. Polymorphism in lysosomes
5. Significance of lysosomes
6. Occurrence and morphology of lysosomes
7. Marker enzymes in mitochondria
8. Significance of mitochondria
9. Location and significance of microfilaments
10. Significance of microtubules.

Unit 3 : (10 Marks)

1. Discuss the chemical behavior of carbon and a note on variety of functional groups of biomolecules.
2. Explain the concept of micromolecules and macromolecules.

3. Describe the structure of water. Add a note on physic-chemical properties of water.
4. Define carbohydrate. Add a note on its classification.
5. What are carbohydrates? Explain the classification of carbohydrate with suitable examples.
6. Define and explain the classification of carbohydrates.
7. Explain with suitable example monosaccharide and disssacharide.
8. Discuss the properties of carbohydrates.
9. What are disaccharides? Draw the structures of maltose and sucrose.
10. What are polysaccharides? How are they classified. Write the structures of glycogen and heparin/ chitin and heparin.
11. Discuss about chemical structure of the monosaccharides/ disaccharides
12. What are amino acids? Discuss classification of amino acids based on R group.
13. Give an account of primary and secondary structure of proteins.
14. Write an account on tertiary and quarternary structure of proteins.
15. Describe the structure of saturated and unsaturated fatty acids.
16. Define essential fatty acids. Add a note on it.
17. Define lipids. Write a note on mono, di and triglcrides/ phospholipids
18. What are fatty acids? Add a note on types of fatty acids.
19. Structure and functions of water soluble vitamins
20. Structure and functions of lipid soluble vitamins

Unit 3: (5mks)

1. Write a short note on - monomers and polymers.
2. Write note on properties of carbohydrates.
3. Give an account of polysaccharides.
4. With suitable example explain glycosidic bond.
5. Explain the linkage in lactose and sucrose.
6. Give the biological importance of carbohydrates.
7. What are essential and nonessential amino acids?
8. Give an account of properties of amino acids.
9. Define and explain peptide bond with suitable example.
10. Types of proteins with suitable examples
11. Biological roles of proteins.
12. Peptide bond
13. Types of fatty acids.
14. Biological role of lipids
15. Properties of fatty acid
16. Sterol and waxes
17. Describe properties of fatty acid/lipids

18. Discuss the clinical significance of protein / carbohydrate /lipids/
19. write short note on clinical significance of lipids
20. Write a note on - isomerism in carbohydrates and amino acids?
21. Structure and functions of vitamin A/ vitamin B/ vitamin C/ vitamin D

MODEL QUESTION BANK SEMESTER IV

USZO403(COURSE X)

Question bank is suggestive. The paper setters are free to modify the questions or include new questions to the best of their perception

Unit-1: (10 Marks)

1) Classify the different types of eggs..
2) Briefly explain types and structure of sperms (any two animals).
3) Define cleavage Explain types of cleavages.
4) Give brief account on various types of blastulae.
5) What is gastrulation ? Explain gastrulation in frog.
6) Give an account of process of coelom formation and its types.
7) Explain various types of placentae in mammals.
8) Give an account of extra embryonic membranes.
9) Describe briefly the types of eggs on the basis of amount and distribution of yolk.
10) Describe the early development of mammalian egg upto gastrulation.
11) Give a brief note on different types of sperms.
12) Write a note on blastula and explain its types.
13) Explain the comparative process of embryo formation**.**

Unit-1: (5-Marks)

1) Draw neat labeled diagram and explain any one of the following:
   (Microlecithal, ,Alecithal, Homolecithal, Heterolecithal, Isolecithal, Telolecithal, Centrolecithal, Discoidal).
2) Explain structure of sperms of frog/ reptiles/ birds/ mammals.
3) Short note on Holoblastic cleavage. Or Meroblastic cleavage.
4) Short note on equal or unequal cleavage.
5) Short note on Discoblastula or Coeloblastula.
6) Short note on centroblastula or amphiblastula or stereoblaastula,
7) Explain the process of coelom formation in process of gastrulation.
8) Short notes on : Amnion /Chorion/Allantois/Yolk sac.
9) Explain the function of Amnion /Chorion/Allantois/Yolk sac/.

10) Short note on Yolk sac placenta or Synsesmochorial placenta/Discoidal placenta/Cotyledonary placenta/Hemo-chorial placenta/Zonary placenta/Diffuse placenta
11) Short note on Deciduous or non-deciduous placenta
12) Write the functions of placenta.
13) What are the roles of Embryonic membranes and extra embryonic membranes

Unit 2: (10 Marks)

1. Describe male reproductive system and its hormonal regulation.
2. Describe female reproductive system and its hormonal regulation.
3. Define reproduction. Explain the hormonal regulation of reproduction.
4. What is contraception? Explain different methods of contraception.
5. How is contraception different from birth control?
6. Define infertility and explain the causes of female infertility.
7. What are the causes of male infertility?
8. Explain the hormonal treatment for infertility using drugs.
9. Describe the methods of treatment of infertility.
10. Give a brief account of infertility related disorders.
11. What are sperm banks? Add a note on cryopreservation of sperms.
12. What is testicular biopsy? Explain Testicular sperm extraction (TESE), Pronuclear stage transfer (PROST).
13. What are the steps involved in Embryo transfer (ET) and / Intra-fallopian transfer (IFT)?
14. What is ART technique? Add a note on IVF (steps, success and ethical considerations).

Unit 2: (5 Marks)

1. Write a note on impact of age on reproductive stage –
    a. Menopause
    b. Andropause
2. What is amenorrhea?
3. What are IUD's? How do they work as barriers for fertilization?
4. How does sterilization act as a method of contraception?
5. Write a note on birth control.
6. What is the difference between natural and artificial methods of contraception?
7. How is T.B. a cause of female infertility?
8. What are the genetic causes of infertility?
9. Write a note on STD's as infertility related disorders?
10. Explain briefly:
    a. Impotency
    b. Surrogacy

c. Endometriosis
d. Idiopathic infertility

11. What are the roles of endocrine disruptions in infertility?
12. Explain the role of the following in infertility:
    a. Gonorrhea
    b. Syphilis
    c. Genital Herpes
    d. Chlamydia
13. Write a note on treatment of infertility by removal of causative environmental factors.
14. Write a note on Ethical considerations of ART.

Unit 3: (10 Marks)

1. What are the causes, effects and control measures for air pollution?
2. What are the causes, effects and control measures for water pollution?
3. What are the causes, effects and control measures for soil pollution?
4. What are the causes, effects and control measures for noise pollution?
5. Define air pollution and give an account of hazardous air pollutants.
6. Explain the causes of nutrient pollution and its control measures.
7. What is ocean littering? Explain in details the causes and control measures for ocean littering?
8. Describe the alteration of metabolism of micro-organisms due to soil pollution.
9. Explain noise pollution along with its measurement and permissible limits.
10. Give a brief account of methods to control gaseous / particulate matters.
11. What is pollution? Add notes on:
    a. Effect of air pollution on vegetation.
    b. Effect of noise pollution on animals.
12. How can the people be made aware of pollution and its effects?

Unit 3: (5 Marks)

1. Explain the effects of air pollution on human beings.
2. What are different types of pollutants that cause air pollution?
3. Write short notes on:
    a. Ozone depletion
    b. Green house gases
    c. Global warming
    d. Acid rain
    e. Sonic boom
    f. Acoustic zoning
4. Explain the effect of thermal pollution on biodiversity.

5. Write a note on solar radiation.
6. Write a note on ionizing radiation
7. How are heavy metals responsible for nutrient pollution? Cite some examples of effects of heavy metal pollution on human health.
8. How is oil spills a cause of water pollution / ocean littering?
9. How do pesticides and fertilizers contaminate water?
10. How can oil be retracted back from sea / ocean?
11. What are the effects of soil pollution on food chain?
12. How are POP's and ordinary salts responsible for nutrient pollution?
13. What are the auditory / non – auditory effects of noise pollution.
14. Why is the necessity to save drinking water?

PRACTICAL
USZOP4 (Course VIII)
Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Major Question 12 marks

Q1. Study Population density by Line transect or Quadrant method and calculate biodiversity indices (any 2)

Minor Question 08 marks

Q2. Prepare a smear to show prokaryotic cell.

OR

Q2. Prepare a smear to show eukaryotic cell.

Q3. Identify and describe as per instructions 08 marks

a. Fossils
b. Speciation

Q4. From the given article prepare the bibliography/ abstract 06 marks

Q5. Power point presentation 06 marks

Q6. Viva and Journal 10 marks

PRACTICAL
USZOP4 (Course IX)
Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Major Question 15 marks

Q1. Study of permeability of cell through plasma membrane (Osmosis in blood cells).

OR

Q1. Measurement of cell diameter by occulometer (by using permanent slide)

Minor Question 10 marks

Q2. Qualitative tests for carbohydrates (Molisch's test, Benedicts test, Barfoed's test, Anthrone test)

OR

Q2. Qualitative tests for proteins (Ninhydrin test, Biuret test, Millon's test, Xanthoproteic test)

OR

Q2. Qualitative test for lipids (Solubility test, Sudan III test)

OR

Q2. Study of rancidity of lipids by titrimetric method

Q3. Identify and describe as per instructions 15 marks

1. Ultra structure of cell organelles (a, b & c)
2. Clinical disorders (d & e)

Q4. Viva 05 marks

Q5. Journal 05 marks

PRACTICAL

USZOP4 (Course X)

Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Major Question 12 marks

Q1. Estimation of Dissolved oxygen from the given water sample

OR

Q1. Detection of Creatinine in urine

OR

Q1. Determination of blood sugar by GOD and POD method

Minor Question 08 marks

Q2. Estimation of Salinity by refractometer from the given water sample

OR

Q2. Estimation of conductivity by conductometer from the given water sample

OR

Q2. Determination of blood pressure by using spyghmomanometer

OR

Q2. Study of bleeding time and clotting time

Q3. Identifiy and describe as per instructions 15 marks

1. Permanent slides (a &b)
2. Fishery (c ,d & e)

Q4. Field Report and viva based on it. 10 marks

Q5. Journal 05 marks

UNIVERSITY OF MUMBAI
No. UG/ /56 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Sc. degree course , **vide** this office Circular No. UG/98 of 2015-16, dated 13th October, 2016 and the Principals of affiliated Colleges in Science are hereby informed that the recommendation made by the Ad-hoc Board of Studies in Chemistry at its meeting held on 7th July, 2016 has been accepted by the Academic Council meeting held on 14th July, 2016 **vide** item No. 4.13 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for T.Y. B.Sc. programme in Chemistry (Sem. V & VI), which are available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

16/11/16

(Dr.M.A.Khan)
REGISTRAR

MUMBAI – 400 032
16 November, 2016

To,

The Principals of the affiliated Colleges in Science.

A.C/4.13/14.07.2016

****

No. UG/ /56A of 2016 MUMBAI-400 032 16 November, 2016

Copy forwarded with Compliments for information to:-

1) The Co-ordinator, Faculties of Science,
2) The Chairman, Board of Studies in Chemistry,
3) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
4) The Director, Board of College and University Development,
5) The Co-Ordinator, University Computerization Centre,
6) The Controller of Examinations.

16/11/16

(Dr.M.A.Khan)
REGISTRAR

PTO..

UNIVERSITY OF MUMBAI

Syllabus for sem V & VI
Program: B.Sc.
Course: CHEMISTRY

(Credit Based Semester and Grading System with effect from the academic year 2016–2017)

T.Y.B.Sc.
CHEMISTRY
Credit Based Semester and Grading System
To be implemented from the Academic year 2016-2017

SEMESTER V
Theory

Course	UNIT	TOPICS	Credits	L / Week
USCH501	**I**	**1.1 Colligative Properties of Dilute Solutions (8L)** **1.1.1** Dilute solution, colligate properties, Raoult's law, relative lowering of vapour pressure. **1.1.2** Elevation in boiling point of a solution, thermodynamic derivation relating elevation in the boiling point of a solution and the molar mass of the non-volatile solute. **1.1.3** Depression in freezing point of a solution, thermodynamic derivation relating the depression in the freezing point of a solution and the molar mass of the non-volatile solute. **1.1.4** Osmotic pressure, van't Hoff's equation for osmotic pressure, (derivation is expected) and determination of molar mass of the solute. Abnormal molar masses of solutes and van't Hoff factor (calculation of Degree of Association and Degree of Dissociation.) **1.2 Phase Rule (7L)** **1.2.1** Gibb's phase rule and terms involved in the equation. **1.2.2** Application of phase rule to ONE component systems (i) water system, (ii) sulphur system **1.2.3** Application of phase rule to TWO component systems, condensed systems, condensed phase rule, eutectic systems (Lead-Silver system), desilverisation of lead. **1.2.4** Introduction to three component system, explanation of phase diagram for three liquids forming one immiscible pair.	**2.5**	**1**

	II	**2.1 Surface Chemistry & Catalysis (9L)** **2.1.1 Adsorption:** Physical and Chemical Adsorption, types of adsorption isotherms **.** Langmuir's adsorption isotherm (Postulates and derivation expected). B.E.T. equation for multilayer adsorption, (derivation not expected). significance of the terms involved in the equation is expected.),determination of surface area of an adsorbent using B.E.T. equation. Numericals on surface area determination are expected. **2.1.2 Catalysis:** Homogeneous and heterogeneous catalysis, catalytic activity and selectivity, promoters, inhibitors, catalyst poisoning and deactivation, **2.1.3 Acid-Base catalysis**, mechanism and kinetics of acid-base catalyzed reactions, effect of pH on acid-base catalyzed reactions. Mechanism and kinetics of enzyme catalyzed reaction (Michaelis-Menten equation). **2.2 Colloids (6L)** **2.2.1** Introduction to colloidal state of matter. **2.2.2** Origin of charge on colloidal particles. Concept of electrical double layer, zeta potential, Helmholtz and Stern model, Electro-kinetic phenomena:1.Electrophoresis, 2.Electrophoresis , 3. Streaming potential 4. Sedimentation potential . **2.2.3** Colloidal electrolytes. **2.2.4** Donnan Membrane Equilibrium. **2.2.5** Surfactants, micelle formation, applications of surfactants in detergents, food industry, in pesticide formulations.		
	III	**3.1 Electrochemistry – Electrochemical cells (15L)** **3.1.1** Lewis concept of Activity and Activity coefficient, Mean ionic activity and mean ionic activity coefficient γ_{+-} of an electrolyte, expression for activities of electrolytes of different valence type, ionic strength		

		3.1.2 Classification of cells: 1.chemical cells without transference 2.Concentration cells with and without transference (derivations of expression for concentration cell EMF are expected) Origin of liquid-liquid junction potential and its elimination using a salt bridge. **3.1.3** Applications of EMF .measurements in the determination of **1.** pH of a solution using quinhydrone and glass electrode. **2** solubility and solubility product of sparingly soluble salts using chemical cell and concentration cell method **3**. determination of liquid-liquid junction potential .		
	IV	**4.1 Introduction to Polymers (8L)** **4.1.1 Basic terms** : macromolecule, monomer, repeat unit, degree of polymerization. **4.1.2. Classification of polymers** based on (i) source, (ii) structure, (iii) thermal response, (iv) physical properties. **4.1.3. Molar masses of polymers**: 1. Number average molar mass, 2.Weight average molar mass, 3. Viscosity average molar mass, monodispersity, polydispersity. **4.1.4. Methods of determining molar masses of polymers** : 1. Ultrcentrifuge method (Limiting velocity method only). Viscosity method (Mark-Houwink equation). **4.1.5. Introduction to light emmiting polymers** (characteristics, method of preparation and it's application are expected). **4.2 Crystalline State (7L)** **4.2.1. Laws of Crystallography** **4.2.2**. Characteristics of simple cubic, face centered and body centered cubic system, inter planar distance in cubic lattices (only expressions for ratios of inter planar distances are expected). **4.2.3.** Use of X- rays in the study of crystal structure, Bragg's equation (derivation expected), X- ray diffraction method of studying crystal lattices, structure of NaCl and KCl,		**1**

		determination of Avagadro number. **4.2.4.** Elementary idea of defects in crystals- Frenkel defect and Schottky defect.		
USCH502	**I**	**1. Chemical Bonding And Solid State Chemistry (15L)** **1.1 Molecular Symmetry (7L)** **1.1.1** Introduction and Importance. **1.1.2** Symmetry elements and symmetry operations. **1.1.3** Concept of a Point Group with illustrations using the following point gro ups: (i) $C_{\alpha v}$ (HCl), (ii) $D_{\alpha h}$ (H_2), (iii) C2v (H_2O), (iv) C_{3v} (NH_3), (v) C_{2h} (trans – trichloroethylene), and (vi) D_{3h} (BCl_3). **1.2 Molecular Orbital Theory for Polyatomic Species (5L)** **1.2.1** Simple triatomic species: H_3^+ and H_3 (correlation between bond angle and Molecular orbitals). Term such as Walsh correlation diagram, Symmetry Adapted Linear Combinations (SALCs), Ligand Group orbitals (LGOs), transformation of atomic orbitals into appropriate symmetry types, expected to be discussed **1.3 (3L)** Other molecules (considering only σ-bonding): i) BeH_2, ii) H_2O, Explanation of terms viz.crystal lattice, lattice points, unit cells and lattice constants.	**2.5**	**1**

	II	**2. Solid Materials (15L)** **2.1 Structures of Solids (10L)** **2.1.1** Importance of solid state chemistry. **2.1.2** Classification of solids on the basis of bonding. **2.1.3** Closest packing of rigid spheres (hcp, ccp), packing density in simple cubic, bcc, fcc and hcp lattices (numerical problems expected). Point defects with respect to Frenkel and Schottky defects expected. **2.1.4** Structure metallic solids. **2.1.5** Tetrahedral and octahedral interstitial voids in ccp lattice, tetrahedral holes,limiting radius ratios for different coordination numbers and their significance, calculation of limiting radius ratio for coordination number 4. **2.1.7** Structures of sodium chloride and cesium chloride. **2.2 Superconductivity (05L)** **2.2.1** Superconductivity, Meissner effect. **2.2.2** Different superconducting materials viz,convential superconductors, organic superconductors, alkali metal fullerides (A_3C_{60}) and high temperature Superconductors. **2.2.3** Applications of superconducting materials.		**1**
	III	**3. Chemistry of elements (15L)** **3.1 Inner transition elements (3L)** **3.1.1** Introduction: position of f-block elements and comparison between lanthanides and actinides **3.1.2** The shapes of *f*-orbitals. **3.1 Lanthanides Series (10L)** **3.2.1** Chemistry of lanthanides with reference to (i) lanthanide contraction, (ii) Oxidation states (iii) magnetic and spectral properties, **3.2.2** Occurrence, extraction and separation of lanthanides by Solvent extraction. **3.2.3** Applications of lanthanides.		**1**

		3.3 Actinides Series (2L) **3.3.1 Chemistry** of Uranium and with reference to occurrence, extraction (solvent extraction method), **3.3.2** Properties and applications.		
	IV	**4. Solution Chemistry** **4.1 Acid-base Chemistry in Aqueous Medium (8L)** **4.1.1 Acidity** of mono- and polyatomic cations. **4.1.2** Basicity of mono- and polyatomic anions (discussion for 4.1.1 as well as 4.1.2 to Include Latimer equation and predominance diagrams). **4.2 Chemistry in Non-aqueous Solvents (7L)** **4.2.1** Classification of solvents and importance of non-aqueous solvents. **4.2.2** Characteristics and study of liquid ammonia, dinitrogen tetraoxide and acetic acid as non-aqueous solvents with respect to (i) acid-base reactions and (ii) redox reactions.		**1**
USCH503	**I**	**1.1. Mechanism of Organic Reactions (15L)** 1.1.1 Thermodynamic and Kinetic control of organic reactions: Concept with mechanisms of the following reactions: addition of HX to butadiene; sulfonation of naphthalene. Nucleophilicity/ electrophilicity vs Basicity/acidity. 1.1.2 Mechanism of elimination reactions, with stereochemistry: E1 and E2 reactions: regioselectivity (Saytzeff and Hofmann rules). 1.1.3 Mechanism of reactions of carbonyl compounds with nucleophiles: 1.1.3.1 Formation of acetals/ketals from aldehydes and ketones. 1.1.3.2 Reaction of aldehydes and ketones with primary and secondary amines. 1.1.3.3 Acyl nucleophilic substitution (tetrahedral mechanism): Acid catalysed esterification of Carboxylic acids and base promoted hydrolysis of esters. 1.1.4 Mechanism of rearrangements with examples and stereochemistry wherever applicable. 1.1.4.1 Migration to electron deficient carbon: Pinacol,	**2.5**	**1**

		Benzylic acid. 1.1.4.2 Migration to electron deficient nitrogen: Beckmann, Hofmann. 1.1.5 Mechanism of the following reactons with synthetic application: Claisen condensation, Michael addition.		
	II	**2. Stereochemistry (15L)** 2.1.1 Molecular chirality and element of symmetry: Mirror Plane symmetry (inversion centre), rotation-reflection (alternating) axis, Chirality of compounds without stereogenic centre: cummulenes, spirans and biphenyls. 2.1.2 Stability ofcycloalkanes: Strains in cycloalkanes-angle,eclipising, transannular (3 to 8 membered). Conformations of cyclohexane, mono- and di- alkyl cyclohexanes and their relative stabilities. 2.1.3 Stereo selectivity and Stereo specificity: Idea of enantioselectivity (ee) and diastereoselectivity (de).Topicity-enantiotopic and diastereotopic atoms, groups and faces. **Stereochemistry of-** (1) Substitution reactions- S_N1, S_N2, S_Ni (reaction of alcohol with thionyl chloride). (2) E_2-anti-elimination-Base induced dehydrohalogenation of 1-bromo-1,2- diphenylpropane. (3) Addition reactions to olefins-i) catalytic hydrogenation ii) bromination (electrophilic anti addition) (iii)syn-hydroxylation (molecular addition) with OsO_4 and $KMnO_4$.		**1**
	III	**3.1 Carbohydrates (10L)** 3.1.1 Introduction: Classification, Sources, Reducing and non-reducing sugars DL notation. 3.1.2 Structures of monosaccharides: Fischer projection (4-6 carbon monosaccharides and Haworth formula-Furanose and pyranose forms of pentoses and hexoses. Interconversion :open and Haworth forms of monosaccharides with 5 and 6 carbons. Chair conformation with stereochemistry of D-glucose and D-fructose. Stability of chair forms of D-		**1**

		glucose. 3.1.3 Determination of open chain configuration- of D-glucose assuming the configuration of D-arabinose; and of D-fructose assuming the configuration of D-glucose. 3.1.4 Anomers and epimers of monosaccharides. Enantiomers and diastereomers of glucose. Mutarotation (with mechanism) in D-glucose. 3.1.5 Chain lengthening and shortening reaction: Modified kiliani-fischer synthesis. Wohl method. 3.1.6 Reactions of D-glucose and D-fructose: (a) osazone formation (b) reduction- H_2/Ni, $NaBH_4$ c)oxidation- bromine water, HNO_3, HIO_4. D) interconversion of D-glucose and D-fructose e) acetylation f) methylation [e and f with cyclic pyranose form]. 3.1.7 Commercial importance of carbohydrates in pharmaceutical, paper,food and Textile industries. **3.2. IUPAC Nomenclature (5L)** IUPAC systematic and accepted trivial nomenclature of the following classes of compounds, including substituted ones (up to 2 substituents/ functional groups): **3.2.1** (a)Bicyclic compounds- spiro-,fused, and bridged (upto 11carbon atoms)-saturated and unsaturated compounds. **3.2.2** (b) Biphenyls. **3.2.3** (c) Cummulenes upto 3 double bonds (d) Monocyclic (5 and 6 membered) aromatic and non-aromatic heterocyclic compounds containing a maximum of two hetero atoms among N,O,S. **3.1.1**Introduction:Classification, Sources, Reducing and non-reducing sugars DL notation. **3.1.2** Structures of monosaccharides: Fischer projection (4- 6 carbon monosaccharides and Haworth formula-Furanose and pyranose forms of pentoses and hexoses. Interconversion :open and Haworth forms of monosaccharides with 5 and 6 carbons. Chair conformation with		

		stereochemistry of D-glucose and D-fructose. Stability of chair forms of D-glucose. **3.1.3** Determination of open chain configuration- of D-glucose assuming the configuration of D-arabinose; and of D-fructose assuming the configuration of D-glucose. **3.1.4** Anomers and epimers of monosaccharides. Enantiomers and diastereomers glucose. Mutarotation (with mechanism) in D-glucose. **3.1.5** Chain lengthening and shortening reaction: Modified kiliani-fischer synthesis. Wohl method. **3.1.6** Reactions of D-glucose and D-fructose: (a) osazone formation (b) reduction- H_2/Ni, $NaBH_4$ c)oxidation-bromine water, HNO_3, HIO_4. D) interconversion of D-glucose and D-fructose e) acetylation f) methylation [e and f with cyclic pyranose form]. **3.2. IUPAC Nomenclature (5L)** IUPAC systematic and accepted trivial nomenclature of the following classes of compounds, including substituted ones (up to 2 substituents/functional groups): **3.2.1** (a)Bicyclic compounds- spiro-,fused, and bridged (upto 11carbon atoms)-saturated and unsaturated compounds. **3.2.2** (b) Biphenyls. **3.2.3** (c) Cummulenes upto 3 double bonds (d) Monocyclic (5 and 6 membered) aromatic and non-aromatic heterocyclic compounds containing a maximum of two hetero atoms among N,O,S.		
	IV	**4.1. Heterocyclic Chemistry (8L)** **4.1.1** Introduction: Electronic structure and aromaticity of furan, pyrrole,thiophene and pyridine. **4.1.2** Synthesis: Synthesis of furans, pyrroles, and thiophenes by Paal-Knor synthesis. Pyridines by Hantzsch synthesis and from 1,5-diketones. **4.1.3** Reactivity: Reactivity towards electrophilic substitution reactions- of furan, pyrrole and thiophene on basis		**1**

		of stability of intermediate; and of pyridine on the basis of electron distribution.Nucleophilic substitution reaction of pyridine on the basis of electron distribution. **4.1.4** Reactions of heterocycles: The following reactions of furan, pyrrole and thiophene: Halogenation , Nitration, Sulphonation, Vilsmeir formylation reaction, Friedel-Crafts reaction. Furan: Diels-Alder reaction. Ring opening of furan. Pyrrole: Acidity and basicity of pyrrole -Comparison of basicity of pyrrole and pyrrolidine, Acid catalyzed polymerization of pyrrole. Pyridine: Basicity. Comparison of basicity of pyridine, pyrrole and piperidine. Sulphonation of pyridine, with and without catalyst. Reduction.Oxidation of alkyl pyridines and action of sodamide (Chichibabin reaction).N-methylation of pyridine. Quaternization of piperdine, pyrrolidine and Hofmann elimination of the quaternary salts. **4.2. Organic Synthesis (7L)** **4.2.1** Introduction: Criteria for ideal organic synthesis. Yield and selectivity. Multi- component synthesis – with examples, Mannich reaction, Hanztsch synthesis of pyridines (without mechanism). **4.2.2** Illustrative synthesis of industrially important compounds: Ibuprofen (chiral synthesis), paracetamol (green synthesis), L-ascorbic acid (from D-glucose), norfloxacin, thyroxine, vanillin, methyl dihydrojasmonate (Hedione), Bifenox-I, pigment red 242, indigo, 2-hydroxy-3-amino-5-nitrobenzene sulphonic acid. **4.2.3** Newer methods of organic synthesis: Introduction to the use of the following in organic synthesis: Ultrasound, microwaves, PTC. **4.1.1** Introduction: aromaticity of furan,pyrrole,thiophene and pyridine. **4.1.2** Synthesis: Synthesis of furans, pyrroles, and thiophenes by Paal-Knor synthesis. Pyridines by Hantzsch		

		synthesis and from 1,5-diketones. **4.1.3** Reactivity: Reactivity towards electrophilic substitution reactions- of furan, pyrrole and thiophene on basis of stability of intermediate; and of pyridine on the basis of electron distribution. Nucleophilic substitution reaction of pyridine on the basis of electron distribution. **4.1.4** Reactions of heterocycles: The following reactions of furan, pyrrole and thiophene: Vilsmeir formylation reaction, Friedel-Crafts reaction. Furan: Diels-Alder reaction. Ring opening of furan. Pyrrole: Acidity and basicity of pyrrole-Comparison of basicity of pyrrole and pyrrolidine, Acid catalyzed polymerization of pyrrole. Pyridine: Basicity. Comparison of basicity of pyridine, pyrrole and piperidine. Sulphonation of pyridine, with and without catalyst. Reduction.Oxidation of alkyl pyridines and action of sodamide (Chichibabin reaction). N-methylation of pyridine.Quaternization of piperdine, pyrrolidine and Hofmann elimination of the quaternary salts. **4.2. Organic Synthesis (7L)** **4.2.1** Introduction: Criteria for ideal organic synthesis. Yield and selectivity. Multi- component synthesis – with examples, Mannich reaction, Hanztsch synthesis of pyridines (without mechanism). **4.2.2** Illustrative synthesis of industrially important compounds: Ibuprofen (chiral synthesis), paracetamol (green synthesis), L-ascorbic acid (from D-glucose), norfloxacin, nalidixic acid, vanillin, methyl dihydrojasmonate (Hedione), Bifenox-I, pigment red 242, 2-hydroxy-3-amino-5-nitrobenzene sulphonic acid. **4.2.3** Newer methods of organic synthesis: Introduction to the use of the following in organic synthesis: Ultrasound, microwaves, PTC.		

USCH504	**I**	**1. Treatment of analytical data-I and sampling (15 L)** **1.1 Treatment of Analytical Data (7L)** Types of errors, determinate and indeterminate errors, minimization of errors, constant and proportionate errors, accuracy and precision, measures of dispersion and central tendency: mean, median, average deviation, relative average deviation, standard deviation, variance, coefficient of variation.[Numerical problems expected] **1.2 Sampling (8L)** Terms involved, importance of sampling, sampling techniques, sampling of gases, ambient and stack sampling, equipment used, sampling of homogeneous and heterogeneous liquids, sampling of static and flowing liquids, methods and equipments used, sampling of solids, importance of particle size and sample size, samples used, need for the reduction in the sample size, methods of reduction in sample size, collection, preservation and dissolution of the sample.	**2.5**	**1**
	II	**2. Titrimetric analysis-I and UV-Visible spectroscopy. (15L)** **2.1 Acid-base Titrations (5L)** Construction of titration curves and choice of indicators in the titration of [1] strong acid and strong base, [2] strong acid and weak base, [3] weak acid and strong base, [4] weak acid and weak base. **2.2 Precipitation titrations (4L)** Argentimetric titrations, construction of the titration curve, Volhard's method, Mohr's method, adsorption indicators, theory and applications**.** **2.3 U.V. Visible Spectroscopy (4L)** Photometers and spectrophotometers, Instrumentation in the case of single and double beam spectrophotometers, Qualitative and quantitative analysis, calibration cure method.		**1**

	III	**3. Methods of separation-I (15L)** **3.1 Solvent Extraction (8L)** Partition coefficient and distribution ratio, extraction efficiency, separation factor, role of complexing agents in solvent extraction, chelation, ion pair formation, solvation, types of solvent extraction: batch, continuous. [Numerical problems expected] **3.2 Chromatography (2L)** Introduction to chromatographic techniques, classification of chromatographic techniques. **3.3 Planar Chromatography (5L)** Principle, techniques and applications of [1] Paper chromatography [2] Thin layer chromatography		**1**
	IV	**4. Optical methods (15L)** **4.1 Atomic Spectroscopy (7L)** Absorption and emission spectra, energy level diagrams, process involved in atomization, flame photometry, flame atomizer, types of burners, monochromators and detectors, atomic absorption spectroscopy; flame and electrothermal atomizer, sources, instrumentation, quantitative applications of atomic absorption and flame photometry, calibration curve method, standard addition and internal standard method. **4.2 Molecular Fluorescence and Phosphorescence Spectroscopy (4L)** Theory, instrumentation and applications **4.3 Turbidimetry and Nephelometry (4L)** Scattering of light, effect of concentration, particle size and wavelength on light scattering, instrumentation and applications.		**1**

Practicals

USCHP05	**Practicals of Course USCH501** **<u>Physical Practicals</u>** **Chemical Kinetics –** To determine the order between $K_2S_2O_8$ & KI by fractional change method. **Viscosity** – To determine the molecular weight of high polymer polyvinyl alcohol (PVA) by viscosity measurement. **OR** To determine the radius of a glycerol molecule by viscosity measurement. **Potentiometry** – 1. To determine the amount of Fe(II) in the given solution by titration with a standard $K_2Cr_2O_7$ solution and hence to find the formal redox potential of Fe^{3+}/Fe^{2+} 2. To determine the solubility product and solubility of AgCl potentiometrically using chemical cell. **OR** 3. To determine the solubility product and solubility of AgCl potentiometrically using concentration cell. **Colorimetry –** To determine the amount of Fe(III) present in the given solution by using salicylic acid by colorimetric titration.(static method) (=525 nm) **pH –Metry –** To determine acidic and basic dissociation constants of amino acid hence to calculate isoelectric point. **Course USCH502** **<u>Inorganic Practicals</u>** **Inorganic preparations** 1. Potassium diaquo bis-(oxalate)cuprate (II)$K_2[Cu(C_2O_4)_2.(H_2O]$	**3**	**8**

	2. CuCl2-2DMSO 3. Bis(ethylene diamine)iron(II)sulphate[$C_2H_4(NH_2)_2FeSO_4.4H_2O$]. 4. Skill based Qualitative preparation of Chromium (II)acetate $Cr(OAc)_2$ so that the following outcomes are achieved: • Setting up reactor for Cr(II) ions • Identification of oxidation states of Chromium • Preparation of chromium(II)acetate • Isolation of the product		

	Volumetric analysis 1. Determination of magnesium from the supplied commercial sample of Milk of magnesia tablet 2. Estimation of Nickel(II)complexometrically using murexide indicator (Students are expected to standardize supplied EDTA solution using $ZnSO_4.7H_20$)		
USCHP06	**Practicals of Course USCH503** **Organic Practicals** i. Separation of binary (solid-slid) mixture.(Weights and physical constant of both crude components of the mixture are to be reported. (Minimum 4 mixtures) ii. Identification of an organic compound of known chemical type. (Minimum 4 mixtures) Syllabus for Organic Chemistry Sem-VI **Organic preparations** i. Acetylation of hydroquinone. ii. Nitration of nitrobenzene. iii. Hydrolysis of ethyl benzoate. iv. Bromination of acetanilide. **Course USCH504** **Analytical Practicals** 1. Estimation of persulphate in the given sample by the method of back titration. 2. Determination of the calcium and the magnesium content of a dolomite sample. 3. Determination of glucose content of a honey sample by Wilstater's method. 4. Determination of the amount of fluoride in the given solution colorimetrically. 5. Determination of Vitamin C content of a given tablet by titration with sodium hydroxide pH metrically	**3**	**8**

T.Y.B.Sc.
Chemistry
Credit Based Semester and Grading System
To be implemented from the Academic year 2016-2017

SEMESTER VI
Theory

Course	UNIT		Credits	L / Week
USCH601	I	**1.1 Molecular Spectroscopy –I (15L)** **1.1.1** Dipole moment: Dipole moment, polarization of a bond, bond moment, dipole moment and molecular structure. **1.1.2 Rotational Spectrum:** Rotational spectrum of a diatomic molecule, rigid rotor, moment of inertia, energy levels, conditions for obtaining pure rotational spectrum, selection rule, nature of spectrum, determination of inter nuclear distance and isotopic shift. **1.1.3 Vibration (IR) spectrum:** Vibrational motion, degrees of freedom, modes of vibration, vibrational spectrum of a diatomic molecule, simple harmonic oscillator, energy levels, zero point energy, conditions for obtaining vibrational spectrum, selection rule, nature of spectrum. **1.1.4 Vibration-Rotation spectrum of diatomic molecule v**ibrating rotor, energy levels, selection rule, nature of spectrum, R and P branches, anharmonic oscillator : energy levels, selection rule, fundamental band, overtones . Application of vibration-rotation spectrum in determining Force constant, determination and significance. Introduction to infrared spectra of simple molecules like H_2O and CO_2 **1.1.5 Raman Spectroscopy :** Scattering of electromagnetic radiation, Rayleigh scattering, Raman scattering, nature of Raman spectrum , Stoke's lines,anti-Stoke's lines, Raman shift, quantum theory of Raman spectrum, comparative study of IR and Raman spectra, rule of mutual exclusion.(example of CO_2molecule).	**2.5**	**1**
	II	**2.1 Basics of Quantum Chemistry (10L)** **2.1.1** Classical mechanics, limitations of classical mechanics, Black body radiation, photoelectric effect, Compton effect. **2.1.2** Introduction to quantum mechanics,		**1**

		Planck's theory of quantization, wave particle duality, de-Broglie equation, Heisenberg's uncertainty principle. **2.1.3** Progressive and standing waves, boundary conditions, Schrodinger's time independent wave equation(derivation not expected)., interpretation and properties of wave function. **2.1.4** Postulates of quantum mechanics (following are to be considered),1. state function and it's significance2. Concept of operators : definition, addition, subtraction and multiplication of operators, commutative and non- commutative operators, linear operator, Hamiltonian operator, 3. Eigen function and eigen value, eigen value equation. **2.2 Applied Electrochemistry (5L)** **2.2.1** Polarization, concentration polarization and it's elimination **2.2.2** Decomposition potential, experimental determination of decomposition potential, factors affecting decomposition potential (nature of electrolyte, nature of electrodes and temperature) Tafel's equation for hydrogen overvoltage, Overvoltage, experimental determination of over-voltage, **2.2.3** Electroplating ---objectives and procedures		
	III	**3.1 Renewable Energy Sources (5L)** **3.1.1.** Lithium ion cell. **3.1.2**. Fuel cells; Choice of fuel and oxidant, Bacon's H_2 and O_2 fuel cell. **3.1.3**. Solar cells, solar energy, photovoltaic effect, semiconductors as solar energy converters, silicon solar cell **3.1.4**. Hydrogen : Fuel of the future, production of hydrogen by direct electrolysis of water, advantages of hydrogen as a universal energy medium. **3.2 Nuclear Magnetic Resonance Spectroscopy (6L)** **3.2.1**. Nuclear spin, magnetic moment, nuclear 'g' factor, energy levels, Larmor precession, Relaxation processes in n.m.r. (spin-spin relaxation and spin-lattice relaxation). **3.2.2**. NMR Spectrometer, chemical shift, shielding and deshielding of protons, low resolution n.m.r. spectrum of methanol and ethanol.		**1**

		3.3 Chemical Kinetics (4 L) **3.3.1** Collision theory of reaction rates, application of collision theory to 1. uni-molecular reaction and 2. bimolecular reaction (Lindemann theory, derivation expected). Merits and drawbacks of collision theory. **3.3.2** Classification of reactions as slow, fast and ultra-fast. study of kinetics of fast reactions by Stop flow method.		
	IV	**4.1 Nuclear Chemistry** **4.1.1** Types of nuclear radiations and their characteristics, behaviour of ion pairs in electric field, detecton and measurement of nuclear radiations using G. M. Counter and Scintillation Counter. **4.1.2** Kinetics of radioactive decay, units of radioactivity (Curie, Bequerel, Rutherford) **4.1.3** Radioactive equilibrium (secular and transient), determination of radioactive constants for radio-elements having 1. moderate half life, 2. long half life 3.extremely long or short half life. **4.1.4** Use of radioisotpes as tracers in 1. chemical investigations- reaction mechanism, 2. age determination- dating by carbon-14 **4.1.5** Nuclear reactions – nuclear transmutation, artificial radioactivity Q-value of nuclear reaction, threshold energy. **4.1.6** Fissile and fertile material, nuclear fission, chain reaction, factor controlling fission process. (multiplication factor and critical size or mass of fissionable material)., nuclear power reactor and breeder reactor.		**1**
USCH602	**I**	**Coordination Chemistry (15L)** **1.1 Crystal Field Theory (CFT)** **1.1.1** Basic tenets of Crystal field theory and effect of crystal field on central metal valence orbitals. **1.1.2** Splitting of *d* orbitals in octahedral, tetrahedral and square planar complexes. **1.1.3** Crystal field splitting energy ($10Dq$ or Δ_o) for octahedral complexes and factors affecting the magnitude of Δ_o. **1.1.4** Crystal field stabilization energy (CFSE), calculation of CFSE, for octahedral and tetrahedral complexes with	**2.5**	**1**

		d^1 to d^{10} metal ion configurations. **1.1.5** Effect of crystal field splitting on i) Ionic radius and ii) Lattice energy. **1.1.6** Theoretical failure of the CFT model. **1.1.7** Experimental evidence for co-valence in co-ordination compounds.(i) ESR spectrum of $[IrCl_6]^{2-}$ (ii) NMR spectrum of tris (acetyl acetanato) vanadium complex, (iii) Intensities of *d-d* transitions, and (iv) Nephelauxetic effect. Consequences of crystal field splitting on various properties such as ionic radii, hydration energy, lattice energy, enthalpies of formation, colour and magnetic properties. **1.2 Molecular Orbital Theory (MOT) of Coordination Complexes** **1.2.1** Application to octahedral complexes in case of (i) $[Ti(H_2O)]^{3+}$, (ii) Fluoro complexes of Fe(II) and Fe (III) and (iii) Cyano complexes of Fe(II) and Fe (III). **1.2.2** Effect of pi-bonding an ligand field splitting parameter in M→L and L→M interactions. **1.3 Electronic States and Terms for Polyelectronic Atoms** **1.3.1** Introduction: electronic configuration and electronic states, Term symbols, coupling of spin momenta (M_S),orbital momenta (M_l)and spin- orbit coupling or Russell-Saunders coupling. **1.3.2** Determination of Terms for p^2 electronic configuration (as in a carbon atom). **1.3.3** Terms and micro-states for transition metal atoms/ions.		
	II	**2. Properties of Coordination compounds (15L)** **2.1 Stability of Complexes (5L)** **2.1.1** Thermodynamic stability and kinetic stability of complexes with examples. **2.1.2** Stability constants: Stepwise and overall constants and their inter-relationship. **2.1.3** Factors affecting thermodynamic stability. **2.1.4** Potentiometric method of determination of stability constants with example of silver-ammonia complex. **2.2 Substitution Reactions in Octahedral Complexes (5L)**		**1**

2.2.1 Introduction, types of reactions in complexes.
2.2.2 Ligand substitution reactions: basic mechanisms.
2.2.3 Inert and labile complexes and

		electronic configurations and lability of complexes. **2.2.4** Acid hydrolysis, base hydrolysis and anation reactions. **2.3 Electronic Spectra (5L)** **2.3.1** Types of electronic transitions like intra –ligand transitions, charge transfer transitions and intra-metal transitions and (*d-d* or ligand field transitions for transition metals). **2.3.2** Rules for electronic transitions: Spin and Orbital or Laporte selection rules. Orgel Diagrams for D Terms (i.e,d^1 , d^4 and d^6 .d^9 electronic configurations) and its use in interpretation of visible electronic absorption spectra of these configurations.		
	III	**Organometallic Chemistry (15L)** **3.1 Organometallic Compounds of main group metals (6L)** **3.1.1** Introduction: General synthetic methods: (i) Oxidative addition, (ii) Metal-Metal exchange (Transmetallation), (iii) Carbanion-Halide exchange, (iv) Metal Hydrogen exchange and (v) Methylene insertion reactions. **3.1.2** Chemical rections: (i) Reactions with oxygen, (ii) Alkylation and arylation reactions (iii) Reactions with protic reagents and (iv) Complex formation reactions. **3.2 Organometallic compounds of transition metals (9L)** **3.2.1** Synthesis , structure, reactions and of ferrocene. **3.2.2** Bonding in ferrocene on the basis of VBT. **3.2.3** Bonding in Re and Mo halide complexes.		**1**
	IV	**Some Selected Topics (15L)** **4.1 Inorganic Polymers (3L)** 4.1.1Various methods of classification with examples. **4.1.2** Chemistry of borazine with reference to preparation , properties, structures, bonding and applications. **4.2 Characteristics and Treatment**		**1**

		of Liquid Effluent (06L) **4.2.2** Characterization of waste: biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), aerobic and anaerobic processes. **4.2.3** Removing of solid contaminants, physical and chemical principles such as coagulation, flocculation and sedimentation. **4.2.4** Primary,secondary and tertiary of liquid effluents. **4.3 Nanomaterials(04L)** **4.3.2** Introduction and importance of nanomaterials. **4.3.3** Properties (Comparison between bulk and nanomaterials): (i) Optical properties, (ii) Electrical conductivity, and (iii) Mechanical properties. **4.3.4** Forms of nanomaterials: nanofilms, nanolayers, nanotubes, nanowires, and nanoparticles. **4.3.5** Chemical methods of preparation: (i) Colloidal route, and (ii) Sol-gel method. **4.5 Inorganic Pharmaceuticals (2L)** **4.4.2** Gastrointestinal agents viz., (i) antacids (aluminium hydroxide, milk of magnesia, sodium bicarbonate and (ii) cathartics (magnesium sulphate and sodium phosphate). Topical agents viz., (i) protectives and adsorbents (talc, calamine), (ii) antimicrobial agents (potassium permanganate, tincture iodine, boric acid) and astringents (alum).		
USCH603	**I**	**1.1 Spectroscopy** (15L) 1.1.1 Introduction : Electromagnetic spectrum, units of wavelength and frequency. 1.1.2 UV- Visible Spectroscopy: Basic theory, solvents, nature of UV-VIS spectrum, concept of Chromophore, auxochrome,bathochromic shift,Hypsochromic shift hyperchromic	**2.5**	**1**

		effect and chromophore-auxochrome interactions. 1.1.3 IR Spectrocopy: Basic theory, nature of IR spectrum, selection rule , fingerprint region. 1.1.4 PMR Spectroscopy: Basic theory of NMR, nature of PMR spectrum, chemical shift (∂ unit), standard for PMR, solvents used. Factors affecting chemical shift: (1) inductive effect (2) anisotropic effect (with reference to C=C, CΞC, C=O and benzene ring). Spin- spin coupling and coupling constant. Proton exchange-application of deuterium exchange ,Application of PMR in structure determination. 1.1.5 Spectral characteristics of following classes of organic compounds, including benzene and monosubstituted benzenes, with respect to UV-VIS, IR,PMR: (1)alkanes (2)alkenes and polyenes (3) alkynes (4) haloalkanes (5) alcohols (6) carbonyl compounds (7) ethers (8) carboxylic acids (9) esters (10)amines (11) amides (broad regions characteristic of different groups are expected). 1.1.6 Mass Spectrometry: Basic theory.Nature of mass spectrum. General rules of fragmentation. Importance of - molecular ion peak, isotopic peaks, basepeak, Nitrogen rule.Illustrative fragmentation of alkanes and aliphatic carbonyl compounds (No Mclafferty rearrangement). 1.1.7 Problems of structure elucidation of simple organic compounds using individual or combined use of the above spectroscopic technique are expected.(index of hydrogen deficiency should be the first step in solving the problems).		
	II	**2.1 Polymers (11L)** 2.1.1 Introduction: General idea of monomers, polymers, and polymerization, natural and synthetic polymers. Homoplymers and copolymers. Classification of polymers- Plastic, fibres, resins, elastomers. Thermoplastics and thermosets. Copolymers-alternating, block, random, graft. 2.1.2 Mechanism of free radical addition		**1**

		polymerization. 2.1.3 Elastomers: Natural and synthetic rubbers. Diene polymerization: 1,2- and 1,4- addition (cis and trans) polymerization of isoprene. 1,3-Butadiene-styrene copolymer. 2.1.4 Stereochemistry of polymers: Tacticity. Role of Ziegler-Natta catalyst (co- ordination polymerization) in directing the tacticity in polypropylene (no mechanism). 2.1.5 Preparation & use of polymers: (1) Addition polymers: (a) polyethylene (b)polypropylene (c) PVC (d) polystyrene (e) polyacrylonitrile (f) polyvinylalcohol (g) Teflon. (2) Condensation Polymers: (a) Polyesters (b) polyamides (c) polyurethans (d)phenol-formaldehyde resin (e) epoxy resin (f) polycarbonates. 2.1.6 Recyclable polymers. Biodegradable polymers and their uses. Biomedical use of polymers. 2.1.7 Additives to polymers: Plasticizers ,stabilizers and fillers.(The students are expected to identify monomers in a given polymer and draw the structure of a polymer from a given set of monomers). **2.2 Photochemistry** 2.2.1 Introduction: Difference between thermal and photochemical reactions. Jablonski diagram, singlet and triple states, allowed and forbidden transitions, fate of excited molecules, photosensitization. 2.2.2 Photochemical reactions of olefins: photoisomerisation, photochemical rearrangement of 1,4-dienes (di π methane) 2.2.3 Photochemistry of carbonyl compounds: Norrish I, Norrish II cleavages, Photo reduction (e.g. benzophenone to benzpinacol).		
	III	**3.1 Catalysts and Reagents (5L)** Study of the following catalysts and reagents with respect to functional group transformations and selectivity (no mechanism). 3.1.1 **Catalysts** : Catalysts for **1** hydrogenation: Raney Ni,Pt and PtO_2: C=C, CN, NO_2, aromatic ring; Pd/C: C=C, COCl→CHO (Rosenmund); Lindlar catalyst: alkynes; Wilkinson's catalyst for		

		stereo selective reduction of olefins. 3.1.2 **Reagents**: (1)$LiAlH_4$ and Red-Al: reduction of CO,COOR, CN, NO_2. (2) $NaBH_4$: reduction of CO (3) SeO_2: hydroxylation of allylic and benzylic positions,oxidation of CH_2, alpha to CO to CO.(5)mCPBA and R-OOH/H_2O_2 for epoxidation of C=C. (6) NBS: allylic and benzylic bromination of position alpha to CO. **3.2 Natural Products (10L)** 3.2.1 Introduction: Primary and secondary metabolites. Introduction to the following natural products with respect to the sources and classes. (Structures of the compounds specified below are expected). (a) Terpene: Isoprene and special isoprene rule.α-terpeniol, citral,camphor, α-pinene. (b) Alkaloids: nicotine,atropine. (c) Vitamins: Vitamins A and C. (d) Hormones: adrenaline, thyroxine. (e) Steroids: cholesterol, progesterone. 3.2.2 Structure determination of natural products: 3.2.2.1 Ozonolysis in terpenoids-Examples of open chain and monocyclic monoterpenes. 3.2.2.2 Hofmann exhaustive methylation and degradation in alkaloids – simple open chain and monocyclic amines.3.2.2.3 Structure determination of citral and nicotine through degradation studies. Total synthesis of degradation studies. Total synthesis of (i) Citral from 3-methylbutan-1-ol (ii) Nicotine from nicotinic acid. 3.2.4 Commercial importance of terpenoids and alkaloids: Synthesis of camphor from α-pinene, α and β ionones, geraniol and nerol from citral. 3.2.5		
	IV	**4.1 Organometallic Chemistry (5L)** 4.1.1 Intoduction: Carbon-metal bond-Nature, types reactivity. 4.1.2 **Organo magnesium Compounds**: Grignard reagent :Preparation, structure, and stability, Reaction with compounds containing acidic hydrogen,carbonyl compounds, cyanides and CO_2. 4.1.3 **Organolithium Compounds** : Preparation using alkyl/aryl halides. Reactions with compounds containing		**1**

		acidic hydrogen, alkyl halides, carbonyl compounds, cyanides and CO_2. Lithium dialkyl cuprates: Preparation and reactions with aliphatic /aromatic/vinylic halides. 4.1.4 **Organozinc compounds**: Preparation of dialkyl zinc. Reaction with water, acid chlorides and alkyl halides. Reformatsky reaction (with mechanism). **4.2 Chemistry of some Important Biomolecules: (10L)** 4.2.1 α-Amino acids: Structure,configuration,Essential amino acids and their abbreviations, classification, Properties: pH dependency of ionic structure and isoelectric point. Methods of preparations: Strecker synthesis, amidomalonate synthesis, Erlenmeyer azalactone synthesis. 4.2.2 Polypeptides and Proteins: Polypeptides: Peptide bond. Nomenclature and representation of polypeptides. Merrifields solid phase peptide synthesis (example of di- and tri- peptides for nomenclature and synthesis). Proteins: Sources, types,functions,colloidal nature, separation based on isoelectric point, denaturation and functions. Partial and total hydrolysis. General idea of primary, secondary, tertiary and quartenary structures. 4.2.3 Nucleic acids: Selective hydrolysis of nucleic acids.Sugars and bases in nucleic acids. Stuctures of nucleosides an nucleotides in DNA and RNA. Structure of nucleic acids (DNA and RNA): Base pairing in nucleic acids. Importance of nucleic acids-self duplication, protein synthesis.		
USCH604	**I**	**Electroanalytical methods. (15L)** **1.1** D.C. Polaroghraphy (11L): Polarizable and nonpolarizable electrodes, basic principles, residual current, diffusion current, limiting current, dropping mercury electrode, supporting electrolyte half wave potential, derivation of the polarographic wave equation for a reversible reaction. Ilkovic equation, oxygen interference and its removal, maxima and maxima suppressors, polarographic cell, qualitative	**2.5**	**1**

		and quantitativeanalysis, calibration curve and standard addition method, applications. [Numerical problems expected] **1.2** Amperometric Titrations: Basic principles, rotating platinum electrode and nature of the titration curves, applications, advantages and limitations.		
	II	**Methods of separation-II (15L)** **2.1** Gas chromatography (6L): Gas liquid chromatography, basic principles retention time, retention volume, resolution, peak width theoretical plates. HETP, instrumentation, columns, detectors, applications. **2.2** High Performance Liquid Chromatography (4L): Instrumentation, types of elution, U.V. and I.R. detector and applications **2.3** Ion Exchange Chromatography (5L): Types of ion exchangers, mechanism of ion exchange, selectivity coefficients and separation factors, capacity and its determination, factors affecting the separation of ions, applications.		**1**
	III	**Treatment of analytical data-II and Titrimetric analysis-II (15L)** **3.1** Treatment of Analytical Data (6L): Distribution of random errors, Gaussian curve, students' t, confidence limits and confidence interval, criteria for rejection of result: 2.5d rule,4.0 rule and Q test, F teset, testing for significance, null hypothesis, method of averages, least squares method. Numerical problems expected] **3.2** Complexometric Titrations (5L): General introduction, EDTA titrations, advantages and limitations of EDTA as the titrant, absolute and conditional formation constants of metal EDTA complexes, construction of titration curves, types of EDTA titrations,methods of increasing the selectivity of EDTA as a titrant, metallochromic indicators, theory and applications. **3.3** Redox Titrations (4L): General introduction, theory of redox indicators, criterion for choosing an indicator for a redox titration, construction of the titration curves in the case of (1) Fe (II) Vs. Ce(IV)		**1**

		(2) Fe (II) Vs. dichromate, use of diphenyl amine and ferroin as redox indicators.		
	IV	**Concepts in Quality and miscellaneous methods (15L)** **4.1** Total quality management (5L) : concept of quality, quality control, quality assurance total quality management, ISO series, Good laboratory practices **4.2** Mass Spectrometry (2L): Basic principles, introduction of components only **4.3** Thermal Methods (5L): Classification of thermal methods, thermogravimetric analysis,basic principles, instrumentation factors affecting the TG curve, applications **4.4** Introduction to Radio Analytical Techniques (3L): Classification of the techniques, introduction to neutron activation analysis and its applications.		**1**

Practicals

USCHP07	**Practicals of Course USCH601** **<u>Physical Practicals</u>** **Chemical Kinetics –** To determine the energy of activation for the acid catalysed hydrolysis of methyl acetate. **Partition coefficient** To determine the equilibrium constant for the reaction$KI + I_2 \rightleftharpoons KI_3$ by partition method. (Partion coefficient of I_2 between CCl_4 and water is to be given) **Potentiometry –** 1. To determine the strength of the given strong acid (HCl) by potentiometric titration using quinhydrone electrode (Calculation of pH from E_{cell} and the plot of (a) $\frac{\Delta E}{\Delta V}$ against V (b) pH against V graphs are expected). **OR** To determine pKa value of the given weak monobasic acid (CH_3COOH) by e.m.f. measurements. 2. To determine E_{cal} at room temperature	**3**	**8**

	and using this value, determine standard reduction potential of Ag/Ag^+ electrode at room temperature. **Conductometry –** To determine the amount of dibasic acid (Oxalic acid) by conductometric titration against strong base. **OR** To determine the relative strength of monochloroacetic acid and acetic acid conductometrically. **Course USCH602** **<u>Inorganic Practicals</u>** **Inorganic preparations** 1. Mercury tetrathiocyanato Cobaltate (II) $Hg[Co(SCN)_4]$ 2. Magnesium oxinate$[Mg(Ox)_2]$ 3. Tris-acetyl acetonato iron(III) $[Fe(AcAc)_3]$ 4. Tetrammine copper(II) sulphate. $[Cu(NH_3)_4]SO_4.H_2O$ **Inorganic estimations/ Analysis** 1. Estimation of copper iodometrically using sodium thiosulphate. (Students are expected to standardize supplied sodium thiosulphate solution using potassium dichromate) 2. Estimation of lead by complexomety using EDTA solution. (Students are expected to standardize the supplied EDTA solution. Suggested standard for standardization: $ZnSO_4.7H_2O$)		
USCHP08	**Practicals of Course USCH603** **<u>Organic Practicals</u>** **Binary Mixture Separation** Seperation of mixture containing (VL + NVL) & (S + VL) components. **Organic Preparations** 1. Aniline/p-toluidine → N-Acetyl derivative 2. Salicylic acid/nitrobenzene/ Acetanilide → Nitro derivative	**3**	**8**

	3. β- naphthol → Methyl Ether derivative (Using dimethyl sulphate) 4. Acetanilide → p-bromoacetanilide derivative 5. Aniline/ p-toluidine → Schiff base with benzaldehyde 6. Hydroquinone/beta naphthol → Acetyl derivative 7. Methyl salicylate/ethyl benzoate → Acid derivative (Hydrolysis) 8. Benzaldehyde/p-nitrobenzaldehyde → Acid (Oxidation) **Course USCH604** **<u>Analytical Practicals</u>** 1. Determination of chemical oxygen demand of a water sample. 2. Determination of percentage purity of a sample of common salt using a cation exchanger. 3. Determination of potassium content of a commercial salt sample by flame photometry. 4. Determination of acetic acid content of a vinegar sample by potentiometric titration with sodium hydroxide using quinhydrone. **5.** Determination of Cr (VI) in the given solution as dichromate by the method of least squares, spectrophotometrically		

Reference List for Paper-I (Physical Chemistry)

1. Physical Chemistry, Ira Levine, 5th Edition, 2002 Tata McGraw Hill Publishing Co.Ltd.
2. Physical Chemistry, P.C. Rakshit, 6th Edition, 2001, Sarat Book Distributors, Kolkota.
3. Physical Chemistry, R.J. Silbey, & R.A. Alberty, 3rd edition , John Wiley & Sons, Inc [part 1]
4. Physical Chemistry, G. Castellan, 3rd edition, 5th Reprint, 1995 Narosa Publishing House.
5. Modern Electrochemistry, J.O.M Bockris & A.K.N. Reddy, Maria Gamboa – Aldeco 2nd Edition, 1st Indian reprint,2006 Springer
6. Visible & U.V. Spectroscopy, Analytical Chemsitry by Open Learning R. Demny and R. Sinclair M 1991 John Wiley & Sons
7. Classical Methods , Vol 1 Analytical Chemistry by Open Learning D. Cooper & C. Devan,1991 John Wiley & Sons
8. Physical Chemistry, G.M. Barrow, 6th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
9. The Elements of Physical Chemistry, P.W. Atkins, 2nd Edition, Oxford Universtity Press Oxford
10. Physical Chemistry, G.K. Vemullapallie, 1997, Prentice Hall of India, Pvt.Ltd. New Delhi.

References for Paper-II.(Inorganic Chemistry).

1. D. Banerjea, *Coordination chemistry*, Tata McGraw Hill, New Delhi, (1993).
2. D. F. Shriver and P. W. Atkins, *Inorganic chemistry*, 3rd Ed., Oxford University Press, (1999).
3. K. F. Purcell and J. C. Kotz, *Inorganic chemistry*, Saunders, Hongkong, (1977).
4. N. N. Greenwood and E. Earnshaw, *Chemistry of elements*,Pergamon Press, Singapore, (1989).
5. W. L. Jolly, *Modern inorganic chemistry*, 2nd Ed. McGraw Hill Book Co., (1991).
6. B. E. Douglas and H. McDaniel, *Concepts and models in inorganic chemistry*, 3rd Ed., John Wiley & Sons, Inc., New York, (1994).
7. G. N. Mukherjee and A. Das, *Elements of bioinorganic chemistry*, Dhuri and Sons, Calcutta, (1988).
8. R. W. Hay, *Bioinorganic chemistry*, Ellis Harwood, England, (1984).

9. R. C. Mehrotra and A. Singh, *Organometallic chemistry: A unified approach*, Wiley Eastern, New Delhi, (1991).
10. For synthesis of iron ethylenediamine sulphate refer Practical Inorganic Chemistry by G. Marr and B. W. Rockett,Van Nostrand Reinhold Company London1972. P 34.
11. For preparation of $CuCl_2$.2DMSO Refer Microscale Inorganic Chemistry by Z. Szafran, Ronald M. Pike and Mono M. Singh. Pub. John Wiley and Sons1991.p.218.

References For Paper-III (Organic Chemistry)

1. Organic Chemistry, Francis A Carey, Pearson Education, 6th Edition, Special Indian Edition 2008
2. Organic Chemistry, R.T. Morrison and R.N. Boyd, 6th Edition, Pearson Edition
3. Organic Chemistry, T.W.G. Solomon and C.B. Fryhle, 8th Edition, John Wiley & Sons, 2004
4. A guide to mechanism in Organic Chemistry, 6th Edition, Peter Sykes, Pearson Education
5. Fundamentals of Organic Chemistry , G. Marc Loudon, 4th Edition Oxford
6. Organic Chemistry, L.G. Wade Jr and M.S. Singh, 6th Edition,2008
7. Organic Chemistry Baula Y. Bruice, Pearson Edition, 2008
8. Organic Chemistry,J.G. Smith, 2nd Editionm Special Indian Edition, Tata McGraw Hill
9. Organic Chemistry, S.H. Pine, McGraw Hill Kogakusha Ltd.
10. Stereochemistry, P.S. Kalsi, New Age International Ltd. 4th Edition,2006

Reference List for Paper-IV (Analytical Chemistry)

1. D. Harvey, Modern Analytical Chemistry, The McGraw-Hill Pub. 1st Edition (2000)
2. H.S. Ray, R Sridhar and K.P. Abraham, Extraction of Nonferrous Metals, AffiliatedEast-West Press Pvt. Ltd. New Delhi (1985) reprint 2007.
3. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney , Vogel's Textbook of Qunatitative Chemical Analysis, Fifth edition, ELBS Publication (1996)
4. D.A. Skoog D.M. West and F.J. Holler, Fundametals of Analytical Chemistry, 7thEdition (printed in India in 2001) ISBN Publication.
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6. Quantitative analysis, Dey & Underwood, Prentice Hall of India, Pvt. Ltd.

New Delhi
7. Fundamentals of Analytical Chemistry, Skoog etal 8th edition, Saunders college publishing.

UNIVERSITY OF MUMBAI
No. UG/86 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B. A. degree course **vide** this office Circular No.UG/159 of 2011 dated 20th June, 2011 and the Principals of affiliated Colleges in Arts Colleges are hereby informed that the recommendation made by Board of Studies in History & Archaeology at its meeting held on 25th May, 2016 has been accepted by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.21 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for the F.Y.B.A. in History & Archaeology (Sem.I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

(Dr.M.A.Khan)
REGISTRAR

MUMBAI – 400 032
October, 2016

To,

The Principals of affiliated Colleges in Arts.

A.C/4.21/24/06/2016

****

No. UG/86 -A of 2016-17 MUMBAI-400 032 25th October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Arts,
2) The Chairman, Board of Studies in History,
3) The Director, Board of College and University Development,
4) The Controller of Examinations,
5) The Co-Ordinator, University Computerization Centre.
6) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL)

(Dr.M.A.Khan)
REGISTRAR

PTO...

AC 24 / 06 / 2016
Item no.4.21

UNIVERSITY OF MUMBAI

Revised syllabus for Sem I and II

Program: B. A.

Course: History & Archaeology

(Choice Based Credit System with effect from the Academic year 2016-17)

F.Y.B.A. (History)

History of Modern India (1857-1947)

Semester - I

Objectives:-

The course is designed to make the student aware about the making of modern India and the struggle for independence.

Module I: Growth of Political Awakening

(a) Revolt of 1857 – Causes and Consequences

(b) Contribution of the Provincial Associations

(c) Foundation of Indian National Congress.

Module II: Trends in Indian Nationalism

(a) Moderates

(b) Extremists

(c) Revolutionary Nationalists

Module III: Gandhian Movements

(a) Non Co-operation Movement

(b) Civil Disobedience Movement

(c) Quit India Movement

Module IV: Towards Independence and Partition

(a) The Indian Act of 1935

(b) Attempts to Resolve the Constitutional Deadlock -The Cripps Mission, The Cabinet Mission and the Mountbatten Plan

(c) Indian Independence Act and Partition

Semester –II
History of Modern India: Society and Economy.

Module I: Socio Religious Reform Movements: Reforms and Revival

(a) Brahmo Samaj, Arya Samaj and Ramakrishna Mission
(b) Satyashodhak Samaj, Aligarh movement and Singh Sabha Movement.
(c) Impact of Reform Movements

Module II: Education, Press and Transport

(a) Introduction of Western Education and its Impact
(b) Development of Press
(c) Transport and Communications

Module III: Impact of the British Rule on Indian Economy.

(a) Revenue Settlements, Commercialisation of Agriculture
(b) Drain Theory
(c) Deindustrialisation and Growth of Large Scale Industry

Module IV: Nationalism and Social Groups: interfaces.

(a) Women
(b) Dalits
(c) Peasants and Tribals

References:

Aloysius G., *Nationalism Without Nation in India*, OUP, New Delhi, 1998.

Bandyopadhyay Sekhar, *From Plassey to Partition, A History of Modern India*, Orient Longman, New Delhi, 2004.

Bhattachaterjee Arun*, History of Modern India (1707 – 1947)*, Ashish Publishing House, New Delhi 1976.

Chakravarti Aroop, *The History of India (1857 – 2000),* Pearson, New Delhi 2012.

Chandra Bipan et al., *India's Struggle for Independence*, Penguin, New Delhi,

Chandra Bipan, A. Tripathi, Barun De, *Freedom struggle,* National Book Trust, India, 1972.

Chandra Bipan, *Rise and Growth of Economic Nationalism in India*, Delhi, 1966.

Chattergy Partho, *The Nation and its Fragments*, OUP, New Delhi, 1933

Chopra P.N.,Puri B.N, Das M.N,Pradhan A.C, *A Comprehensive History of Modern India,* Sterling Publishers 2003.

Desai A.R., *Social Background of Indian Nationalism*, 5th Edition,Popular Prakashan, Bombay, 1976.

Ganachari Arvind, *Nationalism and Social Reform in a Colonial Situation*, Kalpaz Publication, New Delhi, 2005.

Grover B.L, Grover S., *A New Look at Modern Indian History (1707 – present day),* S. Chand and Company, New Delhi 2001.

Keswani K.B., *History of Modern India (1800 – 1964)*, Himalaya Publishing House, Bombay 1996.

Majumdar R.C., Comprehensive History of India, Vol.3 (Part III), People's Publishing House.

Mehrotra S.R., *Emergence of Indian National Congress*, Vikas Publication, Delhi, 1971.

Nanda S.P., *History of Modern India (1707 – Present Time)*, Dominant Pub, New Delhi 2012.

Pannikar K.N. (ed). *National and Left Movement in India*, Vikas Publishing House Pvt. Ltd.. New Delhi. 1980.

Pawar Jaisinghrao, *Aadhunik Hindustanacha Itihas,* Vidya Publications, Nagpur.

Ray Rajat, *Industrialization of India: Growth and Conflict in the Private Corporate Sector, 1914-47*, OUP, Delhi, 1982.

Sarkar Sumit, *Aadhunik Bharat*, Rajkamal Publication, New Delhi,2009.

Sarkar Sumit, *Modern India 1885-1947*, Macmillan, Madras, 1996.

Seal Anil, *The Emergence of Indian Nationalism: Competition and Collaboration in the Later Nineteenth Century,* Cambridge University Press,1971.

Shukla Ramlakhan, *Aadhunik Bharat ka Itihas,* Hindi Madhyam Karyalay Nideshalay, Delhi.

B.A.
HISTORY

Question Paper Pattern For F.Y.B.A. History
Semester I & II

As per University rules and guidelines.

University of Mumbai

No. UG/31 of 2020-21

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office circular No.UG/69 of 2018-19, dated 6th July, 2018 relating to the revised syllabus as per (CBCS) for the T.Y.B.A. in Psychology Sem.V & VI.

They are hereby informed that the recommendations made by the Board of Studies in Psychology at its meeting held on 13th March, 2020 vide Item No.2 and subsequently made by the Board of Deans at its meeting held on 26th June, 2020 vide item No. 11 (1) have been accepted by the Academic Council at its meeting held on 23rd July, 2020 vide item No.4.21 and that in accordance therewith, the revised syllabus as per the (CBCS) of T.Y.B.A. Sem – V &VI in Psychology has been brought into force with effect from the academic year 2020 -21 accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
11th November, 2020

(Dr. Vinod Patil)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.21/23/07/2020

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No. UG/ 31 -A of 2020-21 MUMBAI-400 032 11th November, 2020

Copy forwarded with Compliments for information to:-

1) The Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Psychology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. Vinod Patil)
I/c REGISTRAR

Copy to :-

1. **The Director of Board of Student Development.,**
2. **The Deputy Registrar (Eligibility and Migration Section)**
3. **The Director of Students Welfare,**
4. **The Executive Secretary to the to the Vice-Chancellor,**
5. **The Pro-Vice-Chancellor**
6. **The Registrar and**
7. **The Assistant Registrar, Administrative sub-centers, Ratnagiri, Thane & Kalyan, for information.**

1. **The Director of Board of Examinations and Evaluation**
2. **The Finance and Accounts Officers**
3. **Record Section**
4. **Publications Section**
5. **The Deputy Registrar, Enrolment, Eligibility and Migration Section**
6. **The Deputy Registrar (Accounts Section), Vidyanagari**
7. **The Deputy Registrar, Affiliation Section**
8. **The Professor-cum- Director, Institute of Distance and Open Learning Education,**
9. **The Director University Computer Center (IDE Building), Vidyanagari,**
10. **The Deputy Registrar (Special Cell),**
11. **The Deputy Registrar, (PRO)**
12. **The Deputy Registrar, Academic Authorities Unit (1 copies) and**
13. **The Assistant Registrar, Executive Authorities Unit**

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. **The Assistant Registrar Constituent Colleges Unit**
2. **BUCTU**
3. **The Deputy Accountant, Unit V**
4. **The In-charge Director, Centralize Computing Facility**
5. **The Receptionist**
6. **The Telephone Operator**
7. **The Secretary MUASA**
8. **The Superintendent, Post-Graduate Section**
9. **The Superintendent, Thesis Section**

for information.

Choice Based Credit System (CBCS)
T.Y.B.A. Psychology Syllabi to be implemented from 2020-2021

Paper IV: Psychological Testing and Statistics: Parts I and II

Code	Sem.	Course Title	Credits	Marks
UAPS501	5	Psychological Testing and Statistics: Part I	4	100
UAPS601	6	Psychological Testing and Statistics: Part II	4	100

Learning Objectives -

1) To have students build knowledge and understanding of the nature, uses, technical features, and the process of construction of psychological tests
2) To create awareness among students about measurement of intelligence and assessment of personality
3) To have students build knowledge and understanding of the concepts in Statistics and the various measures of Descriptive Statistics - their characteristics, methods of calculation, uses and applications
4) To create a foundation in students for advanced learning of Psychological Testing, Assessment and Statistics

Semester 5

Psychological Testing and Statistics: Part I (Credits = 4) 4 lectures per week

Unit 1. Psychological Testing, Assessment and Norms

a) Definition of testing and assessment; the process and tools of assessment
b) The parties and types of settings involved
c) What is a 'Good Test'; Norms – sampling to develop norms, types of norms, fixed reference group scoring systems, norm-referenced versus criterion-referenced evaluation; culture and inference

Unit 2. Reliability

a) The concept of Reliability; sources of error variance
b) Reliability estimates: Test-Retest, Parallel and Alternate Forms, Split-Half, Inter-Item Consistency – Kuder-Richardson, Cronbach's Coefficient Alpha; Inter-Scorer Reliability
c) Using and interpreting a coefficient of Reliability – purpose of the Reliability coefficient, nature of the test, the true score model of measurement and alternatives to it
d) Reliability and individual scores: SEM and SE-Difference

Unit 3. Validity and Measures of central tendency

a) The concept of validity; Face and Content validity
b) Criterion-related validity and Construct validity
c) Validity, bias and fairness
d) Calculation of mean, median and mode of a frequency distribution; the assumed mean method for calculating the mean
e) Comparison of measures of central tendency: Merits, limitations, and uses of mean, median and mode

Unit 4. Types of scores, Types of scales, Frequency distribution, Graphical representations

a) Continuous and discrete scores – meaning and difference; Nominal, ordinal, interval and ratio scales of measurement
b) Preparing a Frequency Distribution; advantages and disadvantages of preparing a frequency distribution; smoothed frequencies: method of running averages
c) Graphical representations: Frequency polygon, histogram, cumulative frequency curve, ogive, polygon of smoothed frequencies.

Semester 6

Psychological Testing and Statistics: Part II (Credits = 4) 4 lectures per week

Unit 1. Test Development and Correlation

a) Test conceptualization and Test construction
b) Test tryout and Item analysis
c) Test revision
d) Meaning and types of correlation – positive, negative and zero; Graphic representations of correlation - Scatterplots
e) The steps involved in calculation of Pearson's product-moment correlation coefficient
f) Calculation of rho by Spearman's rank-difference method; Uses and limitations of correlation coefficient
g) Simple Regression and Multiple Regression

(Unit 1-e is only for theoretical understanding and questions, not for calculation in the exam.)

Unit 2. Measurement of Intelligence, Intelligence Scales, Probability, Normal Probability Curve and Standard scores

a) What is Intelligence? - Definitions and theories; measuring Intelligence
b) The Stanford-Binet Intelligence Scales and the Wechsler Scales
c) The concept of Probability; laws of Probability; Characteristics, importance and applications of the Normal Probability Curve; Area under the Normal Curve
d) Skewness- positive and negative, causes of skewness, formula for calculation; Kurtosis - meaning and formula for calculation
e) Standard scores – z, t, Stanine; Linear and non-linear transformation; Normalized Standard scores

Unit 3. Assessment of Personality

a) Personality Assessment – some basic questions: who, what, where, how; Developing instruments to assess personality – logic and reason, theory, data reduction methods, criterion groups; personality assessment and culture
b) Objective methods of personality assessment
c) Projective methods of personality assessment - Inkblots as Projective stimuli - the Rorschach; Pictures as Projective stimuli – Thematic Apperception Test; Projective methods in perspective

Unit 4. Measures of Variability, Percentiles, and Percentile Ranks

a) Calculation of measures of variability: Range, Quartile Deviation and Standard Deviation
b) Comparison of measures of variability: Merits, limitations, and uses .
c) Calculation of Percentile ranks and Percentile Scores.
d) Percentiles – nature, merits, limitations, and uses.

Learning Outcomes-

a) The learner will -
   1. develop knowledge and understanding of the nature, uses, technical features, and the process of construction of psychological tests.
   2. develop awareness about measurement of intelligence and assessment of personality.
   3. be equipped with the knowledge about the concepts in Statistics and the various measures of Descriptive Statistics - their characteristics, uses, applications and methods of calculation.

b) The learner will build a firm foundation, which will be helpful for advanced learning of Psychological Testing, Assessment and Statistics in postgraduate studies.

Book for study

Cohen, J. R., & Swerdlik, M. E., (2018). *Psychological Testing and Assessment: An introduction to Tests and Measurement.* (9th ed.). New York. McGraw-Hill International edition. (Indian reprint 2018)

Books for reference

1) Aiken, L. R., & Groth-Marnat, G. (2006*). Psychological Testing and Assessment.* (12th ed.). Pearson. Indian reprint 2009, by Dorling Kindersley, New Delhi
2) Anastasi, A. & Urbina, S. (1997). *Psychological Testing.* (7th ed.). Pearson Education, Indian reprint 2002
3) Aaron, A., Aaron, E. N., & Coups, E. J. (2006). *Statistics for Psychology.* (4th ed.). Pearson Education, Indian reprint 2007.
4) Cohen, J. R., Swerdlik, M. E., & Sturman, E. D. (2013). *Psychological Testing and Assessment: An introduction to Tests and Measurement.* (8th ed.). New York. McGraw-Hill International edition. (Indian reprint 2015).
5) Cohen, J. R., Swerdlik, M. E., & Kumthekar, M. M. (2014). *Psychological Testing and Assessment: An introduction to Tests and Measurement.* (7th ed.). New Delhi: McGraw-Hill Education (India) Pvt Ltd., Indian adaptation
6) Garrett,H.E (1929). *Statistics in Psychology and education.*
7) Gregory, R. J. (2013). *Psychological Testing: History, Principles, and Applications*. (6th ed.). Pearson Indian reprint 2014, by Dorling Kindersley India pvt ltd, New Delhi.
8) Guilford,J.P.,&Fruchter,B (1978) *Fundamental statistics in Psychology and education.*(6th ED).McGraw Hill International Edition.
9) Gupta, S .P.(1991)*Statistical Methods.*(26th Ed),Sultan Chand & Sons,New Delhi.
10) Hoffman, E. (2002). *Psychological Testing at Work.* New Delhi: Tata McGraw-Hill
11) Hogan, T. P. (2015). *Psychological Testing: A Practical introduction.* (3rd ed.). John Wiley & Sons, New Jersey
12) Hollis-Sawyer, L.A., Thornton, G. C. III, Hurd, B., & Condon, M.E. (2009). *Exercises in Psychological Testing.* (2nd ed.). Boston: Pearson Education
13) Kaplan, R. M., & Saccuzzo, D. P. (2018). *Psychological Testing – Principles, Applications and Issues.* (9th ed.). Wadsworth Thomson Learning, Indian reprint 2019
14) Kline, T.J.B. (2005). *Psychological Testing: A Practical approach to design and evaluation.* New Delhi: Vistaar (Sage) publications
15) Mangal, S.K. (1987). *Statistics in Psychology and Education*. New Delhi: Tata McGraw Hill Publishing Company Ltd.
16) McBurney, D.H. (2001). Research Methods. (5th ed.). Bangalore: Thomson Learning India
17) Miller, L.A., Lovler, R. L., & McIntire, S.A., (2013). *Foundations of Psychological Testing: A practical approach.* (4th ed.). Sage publications
18) Minium, E. W., King, B. M., & Bear, G. (2001). Statistical Reasoning in Psychology and Education. Singapore: John-Wiley
19) Urbina, S. (2014). Essentials of Psychological Testing. (2nd ed.). John Wiley & Sons, New Jersey

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Question Paper Pattern for T.Y.B.A (CBCS)
for Core Course IV Psychological Testing and Statistics.
With Effect From 2020-2021

Duration: 3 hrs **Total marks: 100**

Note: **1.** Attempt **all** questions
2. All questions carry **equal** marks

Q.1 (Based on Module I) (20 marks)
a.
or
b.

Q.2 (Based on Module II) (20 marks)
a.
or
b.

Q.3 (Based on Module III) (20 marks)
a.
or
b.

Q.4 (Based on Module IV) (20 marks)
a.
or
b.

Q.5 Attempt **any two** (Based on Module I, II, III and IV) (20 marks)
a.
b.
c.
d.

Semester 5 – sample question paper pattern

Q.1	Unit 1 A **OR** B	20
Q.2	Unit 2 A **OR** B	20
Q.3	Unit 3 A – Validity **OR** B – Calculation of the mean ,median and mode (17 marks and Theory question 03 marks)	20
Q.4	Unit 4 A- Theory Question on Continuous and discrete scores – meaning and difference; Nominal, ordinal, interval and ratio scales of measurement, steps in preparing a frequency distribution table, advantages and disadvantages of preparing a frequency distribution; smoothed frequencies: method of running averages. **OR** B - being a question based on tabulation of scores into a frequency distribution table, Calculation of range, justifying the choice of the length of class Interval.	20
Q5	any two (each question of 10 marks) A unit 1 B unit 2 C unit 3 D unit 4 Graph 5 marks theory question on graphical representations 5 marks.	20

Semester 6 - sample question paper pattern

Q.1	Unit 1 test development A **OR** B calculation of correlation using rank order method 15 marks theory 5 marks	20
Q.2	Unit 2 A unit 2 a and b **OR** B unit 2 c, d and e	20
Q.3	Unit 3 A	20

	OR B	
Q.4	Unit 4 A-Theory question on Measures of variability **OR** B - Calculation of QD or SD	20
Q5	any two (each question of 10 marks) A unit 1 B unit 2 C unit 3 D unit 4 - Calculation of Percentiles and Percentile Ranks	

Paper V: Abnormal Psychology: Part I and Part II

Code	Sem	Course Title	Credits	Marks
UAPS502	5	Abnormal Psychology: Part I	4	100
UAPS602	6	Abnormal Psychology: Part II	4	100

Learning Objectives -

1) To have students build knowledge and understanding of the basic concepts in Abnormal Psychology and the theories of Abnormality
2) To have students build knowledge and understanding of the different Psychological Disorders – their symptoms, diagnosis, causes and treatment
3) To create awareness among students about Mental Health problems in society
4) To create a foundation in students for higher education and a professional career in Clinical Psychology

Semester 5

Abnormal Psychology: Part I (Credits = 4) 4 lectures per week

Unit 1: Understanding Abnormal Behavior: Clinical Assessment and Diagnosis

a) What do we mean by Abnormality? - The DSM 5 and the Definition of Mental Disorders.
b) Historical views of Abnormal Behaviour - The Emergence of Contemporary views of Abnormal Behaviour.
c) The Basic elements in Assessment - Physical Assessment and Psychosocial Assessment.
d) Classifying Abnormal Behaviour.

Unit 2: Causal factors and Viewpoints

a) Causes and Risk factors for Abnormal Behaviour.
b) Viewpoints for Understanding the Causes of Abnormal Behaviour: The Biological viewpoint, The Psychological viewpoints.
c) Psychological Factors, The Sociocultural Viewpoints.

Unit 3: Panic, Anxiety, Obsessions and Their Disorders

a) The Fear and Anxiety Response Patterns - Specific Phobias, Social Phobias, Panic Disorder and Agoraphobia.
b) Generalised Anxiety Disorder.
c) Obsessive-compulsive and Related Disorders.

Unit 4: Somatic Symptom and Dissociative Disorders

a) Somatic Symptom and Related Disorders - Hypochondriasis, Somatisation Disorder, Pain Disorder, Illness anxiety disorder.
b) Conversion Disorder - Distinguishing Somatic Symptom Disorders from Malingering and Factitious Disorder.
c) Dissociative disorders - Depersonalisation/Derealisation Disorder, Dissociative Amnesia and Dissociative Fugue, Dissociative Identity Disorder.

Semester 6

Abnormal Psychology: Part II (Credits = 4) 4 lectures per week

Unit 1: Schizophrenia and other Psychotic Disorders

a) Clinical Picture and Subtypes of Schizophrenia.
b) Other Psychotic Disorders: Schizoaffective Disorder, Schizophreniform Disorder, Delusional disorder and Brief Psychotic Disorder.
c) Risk and Causal factors: Genetic Factors, Neurodevelopmental Perspective, Neurochemistry, Psychosocial and CulturalFactors.

Unit 2: Mood Disorders and Suicide

a) Unipolar Depressive Disorders: Dysthymia Disorder, Major Depressive Disorder.
b) Causal Factors in Unipolar Mood Disorders - Biological Causal Factors, Psychological Causal Disorders
c) Bipolar and Related Disorders: Cyclothymic Disorder, Bipolar Disorder (I and II) and Causal Factors in Bipolar Disorders: Biological and Psychological Causal Factors.
d) Sociocultural Factors Affecting Unipolar and Bipolar Disorders, Treatment and Outcomes.
e) Suicide: The Clinical Picture and the Causal Pattern.

Unit 3: Personality Disorders

a) Clinical features of Personality Disorders.
b) Cluster A, Cluster B and Cluster C Personality Disorders.
c) General Sociocultural Causal factors, Treatments for Personality Disorders.

Unit 4: Sexual Variants, Abuse and Dysfunctions

a) Sociocultural Influence on Sexual Practises and Standards.
b) The Paraphilias: Causal Factors and Treatment for Paraphilias.
c) Gender Dysphoria, Sexual Abuse.
d) Sexual Dysfunctions: Forms and Treatment.

Learning Outcomes:

a). The learner will
1. Develop an understanding of the basic concepts and theories of Abnormal Psychology.
2. develop insight into various forms of Psychological Disorders – their symptoms, causes, along with the process of diagnosis and treatment.
3. become more sensitised and equipped to deal with various issues related to Mental Health in society.

b). The learner will build foundational knowledge of Abnormal Psychology which will help the learner for higher education and also to pursue a professional career in Clinical Psychology.

Book for study

Butcher, J.N; Hooley, J.M; Mineka, S; & Dwivedi, C.B. (2020). *Abnormal Psychology*. (16th ed.). Pearson

Books for Reference

1. Barlow, D.H., & Durand, V.M. (2005). Abnormal Psychology: An Integrative Approach. (4th ed.). New Delhi: Wadsworth Cengage Learning

2. Beidel, D. C., Bulik, C. M., & Stanley, M.A. (2010). Abnormal Psychology. New Jersey: Pearson Prentice Hall
3. Bennet, P. (2003). Abnormal and Clinical Psychology: An Introductory Textbook. Open University Press
4. Butcher, J. N., Hooley, J. M., & Mineka, S., (2014). Abnormal Psychology. (16th ed.). Pearson education
5. Dhanda, Amita. (2000). Legal Order and Mental Disorder. New Delhi, Sage publications pvt ltd
6. Hecker, J.E., & Thorpe, G.L. (2005). Introduction to clinical Psychology: Science, practice, and ethics. New Delhi, Pearson education, Indian reprint 2007
7. Kring, A.M., Johnson, S. L., Davison, G.C., & Neale, J.M. (2013). Abnormal Psychology. (12th ed.). International student version, John Wiley & Sons, Singapore
8. Nolen-Hoeksema, S. (2014). Abnormal Psychology. (6th ed.). New York: McGraw-Hill.
9. Oltmanns, T. F., & Emery, R. E. (2010). Abnormal Psychology. 6th ed., New Jersey: Pearson Prentice Hall
10. Ray, W.J. (2013). Abnormal Psychology: neuroscience perspectives on human behaviour and experience. Sage Publications, USA
11. Whitbourne, S. K., &Halgin, R. P. (2014). Abnormal Psychology: Clinical Perspectives on Psychological Disorders. (7th ed.). McGraw

Question Paper Pattern for T.Y.B.A (CBCS)
for Core Course V Abnormal Psychology

Duration: 3 hrs **Total marks: 100**

Note: 1. Attempt **all** questions
2. All questions carry **equal** marks

Q.1 (Based on Module I) (20 marks)
a.
or
b.

Q.2 (Based on Module II) (20 marks)
a.
or
b.

Q.3 (Based on Module III) (20 marks)
a.
or
b.

Q.4 (Based on Module IV) (20 marks)
a.
or
b.

Q.5 Attempt **any two** (Based on Module I, II, III and IV) (20 marks)
a.
b.
c.
d.

Paper VI: Industrial/Organizational Psychology: Part I and Part II
(Major Elective; Applied Component)

Code	Sem	Course Title	Credits	Marks
UAPS503	**V**	**Industrial/Organizational Psychology: Part I**	**3.5**	**100 (80+20)**
UAPS603	**VI**	**Industrial/Organizational Psychology: Part II**	**3.5**	**100 (80+20)**

Learning Objectives -

1. To help learners understand and build knowledge about the basic concepts in the field of Industrial/Organizational Psychology.
2. To help learners learn about the role and importance of psychological factors and processes in the world of work.
3. To facilitate in learners a foundation for higher education and a professional career in Industrial Psychology and Organizational Behaviour.

Semester 5

Industrial/Organizational Psychology: Part I (Credits = 3.5) (3 lectures per week)

Unit 1: Introduction to Industrial/Organizational Psychology & Job Analysis

A: Introduction to Industrial/Organizational Psychology

a) What Is I/O Psychology?
b) I/O Psychology as a profession & as a science
c) History of the field of I/O Psychology

B: Job Analysis

a) What is job analysis: The job-oriented approach & the person-oriented approach.
b) Purposes of job analysis.
c) How job analysis information is collected; approaches to collecting job analysis information
d) Methods of job analysis
e) Job evaluation: setting salary levels

Unit 2.Performance Appraisal

a) Why do we appraise employees?
b) Performance criteria
c) Methods for assessing job performance: Objective and subjective methods for assessing job performance; 360-degree feedback

Unit 3: Assessment Methods for Selection and Placement & Recruitment

A: Assessment Methods for Selection and Placement

a) Job-Related characteristics.
b) Different types of psychological tests based on format: group vs. individual, close-ended vs. open-ended; paper-and-pencil vs. performance; power vs. speed
c) Different types of psychological tests based on what is measured: cognitive ability tests, psychomotor ability tests, knowledge and skills tests, personality tests, emotional intelligence tests, integrity tests, vocational interest tests
d) Biographical information, interviews, work samples, assessment centers & electronic assessment.

B. Recruitment

a) Recruiting applicants
b) Getting applicants to accept and keep jobs offered
c) Policies and issues with regard to selection: Reservation policy; gender and disability status of applicant

Unit 4. **Training**

a) Needs assessment
b) Objectives
c) Training design: trainee characteristics; design factors; work environment
d) Training methods: Audiovisual instruction, autoinstruction, conference/lecture, on-the-job training, modeling/role-playing/simulation, e-learning, mentoring/executive coaching
e) Brief overview of delivery and evaluation of a training program

Semester 6

Industrial/Organizational Psychology: Part II (Credits = 3.5) (3 lectures per week)

Unit 1. Theories of Employee Motivation

a) What is motivation?
b) Work motivation theories& need theories
c) Other Theories: Reinforcement theory, expectancy theory and self-efficacy theory; justicetheories; goal-setting theory, control theory and action theory

Unit 2: Job Satisfaction & Productive and Counterproductive Employee Behaviour

A. Job Satisfaction

a) The nature of job satisfaction; how people feel about their jobs
b) Assessment of job satisfaction
c) Antecedents of job satisfaction
d) Potential effects of job satisfaction

B. Productive and Counterproductive Employee Behaviour

a) Organizational Citizenship Behaviour (OCB)
b) Counterproductive work behaviour (CWB): Withdrawal
c) Counterproductive work behaviour: Aggression, sabotage, and theft; labour unrest and strikes

Unit 3: Work Groups, Work Teams & Leadership and Power in Organizations

A. Work Groups and Work Teams

a) Difference between work groups and work teams
b) Important group and team concepts

B. Leadership and Power in Organizations

a) What is leadership?
b) Sources of influence and power; abuse of supervisory power: sexual and ethnic harassment
c) Approaches to the understanding of leadership
d) Women in leadership positions; gender differences in leadership style; cross-cultural differences in leadership

Unit 4. Organizational Development and Theory

a) Organizational Development
b) Organizational Theories

Learning Outcomes:

1. Learners will be able to
   a) describe the scope of I/O Psychology and careers related to I/O Psychology.
   b) list and describe the basic concepts of I/O Psychology.
   c) critically discuss issues related to I/O Psychology.
2. Learners will have built a sufficient foundation in I/O Psychology to pursue postgraduate studies and/or careers related to I/O Psychology.

Book for study

Spector, P. E. (2012). *Industrial and Organizational Psychology: Research and practice*. Singapore: Wiley. (Indian reprint 2016)

Books for reference

1) Aamodt, M.G. (2016). *Industrial/Organizational Psychology: An applied approach* (8thed.). Boston, MA: Cengage Learning.
2) Aamodt, M.G. (2013). *Industrial Psychology* (7thed.). Boston, MA: Cengage Learning.
3) Aswathappa, K. (2013). *Human resource management: Text and cases* (8thed.). Chennai, India: McGraw Hill Education India.
4) Conte, J. M., & Landy, F. J. (2019). *Work in the 21st century: An introduction to Industrial and Organizational Psychology* (6th ed.). New York, NY: Wiley. (earlier editions: 2016, 2013, 2010, 2007, & 2004)
5) Levy, P. E. (2005). *Industrial/Organizational Psychology: Understanding the workplace*. Houghton Mifflin. (2019 edition published by Worth)
6) Luthans, F. (2017). *Organizational behavior: An evidence-based approach* (12th ed.). McGraw Hill Education.
7) Muchinsky, P. M. (2011). *Psychology applied to work* (10th ed.). Hypergraphic Press. (12th ed. published in 2018)
8) Newstrom, J. W. (2017). *Organizational behavior: Human behavior at work* (12th ed.). McGraw Hill Education.
9) Pareek, U., & Khanna, S. (2018). *Understanding organizational behaviour*(4th ed.). Oxford University Press.
10) Riggio, R. E. (2017). *Introduction to Industrial/Organizational Psychology* (7th ed.). New York, NY: Routledge.
11) Sinha, J. B. P. (2008). *Culture and organizational behaviour*. New Delhi: Sage.
12) Spector, P. E. (2016). *Industrial and Organizational Psychology: Research and practice* (7th ed.). New York: Wiley.
13) Vohra, N., Robbins, S. P., & Judge, T. A. (2018)*Organizational behavior* (18thed.). Noida, India: Pearson India Education Services.

Question Paper Pattern for T.Y.B.A (CBCS)
for Major Elective; Applied Component (I/O Psychology: Part I and Part II)
With effect from 2020-2021

Note: 1. Attempt **all** questions (Total = 80 marks)
2. All questions carry **equal** marks

Q.1 (Based on Unit I) (20 marks)
a.
or
b.

Q.2 (Based on Unit II) (20 marks)
a.
or
b.

Q.3 (Based on Unit III) (20 marks)
a.
or
b.

Q.4 (Based on Unit IV) (20 marks)

a.
or
b.

Project Work (Total = 20 marks)

Guidelines for Project Work TYBA – Psychology Paper VI

As per the above guidelines given by the University, the students have to submit a project for each of the elective courses VI and IX for every semester V and VI. The College has to declare the final date of submission.

Types of projects that can be done –

1. Small survey (using interviews/questionnaires)
2. Presentation in class
3. Conduct a workshop for a small group
4. Field visit
5. Literature review
6. Preparation of charts/posters (educational aids and class presentation/exhibition)
7. Case studies - 3 to 4

The topic of the Project may be from the syllabus of the respective papers or closely related to it. For I/O Psychology, students can get ideas for their project from the "**Learning by Doing**" section at the end of each chapter in the prescribed textbook.

Project report:

1. Word Limit – 1000 to 2000 words, A-4 size paper
2. Page limit – 8 - 10 pages of actual report. (Title page, index, Bibliography, List of tables and figures, Appendix etc are not included)
3. Project report may be typed or handwritten.

Marks for passing 7 out of 20

Project of high quality may be given maximum 18-19 marks out of 20.

Paper VII: Cognitive Psychology: Parts I and Part II

Code	Sem.	Course Title	Credits	Marks
UAPS504	**5**	**Cognitive Psychology: Part I**	**4**	**100**
UAPS604	**6**	**Cognitive Psychology: Part II**	**4**	**100**

Learning Objectives:

1. To have students build knowledge and understanding of the fundamental concepts of Cognitive Psychology and the basic Cognitive processes
2. To create awareness among students about the various applications of Cognitive processes in everyday life and a foundation to enable understanding of their applications in other fields - Social, Educational, Industrial, Abnormal, Counselling, Sports, Health, Education, and Neuro-Psychology
3. To have students understand the theoretical orientation and background for the courses on Practicum in Cognitive Processes
4. To create a foundation in students for higher education and a career in the field of Cognitive Psychology

Semester 5

Cognitive Psychology: Part I (Credits = 4) 4 lectures per week

Unit I: Perception: Recognizing Patterns and Objects

a) Introduction & Fundamental Concepts
b) Human Perceptual Systems
c) Recognition

d) Social Perception

Unit II: Attention and Consciousness

a) Introduction
b) Attention
c) Consciousness

Unit III. Sensory, Short Term and Working Memory

a) Introduction
b) Sensory Memory
c) Short Term Memory
d) Working Memory

Unit IV: Long-Term Memory

a) Introduction
b) Memory and amnesia
c) The structure of LTM
d) Non-declarative memory
e) Declarative memory

Semester 6.

Cognitive Psychology: Part II (Credits = 4) 4 lectures per week

Unit I. Learning, Forgetting and Imagery

a) Introduction
b) Learning: Encoding, storage and retrieval
c) Forgetting
d) Everyday/ Real world memory
e) Imagery and Concepts

Unit II. Problem Solving

a) Introduction
b) Problems and problems types
c) Brief history and background
d) Insight revisited
e) Knowledge rich (expert) problem solving
f) Creative problem solving

Unit III: Decision Making

a) Introduction
b) Expected value theory
c) Utility and prospect theory
d) Subjective probability and prospect theory
e) Making probability judgments
f) The affect heuristic
g) Decision processes for multi-attribute alternatives
h) Two-system approaches to decision making
i) Fast and frugal heuristic: the adaptive toolbox
j) Naturalistic decision making
k) Neuroeconomics: Neuroscience approaches to decision making

Unit IV: Reasoning

a) Introduction
b) Deductive reasoning
c) Inductive reasoning: Testing and generating hypotheses

Note – As an Orientation to this course, the following sub-topics should be taught in brief in 2 or 3 lectures (questions will not be set on these sub-topics in the semester-end examination)

1. Cognitive psychology: History, approaches, and cognitive neuroscience

Learning Outcomes:

a). The learner will

1. develop understanding of the basic concepts and theories of Cognitive Psychology.
2. develop insight into theoretical aspects of cognitive processes

b). The learner will build foundational knowledge of Cognitive Psychology which will help the learner for higher education and also to pursue a professional career in any of the several areas of Psychology.

Book for study

Gilhooly, K.; Lyddy,F. & Pollick F. (2014). Cognitive Psychology, McGraw Hill Education

Books for reference

1) Ashcraft, M. H. &. Radvansky, G. A. (2009). *Cognition.* (5th ed), Prentice Hall, Pearson education
2) Francis, G., Neath, I., & VanHorn, D. (2008). *Coglab 2.0 on a CD.* Wadsworth Cengage Learning, international student edition
3) Galotti, K.M. (2014). Cognitive Psychology: In and Out of the Laboratory. (5th ed.). Sage Publications (Indian reprint 2015)
4) Goldstein, E. B. (2007). *Psychology of sensation and perception.* New Delhi: Cengage learning India, Indian reprint 2008
5) Matlin, M.W. (2013). *Cognitive Psychology, 8th* ed., international student version, John Wiley & sons
6) Reed, S. K. (2004). *Cognition: Theory and Applications.* (6th ed.), Wadsworth/ Thomson Learning
7) Robinson-Riegler, B., & Robinson-Riegler, G. L. (2008). *Cognitive Psychology – Applying the science of the Mind.* (2nd ed.). Pearson Education. New Delhi: Indian edition by Dorling Kindersley India pvt ltd.
8) Srinivasan, N., Gupta, A.K., & Pandey, J. (Eds). (2008). *Advances in Cognitive Science.* Volume 1, New Delhi, Sage publications
9) Sternberg, R.J. (2009). *Applied Cognitive Psychology: Perceivnig, Learning, and Remembering.* New Delhi: Cengage learning India, Indian reprint 2009
10) Solso, R.L., Maclin, O.H., & Maclin, M.K. (2013). *Cognitive Psychology.* Pearson education, New Delhi, first Indian reprint 2014
11) Surprenant, A.M., Francis, G., & Neath, I. (2005). *Coglab Reader.* Thomson Wadsworth

Question Paper Pattern for T.Y.B.A (CBCS)
for Core Course V Abnormal Psychology

Duration: 3 hrs **Total marks: 100**

Note: 1. Attempt **all** questions
2. All questions carry **equal** marks

Q.1 (Based on Module I) (20 marks)
a.
or
b.

Q.2 (Based on Module II) (20 marks)
a.
or
b.

Q.3 (Based on Module III) (20 marks)
a.
or
b.

Q.4 (Based on Module IV) (20 marks)
a.
or
b.

Q.5 Attempt **any two** (Based on Module I, II, III and IV) (20 marks)
a.
b.
c.
d.

Paper VIII: Practicals in Cognitive Processes and Psychological Testing

Code	Sem	Course Title	Credits	Marks
UAPS505	**5**	**Practicals in Cognitive processes and psychological Testing: Part I**	**4**	**100**
UAPS605	**6**	**Practicals in Cognitive processes and psychological Testing : Part II**	**4**	**100**

Learning Objectives-

To facilitate the understanding of theoretical concepts of experimental psychology through experiential learning, learn the processes involved in scientific inquiry, develop critical approach and understand use of statistical analysis in psychological research by

a) introducing the students to Practicals in Cognitive Processes and Psychological Testing: through practice and conduct of experiments, use of statistical analysis, interpretation and discussion of data, using APA format for report writing.
b) introducing the students to Psychological Testing: administration, scoring and interpretation of the psychological tests, understanding the concepts of reliability and validity and nuances of procedures and ethical issues.
c) orienting the students to computer-based experiments (Coglab) and sensitize them to methodological issues, strengths and limitations of use of computers for conducting experiments in psychology.
d) Helping students develop skills for evaluation of a research paper and write a research report.

Semester 5

Part I: Practicals in Cognitive Processes and Psychological Testing (Credits =4) (6 lectures per week per Batch of 8 students)

A. Introduction to Experimental Psychology and Statistics in Psychological Research

1. Variables – Types, Operational definition
2. Designs – Types (one IV and two IV), Sampling, Randomization and Counterbalancing
3. Hypotheses – Types – Null and Alternative
4. Statistical Analysis –Inferential statistics - t test, F Test, statistical significance
5. Introduction to Scales of Measurement
6. Report writing – APA format

B. Practice Exercises – Two exercises

1. Experimental Situation given – Discuss design, hypothesis, IV, DV, Control Variables, Statistical Analysis, Ethical Issues.
2. Variables given – Design experiment, frame hypothesis, discuss Statistical Analysis, Ethical Issues.

C. Practice Experiment – One

1. Conduct the experiment

2. Review Original Article
3. Write result and discussion of group data using APA format

D. Two Experiments in Cognitive Processes

1. Conduct the experiments
2. Pool group data
3. Use appropriate statistics
4. Write report – abstract, introduction, method, result (Individual and group), discussion, conclusion

E. **One Psychological Test**

1. Administration, Scoring and Interpretation of the Test
2. Writing report on the findings of the test
3. Calculate Reliability / Validity of the test

Part II: Practicals in Cognitive Processes and Psychological Testing (Credits =4) (6 lectures per week per Batch of 8 students)

A. Introduction to Experimental Psychology and Statistics in Psychological Research

1 Designs - Complex (Mixed)
2. Statistical Analysis – Inferential statistics – ANOVA, Chi Square

B. Review a research paper

C. Two Experiments in Cognitive Processes

1. Conduct the experiments
2. Pool group data
3. Use appropriate statistics
4. Write report – abstract, introduction, method, result (Individual and group), discussion, conclusion

D. One Psychological Test

1. Conducting and debriefing
2. Write report

E. One Computer-based Experiment (Coglab)

F. Use of Excel

1. Introduction to Excel
2. Statistical Analysis of both the experiments

Learning Outcomes –

After studying this paper, students will able to…

1. Translate theoretical concepts into application-based experiments.
2. Conduct experiments following standardized procedure.
3. Apply statistical tests and analyze the data collected.
4. Write reports on research conducted using APA format.
5. Make sense of the research papers on any given topic

Distribution of Marks

Internal 40 marks Practical examination of 2 hours 60 marks

Distribution of Marks		
Internal marks		
1	Checklist for Instructions	10
2	Checklist for Conduct	10
3	Report Writing	10
4	Attendance	05
5	Journal	05
Examination Practical		
	Instructions, Conduct, report	40

	Viva	20

The teacher has to give marks for each report. The final marks will be the average marks obtained for each point as mentioned above.

During Examination, checklists for Instructions, Conduct and report. In viva 6 questions of 3 marks and one question of 2 marks will be asked.

Books for reference

1) Anastasi, A. & Urbina, S. (1997).*Psychological Testing*. (7th ed.). Pearson Education, New Delhi, first Indian reprint 2002
2) Aaron, A., Aaron, E. N., & Coups, E. J. (2006). *Statistics for Psychology.*(4th ed.). Pearson Education, Indian reprint 2007
3) Cohen, J. R., & Swerdlik, M. E., (2018). *Psychological Testing and Assessment: An introduction to Tests and Measurement.* (9th ed.). New York. McGraw-Hill International edition. (Indian reprint 2018)
4) Elmes, D.G., Kantowitz, B.H., & Roediger, H.L. (1999) *Research Methods in Psychology.*(6th ed.). Brooks/Cole, Thomson Learning
5) Francis, G., Neath, I., &VanHorn, D. (2008). *Coglab 2.0 on a CD.* Wadsworth Cengage Learning, International student edition
6) Gilhooly, K.; Lyddy,F. & Pollick F. (2014). Cognitive Psychology, McGraw Hill Education
7) Garrett, H.E. (1973). *Statistics in Psychology and Education* (6th ed.) Bombay: Vakils, Feffer, and Simons Pvt. Ltd.
8) Guilford, J.P. Fruchter, B. (1973). *Fundamental statistics in psychology and education.* (5th ed.) New York : McGraw-Hill
9) Goldstein, E. B. (2005). *Cognitive Psychology: Connecting Mind, Research, and Everyday Experience.*Wadsworth/ Thomson Learning
10) Harris, P. (2008). *Designing and Reporting Experiments in Psychology.* 3rd ed., Open University Press, McGraw-Hill Education
11) Hollis-Sawyer, L.A., Thornton, G. C. III, Hurd, B., & Condon, M.E. (2009). *Exercises in Psychological Testing.* (2nd ed.). Boston: Pearson Education
12) McBurney, D. H. (2001). *Research Methods.* (5th ed.). Bangalore: Thomson Learning India
13) Mangal, S. K. (1987). *Statistics in Psychology and Education*. New Delhi : Tata McGraw Hill Publishing Company Ltd.
14) Martin, D. W. (2004). *Doing Psychology Experiments.* (6th ed.). Belmont: Thomson Wadsworth
15) Matlin, M. W. (1995). *Cognition.* 3rd ed., Bangalore: Prism Books pvt. ltd.
16) King, B. M., Rosopa, P. J., &. Minium, E. W., (2011). *Statistical Reasoning in the Behavoiral sciences,*John Wiley & sons
17) Minium, E. W., King, B. M., & Bear, G. (2001). *Statistical Reasoning in Psychology and Education.* Singapore: John-Wiley
18) Pareek, U. (2003). *Training Instruments in HRD and OD* (2nd ed.), Tata McGraw- Hill Publishing Company, Mumbai
19) Snodgrass, J. G., Levy-Berger G. V., & Haydon, M. (1985). *Human Experimental Psychology.* New York: Oxford University Press.
20) Solso, R. L., &McLin, M. K. (2002). *Experimental Psychology: A case approach.* 7th ed., Allyn Bacon, Pearson Education New Delhi, Indian reprint 2003
21) Steinberg, W. J. (2008). *Statistics Alive!* Los Angeles: Sage Publications, Inc.
22) Surprenant, A.M., Francis, G., & Neath, I. (2005). *Coglab Reader.* Thomson Wadsworth

Paper IX: Counselling Psychology: Part I and Part II
(Major Elective; Applied Component)

Code	Sem	Course Title	Credits	Marks
UAPS506	**V**	**Counselling Psychology : Part I**	**3.5**	**100 (80+20)**
UAPS606	**VI**	**Counselling Psychology: Part II**	**3.5**	**100 (80+20)**

Learning Objectives –

1. To have students develop an interest in and an understanding of Counselling concepts
2. To have students understand counsellor's roles and responsibilities in practice environments
3. To have students build knowledge and understanding of the basic skills in practice
4. To help students understand the theoretical foundations underlying different counselling and psychotherapeutic approaches
5. To create a foundation in students for higher education in Counselling and a career as a professional counselor

Semester 5

Counselling Psychology:

Part I- Introduction and Approaches to counselling (Credits = 3.5) (3 lectures per week)

Unit 1: Introduction to Counselling: (***Egan & Resse, Chapters 1 and 3***)

a) Role of formal and informal helpers, key ingredients of successful helping, focus on client and context- what client brings in sessions, defining **s**uccess in terms of outcomes with life-enhancing impact for the client, qualities of effective helper.

b) Role of beliefs, values, norms, and moral principles in the helping process. Helping clients redo poor decisions and make and execute life-enhancing decisions.

c) Developing working alliance, key values that drive the working alliance, behaviours showing disrespect & respect.

d) Appreciating the role of culture, personal culture, and values, competencies related to client diversity and culture, promoting self-responsibility by helping clients develop and use self- efficacy.

Unit 2. Psychoanalytic, Adlerian, Humanistic, Behavioral, Cognitive Theories of Counselling (***Gladding , chapters 9&10)***

a) Psychoanalytic theories, Adlerian theory, Humanistic theories

b) Behavioural counselling, Cognitive and Cognitive-Behavioural Counselling

Unit 3. Systemic, Brief, Crisis Theories and Group Counselling ***(Gladding, chapters10 &11)***

a) Systems theories, brief counselling approaches, Crisis and trauma counselling approaches.

b) A brief history of groups, benefits, drawbacks and types of groups. Theoretical approaches in conducting groups, stages in groups.

Unit 4. Counselling in Diverse Groups (*Gladding, Chapters 5 & 19)*

a) Counselling aged populations, gender-based counselling, counselling and sexual orientation.

b) Abuse & Addiction Counselling

Semester 6

Counselling Psychology:

Part II- Micro skills in Counselling practice (Credits = 3.5) (3 lectures per week

Unit 1. Therapeutic Presence: Importance of Listening

a) Dialogue as the second nature to interactions with clients, basic guidelines for visibly tuning in to clients. Nonverbal behaviour as a channel of communication. Active listening as the foundation of understanding.
b) Forms of poor listening, processing information from client in a thoughtful search for meaning.
c) Importance of listening to helpers own internal conversation, key ingredients of successful therapy, dealing with distorted listening.

Unit 2. Empathic Responding (*Egan & Resse, Chapter 5*)

a) Importance of responding skills in developing relationships with clients-empathy as a communication skill to develop relationships, wider view of empathy
b) Three dimensions of responding skills- perceptiveness as the foundation of responding skills, basic know-how of responding well, assertiveness in responding to clients
c) Basic formula for communicating empathy- responding accurately to clients' feelings, emotions, and moods, responding accurately to the key experiences, thoughts, and behaviours in clients' stories, tactics for responding with empathy, responding to the context, using empathy to achieve therapeutic goals

Unit 3. Other Skills (*Egan & Resse, Chapters 6,7,8)*

A. Art of Probing , Summarizing

a) Probing, verbal and nonverbal prompts, types of probing, guidelines for using probes, probes with empathic response.
b) Using Summaries: Use summaries when they add value, get clients to provide summaries, use of summaries and probes in the case of Marcus and Andréa.

B. Challenging &Self disclosure

a) Challenging: concept of self-challenge, targets of self challenge, identifying blind spots, skills to challenge blind spots.
b) Helpers self - disclosure

C. Dealing with Resistance: identifying and dealing with reluctance and resistance

Unit 4. The stages and tasks of problem management (*Egan & Resse, Chapters 9, 10, 11*)

A. Tasks of Stage I- Challenges clients face in talking about themselves, Case illustration, principles that can guide to help clients tell their stories- feel safe, styles of storytelling, starting where the client starts, assessing severity of problems, helping clients identify and clarify key issues, exploring context of key issues.

B. Help clients tell their real stories, case illustration, help clients challenge the quality of their participation. Help clients focus on the right story, choosing issues that will make a difference in their lives , challenging to make right decisions.

C. Tasks of Stage II- Help clients determine what kind of change they need or want, help clients distinguish needs from wants, continuum between first-order and second-order change, power of goal setting guidelines to help clients set goals, helping clients commit themselves to their goals.

D. Tasks of Stage III-Help clients develop strategies for accomplishing their goals – brainstorming, frameworks, finding social support, skills, strategies. Choosing goal-accomplishing strategies, balance-sheet method for choosing strategies, choosing evidence-based treatments.

Learning Outcomes:

Student will able to…

1. identify unique features of Counselling as a profession.
2. understand the process to be followed while helping people and roles and responsibilities of the counselor.
3. identify key ingredients necessary for successful helping.

4. understand micro-skills required to practice Counselling.
5. understand theoretical foundations underlying different counselling and psychotherapeutic approaches and critically evaluate the strengths, limitations associated with each of them.
6. feel motivated to seek further training to practice Counselling.

Book for study

Egan, G. & Reese, R. J. (2019). The Skilled Helper: A Problem-Management and Opportunity-Development Approach to Helping. (11th Edition) Cengage Learning.

Gladding, S. T. (2014). *Counselling: A Comprehensive Profession.* (7th Ed.). Pearson Education. New Delhi: Indian subcontinent version by Dorling Kindersley India

Books for reference

1. Capuzzi, D., & Gross, D. R. (2007). *Counselling and Psychotherapy: Theories and Interventions. (*4th ed.). Pearson Prentice Hall. First Indian reprint 2008 by Dorling Kindersley India pvt ltd.
2. Capuzzi, D., & Gross, D. R. (2009). *Introduction to the Counselling Profession.* (5th ed.). New Jersey: Pearson Education
3. Corey, G. (2005). *Theory and Practice of Counselling and Psychotherapy* (7th ed.). Stamford, CT: Brooks/Cole
4. Corey, G. (2008). *Group Counselling.* Brooks/Cole. First Indian reprint 2008 by Cengage Learning India
5. Corey ,G (2016) . Theory and Practice of Counselling and Psychotherapy. Cengage Learning, India
6. Cormier, S. & Nurius, P.S. (2003). *Interviewing and change strategies for helpers: Fundamental skills and cognitive behavioural interventions.* Thomson Brooks/Cole
7. Dryden, W., & Reeves, A. (Eds). (2008). *Key issues for Counselling in Action.* 2nd ed. London: Sage publications
8. Gelso, C.J., & Fretz, B.R. (2001). *Counselling Psychology: Practices, Issues, and Intervention.* First Indian reprint 2009 by Cengage Learning India
9. Gibson, R.L., & Mitchell, M.H. (2008). *Introduction to Counselling and Guidance.* 7th ed., Pearson Education, Dorling Kindersley India, New Delhi
10. Henderson,D.A . & Thompson C.L . (2015) Counselling Children. Cengage Learning
11. Heppner, P. P., Wampold, B. E., & Kivlighan, D. M. Jr. (2007). *Counselling research.* Brooks/ Cole, Indian reprint 2008 by Cengage Learning, New Delhi
12. Ivey,A.E., Ivey M.B.& Zalaquett ,C,P. (2018) .Intentional Interviewing and Counselling: Facilitating Client Development in a Multicultural Society. Cengage, Boston M A
13. Jena, S.P.K. (2008). *Behaviour Therapy: Techniques, research, and applications.* Sage publications, New Delhi
14. Kinara, A. K. (2008). *Guidance and Counselling.* Pearson, New Delhi: Dorling Kindersley India pvt ltd.
15. McLeod, J. (2009). *An Introduction to Counselling.* (4th ed.). Open University Press/ McGraw-Hill Higher Education
16. Nelson-Jones, R. (2009). *Introduction to Counselling Skills: Text and Activities*. 3rd ed., London: Sage publications
17. Nelson-Jones, R. (2012). *Basic Counselling Skills: A helper's manual.* 3nd ed., Sage South Asia edition
18. Nugent, F.A., & Jones, K.D. (2009). *Introduction to the Profession of Counselling.* (5th ed.). New Jersey: Pearson Education
19. Simmons, J. & Griffiths, R. (2009). *CBT for Beginners.* London: Sage publications
20. Welfel, E. R., & Patterson, L. E. (2005). *The Counselling Process: A Multi-theoretical Integrative Approach.* (6th ed.). Thomson Brooks/ Cole

Question Paper Pattern for T.Y.B.A (CBCS)

for Major Elective; Applied Component (Counselling Psychology: Part I and Part II)

Note: 1. Attempt **all** questions (Total = 80 marks)
2. All questions carry **equal** marks

Q.1 (Based on Unit I) (20 marks)
a.
or
b.

Q.2 (Based on Unit II) (20 marks)
a.
or
b.

Q.3 (Based on Unit III) (20 marks)
a.
or
b.

Q.4 (Based on Unit IV) (20 marks)
a.
or
b.

Project Work (Total = 20 marks)

Guidelines for Project Work TYBA – Psychology Paper IX

As per the above guidelines given by the University, the students have to submit a project for each of the elective courses VI and IX for every semester V and VI. The College has to declare the final date of submission.

Types of projects that can be done –

1. Small survey (using interviews/questionnaires)
2. Presentation in class
3. Conduct a workshop for a small group
4. Field visit
5. Literature review
6. Preparation of charts/posters (educational aids and class presentation/exhibition)
7. Case studies - 3 to 4

The topic of the Project may be from the syllabus of the respective papers or closely related to it.

Project report:

4. Word Limit – 1000 to 2000 words, A-4 size paper
5. Page limit – 8 - 10 pages of actual report. (Title page, index, Bibliography, List of tables and figures, Appendix etc are not included)
6. Project report may be typed or handwritten.

Marks for passing 7 out of 20

Project of high quality may be given maximum 18-19 marks out of 20

UNIVERSITY OF MUMBAI
No. UG/ 88 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B. A. degree course **vide** this office Circular No.UG/176 of 2011 dated 20th June, 2011 and the Principals of affiliated Colleges in Arts are hereby informed that the recommendation made by Board of Studies in Politics at its meeting held on 25th May, 2016 has been accepted by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.23 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for the F.Y.B.A (Politics) (Sem. I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

MUMBAI – 400 032
October, 2016

(Dr.M.A.Khan)
REGISTRAR

To,

The Principals of affiliated Colleges in Arts.

A.C/4.23/24/06/2016

****

No. UG/88 -A of 2016-17 MUMBAI-400 032 25 October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Arts,
2) The Chairperson, Board of Studies in Politics,
3) The Director, Board of College and University Development,
4) The Controller of Examinations,
5) The Professor-cum-Director, Institute of Distance and Opening Learning,
6) The Co-Ordinator, University Computerization Centre.

(Dr.M.A.Khan)
REGISTRAR

PTO...

AC 24-06-2016
Item No. 4.23

University of Mumbai

BATCHELOR OF ARTS

FYBA - POLITICS PAPER I

REVISED SYLLABUS

AS PER CHOICE BASED CREDIT SYSTEM (CBCS)
(TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2016-17)

REVISED SYLLABUS
AS PER CHOICE BASED CREDIT SYSTEM (CBCS)
(TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2016-17)

FYBA
POLITICS PAPER I

SEMESTER I
TITLE: INDIAN POLITICAL SYSTEM

SUB-TITLE: THE CONSTITUTIONAL FRAMEWORK

1. INTRODUCTION TO THE CONSTITUTION (12)
- 1.1 BRIEF HISTORY OF THE MAKING OF CONSTITUTION
- 1.2 PREMABLE
- 1.3 BASIC FEATURES

2. CITIZENS AND THE CONSTITUTION (11)
- 2.1 FUNDAMENTAL RIGHTS – ARTS 14 TO 19
- 2.2 FUNDAMENTAL RIGHTS –ARTS- 20 TO 32
- 2.3 DIRECTIVE PRINCIPLES OF STATE POLICY

3. LEGISLATURE AND JUDICIARY (11)
- 3.1 PARLIAMENT
- 3.2 JUDICIAL SYSTEM – ORIGINAL AND WRIT JURISDICTION
- 3.3 JUDICIAL ACTIVISM

4. EXECUTIVE (11)
- 4.1 UNION EXECUTIVE - THE PRESIDENT
- 4.2 PRIME MINISTER AND COUNCIL OF MINISTERS
- 4.3 LOCAL SELF-GOVERNMENT – 73rd,74th, AMENDMENTS AND THEIR IMPLEMENTATION

SUGGESTED READINGS:

1. Basu, Durga Das, Introduction to the Constitution of India, Lexis Nexis, 2012.
2. Laxmikant, M, Indian Polity, TMH, 2015.
3. Laxmikant, M., Governance in India, TMH, 2015.
4. Pylee, M. V., An Introduction to the Constitution of India, Vikas Publishing, 2008.
5. Sharma, Brij Kishore, Introduction to the Constitution of India, PHI Learning, 2009.
6. क्षीरसागर, के. श्री., भारतीयराज्यव्यवस्था, विद्याप्रकाशन.
7. घांग्रेकर, चिं. ग., भारतीयराज्यघटना, श्रीमंगेशप्रकाशन, २००१.
8. जाधव, तुकाराम, आणिशिरापूरकर, महेश, भारतीयराज्यघटनावघटनात्मकप्रक्रिया, युनिकअकादमी, २०१४.

SEMESTER II
SUB-TITLE: INDIAN POLITICAL PROCESS

1. **CHANGING NATURE OF FEDERAL SYSTEM** (11)
   - 1.1 CENTRE-STATE RELATIONS WITH REFERENCE TO FISCAL AND EMERGNCY POWERS.
   - 1.2 DEMAND FOR GREATER AUTONOMY
   - 1.3 CHANGING DYNAMICS OF CENTRE-STATE RELATIONS

2. **PARTY POLITICS AND ELECTIONS**
   - 2.1 NATIONAL PARTIES - FEATURES
   - 2.2 REGIONAL PARTIES – CHARACTERISTICS
   - 2.3 ANALYSIS OF ELECTORAL PERFORANCE OF NATIONAL AND REGIONAL PARTIES SINCE 1989.

3. **SOCIAL DYNAMICS** (11)
   - 3.1 CASTE (WITH REFERENCE TO RESERVATION)
   - 3.2 RELIGION (WITH REFERENCE TO COMMUNALISM)
   - 3.3 GENDER (WITH REFERENCE TO POLITICAL PARTICIPATION)

4. **CHALLENGES TO NATIONAL SECURITY** (12)
   - 4.1 CRIMINALISATION OF POLITICS
   - 4.2 INTERNAL THREATS TO SECURITY (WITH REFERENCE TO NAXALISM AND INSURGENCY)
   - 4.3 GLOBAL TERRORISM

SUGGESTED READINGS:

1. Abbas, H., Kumar, Ranjay, and Alam, Mohammad Aftab, Indian Government and Politics, Pearson, 2011.
2. Chakravarty, Bidyut, and Pande, Rajendra Kumar, Indian Government and Politics, Sage Publications, 2008.
3. Chandoke, Neera, and Priyadarshi, Praveen, Contemporary India, Pearson, 2009.
4. Ghosh, Peu, Indian Government and Politics, PHI, 2012.
5. Jayal, Nirja G., and Mehta, BhanuPratap, The Oxford Companion to Politics in India, OUP, 2011.
6. Jha, Pravin Kumar, Indian Politics in Comparative Perspective, Pearson, 2012.
7. Paranjpe,Shrikant,India’s Internal Security:Issues and Perspectives, Kalinga Publications, 2009.
8. Singh, M. P., and Saxena, Rekha, Indian Politics, PHI, 2011.
9. कुलकर्णीबी. वाय., भारतीयशासनआणिराजकारण, विद्याप्रकाशन, २००८.
10. पाटील, बी. बी., भारतीयशासनआणिराजकारण, फडकेप्रकाशन, २०१०.
11. पाटीलव्ही. बी., भारतीयराज्यव्यवस्था, के. सागर, २०११.
12. पित्रे, शशिकांन्त, डोमेलतेकारगिल, राजहंसप्रकाशन, २०००.
13. भुरे, रश्मी, शांततेच्याशोधातकाश्मिरीतरुण, श्रीविद्याप्रकाशन, २००९.

14. लोटे, रा. ज., भारतीयराज्यवशासनव्यवस्था, पिंपळापुरेआणिकंपनी, २००३.
15. साबळे, भारतीयशासनआणिराजकारण, हिमालयापब्लिशिंगहाउस, २००४.

University of Mumbai

No. UG/ 29 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office Circular No. UG/51 of 2017-18, dated 15th July, 2017 relating to the revised syllabus as per (CBCS) of F.Y.B.A. in Hindi (Compulsory & Ancillary) (Sem. I & II).

They are hereby informed that the recommendations made by the Board of Studies in Hindi at its meeting held on 9th April, 2019 have been accepted by the Academic Council at its meeting held on 15th April, 2019 **vide** item No. 4.23 & 4.24 and that in accordance therewith, the revised syllabus as per the (CBCS) for the F.Y.B.A. Compulsory & Ancillary (Sem. I & II) in Hindi has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Ajay Deshmukh)
REGISTRAR

MUMBAI – 400 032
3rd June, 2019

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.23 & 4.24 /15/04/2019

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No. UG/ 29 -A of 2019 MUMBAI-400 032 3rd June, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Hindi,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)
REGISTRAR

UNIVERSITY OF MUMBAI

Revised Syllabus

And

Pattern of Question Paper in the Subject of

Hindi

At the

F.Y.B.A. Compulsory Examination

As per

CHOICE BASED CREDIT SYSTEM (CBCS)

(With effect from the Academic Year: 2019-2020)

UNIVERSITY OF MUMBAI

Revised Syllabus and Pattern of Question Paper in the Subject of Hindi at the

F.Y.B.A. Compulsory Examination

CHOICE BASED CREDIT SYSTEM (CBCS)

(With effect from the Academic Year: 2019-2020)

हिन्दी अध्ययन मंडल

अध्यक्ष : डॉ. अनिल सिंह

1. डॉ. करुणाशंकर उपाध्याय (सदस्य)
2. डॉ. हूबनाथ पाण्डेय (सदस्य)
3. डॉ. विद्या शिंदे (सदस्य)
4. डॉ. शीला आहुजा (सदस्य)
5. डॉ. चित्रा गोस्वामी (सदस्य)
6. डॉ. संतोष मोटवानी (सदस्य)
7. डॉ. प्रकाश धुमाल (सदस्य)
8. डॉ. गौतम सोनकांबले (सदस्य)
9. डॉ. मोहसिन ख़ान (सदस्य)

पाठ्यक्रम समिति

1. डॉ. शीला आहुजा **(समन्वयक)**
2. डॉ. रेखा शर्मा (सदस्य)
3. डॉ. सुमनिका सेठी (सदस्य)
4. डॉ. संतोष मोटवानी (सदस्य)
5. डॉ. रमा सिंह (सदस्य)
6. प्रा.जयशंकर पांडेय (सदस्य)

मुंबई विश्वविद्यालय, मुंबई

SEMESTER – I

NAME OF PROGRAM : B.A.

NAME OF THE COURSE : F.Y.B.A. Compulsory Hindi (अनिवार्य हिन्दी)
COURSECODE : UAHINCOM 101
TOTAL LECTURES : 60
CREDITS : 3

Aims and Objectives:

१.विद्यार्थियों को कविता और कहानी विधाओं के अतिरिक्त हिन्दी के प्रमुख साहित्यकारों से परिचित कराना।
२.अनुवाद और पत्र लेखन की कला का ज्ञान देना।
३.विद्यार्थियों की भाषा को समृद्ध करना।

निर्धारित पाठ्य पुस्तकें :

1. काव्य सरिता: संपादन: हिंदी अध्ययन मंडल, मुंबई विश्वविद्यालय, मुंबई
परिदृश्य प्रकाशन, मरीन लाईन्स,मुंबई-400002

१.भारत माता का मंदिर	- मैथिलीशरण गुप्त
२.सब जीवन बीता जाता है	- जयशंकर प्रसाद
३.भर देते हो	- सूर्यकांत त्रिपाठी निराला
४.बापू के प्रति	- सुमित्रानंदन पंत
५.यह मंदिर का दीप	- महादेवी वर्मा
६. शक्ति और क्षमा	- रामधारी सिंह दिनकर
७.पुष्प की अभिलाषा	- माखनलाल चतुर्वेदी
८.वे और तुम	- नागार्जुन
९.रीढ़ की हड्डी	- हरिवंश राय बच्चन
१०.आज का दैनिक	- भवानी प्रसाद मिश्र

2. कथा दर्पण: संपादन:हिंदी अध्ययन मंडल, मुंबई विश्वविद्यालय, मुंबई

अमन प्रकशन,रामबाग,कानपुर -208012

१.मनोवृत्ति	- प्रेमचंद
२.व्रत भंग	- जयशंकर प्रसाद
३.प्रलय की रात्रि	- सुदर्शन
४.इनाम	- जैनेंद्रकुमार
५.महादान	- यशपाल
६.प्रायश्चित	- भगवतीचरण वर्मा
७. ठेस	- फणीश्वरनाथ रेणु
८.निष्कासित	- गोविंद मिश्र

- **पत्र लेखन -**

  अनौपचारिक : बधाई,निमंत्रण,क्षमा याचना पत्र

  औपचारिक : आवेदन,सुझाव, संपादक के नाम (शिकायती एवं सुझाव पत्र)

- **भाषा ज्ञान -**

  वर्तनी की शुद्धता, संज्ञा, सर्वनाम, विशेषण, क्रिया शब्दों को वाक्य में पहचानना

- **अनुवाद** (अंग्रेजी से हिन्दी में)

प्रथम सत्र यूनिट विभाजन

1) काव्य सरिता :

यूनिट १ - व्याख्यान ११	- १ से ५ तक कविताएँ
यूनिट २–व्याख्यान११	- ६ से १० तक कविताएँ

2) कथा दर्पण :

यूनिट ३ - व्याख्यान ११	- १ से ४ तक कहानियाँ
यूनिट ४ - व्याख्यान ११	- ५ से ८ तक कहानियाँ
यूनिट ५ - **क** - व्याख्यान ८	- पत्र लेखन
ख- व्याख्यान ८	- भाषा ज्ञान तथा अनुवाद

प्रथम सत्रांत परीक्षा के प्रश्न पत्र का प्रारूप

कुल अंक : १०० **समय : ३ घंटे**

प्रश्न १. संदर्भ सहित व्याख्या (कविता और कहानी में दोनों से विकल्प सहित) २० अंक

प्रश्न २. दीर्घोत्तरी प्रश्न (कविता और कहानी दोनों में से विकल्प सहित) ३० अंक

प्रश्न ३. टिप्पणियाँ (कविता और कहानी दोनों में से विकल्प सहित) १० अंक

प्रश्न ४. वस्तुनिष्ठ प्रश्न १० (कविता और कहानी दोनों में से) १० अंक

प्रश्न ५. पत्र लेखन (दो में से एक) १० अंक

प्रश्न६. **(अ)भाषा ज्ञान** १० अंक

१. वर्तनी की शुद्धता
२. संज्ञा
३. सर्वनाम
४. विशेषण
५. क्रिया

(आ) अनुवाद (अंग्रेजी से हिन्दी में) १० अंक

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SEMESTER – II

NAME OF PROGRAM : B.A.

NAME OF THE COURSE : F.Y.B.A. Compulsory Hindi (अनिवार्य हिन्दी)

COURSECODE : UAHINCOM 201

TOTAL LECTURES : 60

CREDITS : 3

Aims and Objectives:

१. निबंध लेखन और संवाद लेखन द्वारा भावों एवं विचारों की अभिव्यक्ति में सक्षम बनाना।
२. मुहावरों और व्याकरण के माध्यम से विद्यार्थियों की भाषाको समृद्ध करना।
३. विद्यार्थियों में लेखन के दौरान होने वाली अशुद्धियों को दूर करना।

निर्धारित पाठ्य पुस्तकें :

1. काव्य सरिता : संपादन: हिंदी अध्ययन मंडल, मुंबई विश्वविद्यालय, मुंबई
परिदृश्य प्रकाशन, मरीन लाईन्स,मुंबई-400002

११ .मेरा नया बचपन - सुभद्रा कुमारी चौहान
१२.आया बसंत - सोहनलाल द्विवेदी
१३.हम ज़रूर जीतेंगे - अज्ञेय
१४.हम पंछी उन्मुक्त गगन के - शिवमंगल सिंह 'सुमन'
१५.कहीं पे धूप की चादर - दुष्यन्त कुमार
१६.काग़ज़ क़लम और स्याही - कुँवर नारायण
१७.जड़ें - सर्वेश्वर दयाल सक्सेना
१८.स्त्री - सुशीला टाकभोरे
१९.अपने घर की तलाश - निर्मला पुतुल
२०.मन कितना अभिनय शेष रहा - भारत भूषण

2. कथा दर्पण: संपादन: हिंदी अध्ययन मंडल, मुंबई विश्वविद्यालय, मुंबई
अमन प्रकशन,रामबाग,कानपुर-208012

९ .ताई	- विश्वंभरनाथ शर्मा 'कौशिक'
१०.सज़ा	- मन्नू भंडारी
११.माता-विमाता	- भीष्म साहनी
१२.पिता	- ज्ञानरंजन
१३ .वे तीन घर	- काशीनाथ सिंह
१४.दादी अम्मा	- कृष्णा सोबती
१५.हैरिटेज	- मोहनदास नैमिशराय
१६.पाँचवां बेटा	- नासिरा शर्मा

- **निबंध लेखन –**
  सामाजिक, समसामयिक, शैक्षणिक, वैचारिक, आत्मकथात्मक निबंध

- भाषा ज्ञान –
  लिंग,वचन,पर्यायवाची शब्द,विलोमार्थी शब्द, मुहावरों का वाक्य में प्रयोग
- संवाद लेखन / अपठित गद्यांश

द्वितीय सत्र यूनिट विभाजन

1. काव्य सरिता :

यूनिट १. व्याख्यान ११ - ११ से १५ तक कविताएँ
यूनिट २. व्याख्यान ११ - १६ से २० तक कविताएँ

2. कथा दर्पण :

यूनिट ३. व्याख्यान ११ - ९ से १२ तक कहानियाँ

यूनिट ४. व्याख्यान ११ - १३ से १६ तक कहानियाँ

यूनिट ५ - **क** - व्याख्यान ८ - निबंध लेखन

ख - व्याख्यान ८ - भाषा ज्ञान तथा संवाद लेखन / अपठित गद्यांश

द्वितीय सत्रांत परीक्षा के प्रश्न पत्र का प्रारूप

कुल अंक : १०० **समय : ३घंटे**

प्रश्न १. संदर्भ सहित व्याख्या (कविता और कहानी में दोनों से विकल्प सहित) २० अंक

प्रश्न २. दीर्घोत्तरी प्रश्न (कविता और कहानी दोनों में से विकल्प सहित) ३० अंक

प्रश्न ३. टिप्पणियाँ(कविता और कहानी दोनों में से विकल्प सहित) १० अंक

प्रश्न ४. वस्तुनिष्ठ प्रश्न १०(कविता और कहानी दोनों में से) १० अंक

प्रश्न ५. निबंध लेखन (चार में से एक) १० अंक

प्रश्न६. (**अ**) भाषा ज्ञान १० अंक

१. लिंग
२. वचन
३. पर्यायवाची शब्द
४. विलोमार्थी शब्द
५. मुहावरों का वाक्य में प्रयोग

(**आ**) संवाद लेखन (सामान्य वार्तालाप) / अपठित गद्यांश १० अंक

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University of Mumbai

No. UG/ 36 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office Circular No. UG/95 of 2015-16, dated 5th October, 2015 relating to the revised syllabus as per (CBSGS) for the T.Y.B..Sc. Botany (Sem. V & VI).

They are hereby informed that the recommendations made by the Board of Studies in Botany at its meeting held on 18th March, 2019 have been accepted by the Academic Council at its meeting held on 10th May, 2019 **vide** item No. 4.26 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T. Y .B.Sc. Botany in (Sem. V & VI) has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Ajay Deshmukh)
REGISTRAR

MUMBAI – 400 032
03rd July, 2019

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.26/10/05/2019

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No. UG/ 36 -A of 2019 MUMBAI-400 032 3rd July, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Botany,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,s

(Dr. Ajay Deshmukh)
REGISTRAR

University of Mumbai

UNIVERSITY OF MUMBAI

Syllabus for the T.Y.B.Sc.
Program: B.Sc. Course: BOTANY

(Credit Based Semester and Grading System with effect from the academic year 2019–2020)

T.Y.B.Sc. Botany Syllabus
Restructured for Credit Based and Grading System
To be implemented from the Academic year 2019-2020

SEMESTER V

Course Code	UNIT	TOPICS	Credit	L / Weeks
USBO501	PLANT DIVERSITY III			
	I	Microbiology	2.5	1
	II	Algae		1
	III	Fungi		1
	IV	Plant Pathology		1
USBO502	PLANT DIVERSITY IV			
	I	Paleobotany	2.5	1
	II	Angiosperms I		1
	III	Anatomy I		1
	IV	Palynology		1
USBO503	FORM AND FUNCTION III			
	I	Cytology and Molecular Biology	2.5	1
	II	Plant Physiology I		1
	III	Environmental Botany		1
	IV	Plant Tissue Culture		1
USBO504	CURRENT TRENDS IN PLANT SCIENCES II			
	I	Ethnobotany and Mushroom Industry	2.5	1
	II	Plant Biotechnology I		1
	III	Instrumentation		1
	IV	Pharmacognosy and medicinal botany		1
USBOP5	Practicals based on Two Courses in Theory (501 & 502) – For 6 Units		3	8
USBOP6	Practicals based on Two Courses in Theory (503 &504) – For 6 Units		3	8
USBOP7	Practicals based on Two Courses in Theory (502 & 503) – For 3 Units		3	8
			16	32 + 8 (3 Units)

SEMESTER VI

Course Code	UNIT	TOPICS	Credit	L / Weeks
USBO601	**PLANT DIVERSITY III**			
	I	**Bryophyta**	**2.5**	**1**
	II	**Pteridophyta**		**1**
	III	**Bryophyta and Pteridophyta: Applied Aspects**		**1**
	IV	**Gymnosperms**		**1**
USBO602	**PLANT DIVERSITY IV**			
	I	**Angiosperms II**	**2.5**	**1**
	II	**Anatomy II**		**1**
	III	**Embryology**		**1**
	IV	**Plant Geography**		**1**
USBO603	**FORM AND FUNCTION III**			
	I	**Plant Biochemistry**	**2.5**	**1**
	II	**Plant Physiology II**		**1**
	III	**Genetics**		**1**
	IV	**Biostatistics**		**1**
USBO604	**CURRENT TRENDS IN PLANT SCIENCES II**			
	I	**Plant Biotechnology II**	**2.5**	**1**
	II	**Bioinformatics**		**1**
	III	**Economic Botany**		**1**
	IV	**Post Harvest Technology**		**1**
USBOP8	**Practicals based on Two Courses in theory (601 & 602) – For 6 Units**		**3**	**8**
USBOP9	**Practicals based on Two Courses in theory (603 & 604) – For 6 Units**		**3**	**8**
USBOP10	**Practicals based on Two Courses in theory (602 & 603) – For 3 Units**		**3**	**8**
			16	**32 + 8 (3 Units)**

BSc BOTANY: PROGRAM OUTCOMES

Specific core discipline knowledge

- Students can recall details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life.
- Students can recall details of the unique ecological and evolutionary features of the local and Indian flora.

Communication skills

- Students can communicate effectively using oral and written communication skills

Problem solving and research skills

- Students can generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context

BSc BOTANY: PROGRAM SPECIFIC OUTCOMES

- To recognize and identify major groups of non-vascular and vascular plants and their phylogenetic relationships.
- To understand the phylogeny of plants and study various systems of classification.
- To explore the morphological, anatomical, embryological details as well as economic importance of algae, fungi, bryophytes, pteridophytes, gymnosperms and angiosperms.
- To understand physiological processes and adaptations of plants.
- To provide knowledge about environmental factors and natural resources and their importance in sustainable development.
- To be able to carry out phytochemical analysis of plant extracts and application of the isolated compounds for treatment of diseases.
- To be able to deal with all microbes and the technologies for their effective uses in industry and mitigation of environmental concerns.
- To explain how current medicinal practices are often based on indigenous plant knowledge and to get introduced to different perspectives on treating ailments according to ethnomedicinal principles.
- To understand patterns of heredity and variation among individuals, species and populations and apply principles for improvement of quality and yield.
- To be able to apply statistical tools to gain insights into significantly different data from different sources.
- To acquire recently published knowledge in molecular biology, such as rDNA technology; PTC and bioinformatics and their applications.

SEMESTER V
THEORY

Course Code	Title	Credits
USBO501	**PLANT DIVERSITY – III**	**2.5 Credits (60 Lectures)**

Course outcomes:

The students would be able :

- To gain knowledge about microbial diversity and techniques for culturing and visualization.
- To understand the salient features of three major groups of algae, their life cycle patterns with a suitable example; to be able to identify them.
- To learn the general characteristics and classification of two major groups of fungi along with life cycles of each group; to be able to identify them.
- To understand the scope and importance of Plant Pathology and apply the concepts of various control measures of commonly widespread plant diseases.

Unit I: Microbiology • **Types of Microbes:** Viruses, Bacteria, Algae, Fungi, Protozoa, Mycoplasma and Actinomycetes. • **Culturing:** Sterilization, media, staining, colony characters. • Pure cultures	**(15 lectures)**
Unit –II: Algae (G.M. Smith Classification System to be followed) • Division Rhodophyta: Classification and General Characters: Distribution, Cell structure, pigments, reserve food, range of thallus, reproduction: asexual and sexual, Alternation of Generations, Economic Importance. • Structure, life cycle and systematic position of *Polysiphonia, Batrachospermum.* • Classification and General Characters of Xanthophyta: Distribution, Cell structure, pigments, reserve food, range of thallus, Reproduction: asexual and sexual, Alternation of Generations, Economic Importance. • Structure, life cycle and systematic position of *Vaucheria.* • Classification and General Characters of Bacillariophyta: Distribution, Cell structure, pigments, reserve food, range of thallus, Reproduction: asexual and sexual, Alternation of Generations, Economic Importance. • Structure, life cycle and systematic position of *Pinnularia.*	**(15 lectures)**
Unit III: Fungi (G.M. Smith Classification System to be followed) • Basidiomycetes: Classification and General characters ➢ Life cycle of *Agaricus* ➢ Life cycle of *Puccinia* • Deuteromycetae: Classification and General Characters • Life cycle of *Alternaria*	**(15 lectures)**

Unit IV: Plant Pathology • **Study of plant diseases:** Causative organism, symptoms, predisposing factors, disease cycle and control measures of the following. ➢ White Rust –*Albugo candida* ➢ Tikka disease of ground nut: *Cercospora* ➢ Damping off disease: *Pythium* ➢ Citrus canker –*Xanthomonas axonopodis* pv. citri ➢ Leaf curl – leaf curl virus in *Papaya.* • Study of Physical, chemical and biological control methods of plant diseases.	**(15 lectures)**

Course Code	Title	Credits
USBO502	**PLANT DIVERSITY – IV**	**2.5 Credits (60 lectures)**

Course outcomes:

The students would be able :

- To acquire knowledge of different fossil forms and understand their role in evolution.
- To provide plant description, describe the morphological and reproductive structures of seven families and also identify and classify according to Bentham and Hooker's system.
- To gain proficiency in the use of keys and identification manuals for identifying any unknown plants to species level.
- To relate anomalies in internal stem structure with function and appreciate the salient features of the root stem transition zone.
- To get exposure to pollen study and learn to apply it in various fields.

Unit I: Paleobotany • *Lepidodendron*– All form genera root, stem, bark, leaf, male and female fructification. • *Lyginopteris*– All form genera root, stem, leaf, male and female fructification. • *Pentoxylon*– All form genera. • Contribution of Birbal Sahni, Birbal Sahni Institute of Paleobotany, Lucknow	**(15 lectures)**
Unit II: Angiosperms I • Morphology of flower – All Parts of Flower. • Complete classification of Bentham and Hooker (only for prescribed families), Merits and demerits • Bentham and Hooker's system of classification for flowering plants up to family with respect to the following prescribed families and economic and medicinal importance for members of the families. (Special stress on fruit morphology to be given) ➢ Capparidaceae ➢ Umbelliferae ➢ Cucurbitaceae ➢ Rubiaceae ➢ Solanaceae ➢ Commelinaceae ➢ Graminae	**(15 lectures)**
Unit III: Anatomy I • **Anomalous secondary growth** in the Stems of *Bignonia*, *Salvadora*, *Achyranthes*, *Dracaena*. Storage roots of Beet, Radish • **Root stem transition** • **Types of Stomata**– Anomocytic, Anisocytic, Diacytic, Paracytic, and Graminaceous	**(15 lectures)**

Unit IV: Palynology ● **Pollen Morphology** ● **Pollen viability**–storage ● Germination and growth of pollen ● Application of Palynology in honey industry, coal and oil exploration, Aerobiology and pollen allergies, forensic science	**(15 lectures)**

Course Code	Title	Credits
USBO503	**FORM AND FUNCTIONS- II**	**2.5 Credits (60 Lectures)**

Course outcomes:

The students would be able :

- To acquire knowledge about two important organelles and molecular mechanisms of translation
- To understand water relations of plants, inorganic and organic solute transport, and apply the knowledge to manage mineral nutrition and survival in challenging abiotic stresses.
- To understand succession in plant communities and study remediation technologies in order to apply knowledge acquired for cleanup of polluted sites.
- To get exposure to principles and techniques of plant tissue culture and apply these studies for improving agriculture and horticulture and to become an entrepreneur.

Unit I: Cytology and Molecular Biology • Structure and function of nucleus • Structure and function of vacuole • Structure and function of giant chromosomes • The genetic code: Characteristics of the genetic code • Translation in Prokaryotes and Eukaryotes.	**(15 lectures)**
Unit II: Plant Physiology I • **Water relations:** Potential, osmosis, transpiration, imbibition, • **Solute transport:** Transport of ions across cell membranes, active and passive transport, carriers, channels and pumps. • **Translocation of solutes:** Composition of phloem sap, girdling experiment. • **Pressure flow model (Munch's hypothesis):**Phloem loading and unloading, anatomy of sieve tube elements and mechanisms of sieve tube translocation. • **Mineral Nutrition:** Role of Macro and Micro nutrients, physiological functions and deficiency symptoms.	**(15 lectures)**
Unit III: Environmental Botany • **Bioremediation:** Principles, factors responsible and microbial population in bioremediation. • **Phytoremediation**: Metals, Organic pollutants • **Plant succession**: Hydrosere and Xerosere – Formation of Barren Space, Succession on the Land Citing Different Seres leading up to the Climax, Succession in Water, Ecesis, Poly and Mono-climax theories.	**(15 lectures)**
Unit IV: Plant Tissue Culture • **Aspects of Micro-propagation with reference to Floriculture:** Detailed study of Orchid Cultivation • **Plant cell suspension cultures for the production of secondary metabolites:** With special reference to Shikonin production. • Somatic Embryogenesis and Artificial Seeds. • **Protoplast Fusion and Somatic Hybridization:** i) Concept, Definition, and various methods of Protoplast Fusion ii) Applications of Somatic Hybridization in Agriculture	**(15 lectures)**

Course Code	Title	Credits
USBO504	**CURRENT TRENDS IN PLANT SCIENCES – II**	**2.5 Credits (60 Lectures)**

Course outcomes:

The students would be able :

- To get exposure to the technique of mushroom cultivation and explore the possibility of entrepreneurship in the same.
- To learn ethnobotanical principles, applications and utilize indigenous plant knowledge for the cure of common human diseases and improvement of agriculture.
- To gain knowledge about the latest molecular biology techniques for isolation and characterization of genes.
- To learn principles and application of commonly used techniques in instrumentation.
- To gain proficiency in the monograph study and pharmacognostic analysis of six medicinal plants.

Unit I: Ethnobotany and Mushroom Industry • **Ethnobotany**- Definition, history, sources of data and methods of study. • **Applications of ethnobotany:** ➢ Ethno-medicines. ➢ Agriculture. ➢ Edible plants. • **Traditional medicines** used by tribals in Maharashtra towards ➢ Skin ailments: *Rubia cordfolia, Sandalwood* ➢ Liver ailments: *Phyllanthus, Andrographis* ➢ Wound healing and ageing: *Centella, Typha, Terminalia, Tridax.* ➢ Fever: *Vitex negundo*, *Tinospora cordifolia* leaves ➢ Diabetes: *Momordica charantia, Syzygium cuminii* • **Mushroom industry:** ➢ Detail general account of production of mushrooms with respect to methods of Composting, spawning, casing, harvesting of mushroom. Cultivation of *Pleurotus, Agaricus, Volvariella* mushroom. ➢ General account of mushrooms: Nutritional value, picking and packaging, economic importance.	**(15 lectures)**
Unit II: Plant Biotechnology I • Construction of genomic DNA libraries, Chromosome libraries and c- DNA libraries. • Identification of specific cloned sequences in c-DNA libraries and Genomic libraries • **Analysis of genes and gene transcripts –**Restriction enzyme, analysis of cloned DNA sequences. Hybridization(Southern Hybridization)	**(15 lectures)**
Unit III: Instrumentation • **Colorimetry and Spectrophotometry** (Visible, UV and IR) – Instrumentation, working, principle and applications. • **Chromatography:** General account of Column chromatography. Principle and bedding material involved in adsorption and partition chromatography, ion exchange chromatography, molecular sieve chromatography.	**(15 lectures)**

Unit IV: Pharmacognosy and Medicinal Botany • Monographs of drugs with reference to biological sources, geographical distribution, common varieties, macro and microscopic characters, chemical constituents, therapeutic uses, adulterants- *Strychnos* seeds, *Senna* leaves, Clove buds, *Allium sativum, Acorus calamus* and *Curcuma longa*	**(15 lectures)**

SEMESTER V
PRACTICAL

Minimum marks for passing: 20

Semester V USBOP5 – For 6 Units	**Cr**
PRACTICAL PAPER I–PLANT DIVERSITY III – USBOP 501 (For 6 Units)	**1.5**
Microbiology • Study of aeromicrobiota by petriplate exposed method: Fungal culture, Bacterial culture. • Determination of Minimum Inhibitory Concentration (MIC) of sucrose against selected microorganism. • Study of antimicrobial activity by the disc diffusion method.	
Algae (G.M. Smith Classification System to be followed) • Study of stages in the life cycle of the following Algae from fresh / preserved material and permanent slides. ➢ *Polysiphonia* ➢ *Batrachospermum* ➢ *Vaucheria* ➢ *Pinnularia*	
Fungi (G.M. Smith Classification System to be followed) • Study of stages in the life cycle of the following Fungi from fresh / preserved material and permanent slides ➢ *Agaricus* ➢ *Puccinia* ➢ *Alternaria*	
Plant Pathology • Study of the following fungal diseases: ➢ White rust in Cruciferae (Brassicaceae) ➢ Tikka disease in Groundnut ➢ Damping off disease ➢ Citrus canker ➢ Leaf curl in *Papaya Leaf*	
Semester V USBOP7 – For 3 Units	
PRACTICAL PAPER II–PLANT DIVERSITY IV USBOP 502 (For 3 & 6 Units)	**Cr**
Paleobotany • Study of the following form genera with the help of permanent slides/ photomicrographs. ➢ *Lepidodendron* ➢ *Lyginopteris* ➢ *Pentoxylon*	**1.5**
Angiosperms I • Morphology of Flower – All Parts of Flower • Study of one plant from each of the following Angiosperm families as per Bentham and Hooker's system of classification. ➢ Capparidaceae ➢ Umbelliferae ➢ Cucurbitaceae	

➢ Rubiaceae ➢ Solanaceae ➢ Commelinaceae ➢ Graminae • Morphological peculiarities and economic importance of the members of the above-mentioned Angiosperm families • Identifying the genus and species of a plant with the help of Flora	
Anatomy I • Study of anomalous secondary growth in the stems of the following plants using double staining technique. *1) Bignonia* *2) Salvadora* *3) Achyranthes* *4) Dracaena* • Study of anomalous secondary growth in the roots of 1) Beet 2) Radish • Types of Stomata 1) Anomocytic 2) Anisocytic 3) Diacytic 4) Paracytic 5) Graminaceous	
Palynology I • Study of pollen morphology (NPC Analysis) of the following by Chitale's Method ➢ *Hibiscus* ➢ *Datura* ➢ *Ocimum* ➢ *Crinum* ➢ *Pancratium* ➢ *Canna* • Determination of pollen viability • Pollen analysis from honey sample – unifloral and multifloral honey • Effect of varying concentration of sucrose on *In vitro* Pollen germination	
Total Credit	**3**

Semester V USBOP6 – For 6Units **Semester V USBOP7 – For 3Units**	**Cr**
PRACTICAL –PAPER III FORM AND FUNCTION II USBOP 503 (For 3 & 6 Units)	**1.5**
Cytology and Molecular Biology • Mounting of Giant chromosomes from *Chironomous* larva • Smear preparation from *Tradescantia* buds • Predicting the sequence of amino acids in the polypeptide chain that will be formed following translation(Eukaryotic)	
Plant Physiology I • Estimation of Phosphate phosphorus (Plant acid extract) • Estimation of Iron (Plant acid extract) Note: Preparation of a standard graph and determination of the multiplication factor for Phosphate / Iron estimation using a given standard phosphate / Standard Iron solution should be done in regular practical as this will also be put as a question in practical exam	
Environmental Botany • Estimation of the following in given water sample ➢ Dissolved oxygen demand ➢ Biological oxygen demand ➢ Hardness ➢ Salinity and Chlorinity	
Micropropogation • Plant Tissue culture: • Identification – Multiple shoot culture, hairy root culture, somatic embryogenesis • Preparation of stock solutions for preparation of MS medium (Note: Concept of preparation of specified molar solutions should be taught and problems based on preparation of stock solutions for tissue culture media will be given).	
Semester V USBOP6 – For 6 Units	
PRACTICAL – PAPER IV CURRENT TRENDS IN PLANT SCIENCES II USBOP 504 (For 6 Units)	**Cr**
Ethnobotany and mushroom industry • Study of plants mentioned in theory for Ethnobotany • Mushroom cultivation (To be demonstrated) • Identification of various stages involved in mushroom cultivation – spawn, pin head stage, mature/ harvest stage of *Agaricus, Pleurotus, Volvariella*	**1.5**
Biotechnology I • Growth curve of E. coli • Plasmid DNA isolation and Separation of DNA using AGE • Restriction mapping (problems), Southern blotting	
Instrumentation • Demonstration of Beer Lambert's Law • Experiment based on ion exchange chromatography for demonstration • Experiment based on separation of dyes/ plant pigments using silica gel column.	

Pharmacognosy • Macroscopic/ Microscopic characters and Chemical tests for active constituents of the following plants. ➢ *Allium sativum* ➢ *Acorus calamus* ➢ *Curcuma longa* ➢ *Senna angustifolia* ➢ *Strychnos nux-vomica* ➢ *Eugenia caryophyllata*	
Total Credit	**3**

Course Code	Title	Credits
USBO601	**PLANT DIVERSITY – III**	**2.5 Credits (60 Lectures)**

Course outcomes:

The students would be able :

- To identify, describe and study in detail the life cycles of three Bryophytes.
- To and study in detail classification and general characters of three classes of Pteridophytes and identify as well as describe the life cycles of one example from each class.
- To study evolutionary aspects and economic utilization of Bryophytes and Pteridophytes.
- To identify, describe and study in detail the life cycles of three Gymnosperms.

Unit I: Bryophyta (G. M. Smith Classification system to be followed) • Life cycle of *Marchantia* • Life cycle of *Pelia* • Life cycle of *Sphagnum*	**(15 lectures)**
Unit II: Pteridophyta (G. M. Smith Classification System to be followed) • Lepidophyta – Classification, general characters; Life cycle of • *Lycopodium* • Calamophyta – Classification, general characters; Life cycle of • *Equisetum* • Pterophyta - Classification, general characters; Life cycle of *Adiantum* and *Marselia*	**(15 lectures)**
Unit III: Bryophytes and Pteridophytes: Applied aspects • Ecology of Bryophytes. • Economic importance of Bryophytes. • Bryophytes as Indicators. • Evolution of Sporophyte and Gametophyte in Bryophytes. • Economic importance of Pteridophytes • Diversity and distribution of Indian Pteridophytes • Types of Sori and Evolution of Sori in Pteridophytes.	**(15 lectures)**
Unit IV: Gymnosperms (Chamberlain's Classification System to be followed) • Life cycle of *Thuja*, • Life cycle of *Gnetum* • Life cycle of *Ephedra*. • Economic importance of Gymnosperms	**(15 lectures)**

Course Code	Title	Credits
USBO602	**PLANT DIVERSITY – IV**	**2.5 Credits (60 Lectures)**

Course outcomes:

The students would be able :

- To study contribution of Botanical gardens, BSI to Angiosperm study and provide plant description, describe the morphological and reproductive structures of seven families.
- To gain exposure to a phylognetic system of classification.
- To gain insight into the anatomical adaptations of different ecological plant groups.
- To understand development plant of male and female gametophytes, embryonic structure and development.
- To understand the different aspects and importance of Biodiversity and utilize them for conservation of species so as to prevent further loss or extinction of Biodiversity and preserve the existing for future generations.

Unit I: Angiosperms II — **(15 lectures)**

- **Major Botanic gardens of India**– Indian Botanic Garden, Howrah; National Botanic Garden (NBRI) Lucknow; Lloyd Botanic Garden, Darjeeling; Lalbaugh Botanic Garden, Bangaluru.
- Botanical survey of India and regional branches of India
- Bentham and Hooker's system of classification for flowering plants up to family with respect to the following prescribed families and economic importance, medicinal importance and fruit morphology for members of the families
  - Rhamnaceae
  - Combretaceae
  - Asclepiadaceae
  - Labiatae
  - Euphorbiaceae
  - Cannaceae
- Hutchinson's classification system of Angiosperms Brief Introduction, Merits and Demerits of Hutchinson's Classification System

Unit II: Anatomy II — **(15 lectures)**

- **Ecological anatomy**
  - Hydrophytes – submerged, floating, rooted
  - Hygrophytes -*Typha*
  - Mesophytes
  - Sciophytes
  - Halophytes
  - Epiphytes
  - Xerophytes

Unit III: Embryology — **(15 lectures)**

- **Microsporogenesis**
- **Megasporogenesis**- Development of monosporic type, examples of all embryo sacs
- Types of ovules
- Double fertilization
- Development of embryo–*Capsella*

Unit IV: Plant Geography (Shifted from Paper – IV) • **Phytogeographical regions of India**. • **Biodiversity**: ➢ Definition, diversity of flora found in various forest types of India ➢ Levels of biodiversity ➢ Importance and status of biodiversity ➢ Loss of biodiversity ➢ Conservation of biodiversity ➢ Genetic diversity- Molecular characteristics	**(15 lectures)**

Course Code	Title	Credits
USBO603	**FORMS AND FUNCTION – III**	**2.5 Credits 60 Lectures)**

Course outcomes:

The students would be able :

- To study various plant biomolecular structures and appreciate the structures, role, functions and applications of enzymes.
- To gain insight into the Nitrogen and plant hormone metabolism with applications of the same in agriculture and horticulture.
- To understand principles of genetic mapping , mutations and solve problems based on them, gain knowledge of various metabolic disorders and their implications.
- To generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context, using suitable statistical techniques.

Unit I: Plant Biochemistry • **Structure of biomolecules:** Carbohydrates (sugars, starch, cellulose, pectin, lipids (fatty acids and glycerol), proteins (amino acids) • **Enzymes:** Nomenclature, classification, mode of action, Enzyme kinetics, Michaelis-Menten equation, competitive, non-competitive and un-competitive inhibitors.	**(15 lectures)**
Unit II: Plant Physiology II • **Nitrogen Metabolism:** Nitrogen cycle, root nodule formation, and leghaemoglobin, nitrogenase activity, assimilation of nitrates, (NR, NiR activity), assimilation of ammonia, (amination and transamination reactions), nitrogen assimilation and carbohydrate utilization. • Physiological effects and commercial applications of Auxins, Gibberillins, Cytokinins and Abscisic acid	**(15 lectures)**
Unit III: Genetics • **Genetic mapping in eukaryotes:** discovery of genetic linkage, gene recombination, construction of genetic maps, three- point crosses and mapping chromosomes, problems based on the same • **Gene mutations:** definition, types of mutations, causes of mutations, induced mutations, the Ame's test • **Metabolic disorders**– enzymatic and non-enzymatic: Gene control of enzyme structure Garrod's hypothesis of inborn errors of metabolism, Phenyl ketone urea.	**(15 lectures)**
Unit IV: Biostatistics (Shifted from Paper – II) • Test of significance student's *t*-test – Paired and Unpaired. • Regression. • ANOVA (one way).	**(15 lectures)**

Course Code	Title	Credits
USBO604	**Current Trends in Plant Science – II**	**2.5 Credits (60 Lectures)**

Course outcomes:

The students would be able :

- To gain insight into recent molecular biology techniques for DNA analysis and amplification and Barcoding techniques and applications therein.
- To understand and apply tools of Bioinformatics for data retrieval and phylogenetic analysis.
- To learn about the sources of economically important plants in the field of fats and oils and apply it for extraction, dealing with entrepreneurship in the field.
- To gain knowledge and proficiency in preservation of post harvest produce and explore the possibility of entrepreneurship in the field.

Unit I: Plant Biotechnology II • **DNA sequence analysis**– Maxam – Gilbert Method and Sanger's method, Pyro Sequencing. • Polymerase Chain Reaction (PCR). • **DNA barcoding:** Basic features, nuclear genome sequence, chloroplast genome sequence, *rbc*L gene sequence, *mat* K gene sequence, present status of barcoding in plants.	**(15 lectures)**
Unit IV: Bioinformatics (Shifted from Paper – III) • Organization of biological data, databases • Exploration of data bases, retrieval of desired data, BLAST. • Protein structure analysis and application • Multiple sequence analysis and phylogenetic analysis	**(15 lectures)**
Unit III: Economic Botany • **Essential Oils:** Extraction, perfumes, perfume oils, oil of Rose, Sandalwood, *Patchouli*, *Champaca*, grass oils: *Citronella*, Vetiver. • **Fatty oils:** Drying oil (Linseed and Soyabean oil), semidrying oils (Cotton seed, Sesame oil) and non-drying oils (Olive oil and Peanut oil), • **Vegetable Fats**: Coconut and Palm oil	**(15 lectures)**
Unit IV : Post Harvest Technology • **Storage of Plant Produce –**Preservation of Fruits and Vegetables ➢ Drying (Dehydration) – Natural conditions – Sun drying, Artificial Drying – Hot Air Drying, Vacuum Drying, Osmotically Dried Fruits, Crystallized or Candied Fruits, Fruit Leather, Freeze Drying) ➢ Freezing (Cold Air Blast System, Liquid Immersion method, Plate Freezers, Cryogenic Freezing, Dehydro-Freezing, Freeze Drying), ➢ Canning ➢ Pickling (in Brine, in Vinegar, Indian Pickles) ➢ Sugar Concentrates (Jams, Jellies, Fruit juices) ➢ Food Preservatives ➢ Use of Antioxidants in Preservation	**(15 lectures)**

SEMEST ER VI
PRACTICAL

Minimum marks for passing: 20

SEMESTER VI USBOP8 – FOR 6 UNITS	**Cr**
PRACTICAL PAPER I–PLANT DIVERSITY III – USBOP 601(For 6 Units)	**1.5**
Bryophyta (G.M. Smith Classification System to be followed) • Study of stages in the life cycle of the following Bryophyta from fresh / preserved material and permanent slides ➢ *Marchantia* ➢ *Pelia* ➢ *Sphagnum*	
Pteridophyta (G.M. Smith Classification System to be followed) • Study of stages in the life cycles of the following Pteridophytes from fresh / preserved material and permanent slides ➢ *Lycopodium* ➢ *Equisetum* ➢ *Adiantum* ➢ *Marselia*	
Bryophytes and Pteridophytes: Applied aspects • Economic importance of Bryophyta • Economic importance of Pteridophyta • Types of Sporophytes in Bryophyta (from Permanent slides) • Types of Sori and Soral Arrangement in Pteridophytes	
Gymnosperms (Chamberlain's Classification System to be followed) • Study of stages in the life cycles of the following Gymnosperms from fresh / preserved material and permanent slides ➢ *Thuja* ➢ *Gnetum* ➢ *Ephedra* • Economic importance of Gymnosperms	
USBOP10 – FOR 3 UNITS	
PRACTICAL PAPER II–PLANT DIVERSITY IV USBOP602 (For 3 & 6 Units)	**1.5**
Angiosperms II • Study of one plant from each of the following Angiosperm families as per Bentham and Hooker's system of classification. ➢ Rhamnaceae ➢ Combretaceae ➢ Asclepiadaceae ➢ Labiatae ➢ Euphorbiaceae ➢ Cannaceae • Morphological peculiarities and economic importance of the members of the above-mentioned Angiosperm families • Identify the genus and species with the help of flora	

Anatomy II • Study of Ecological Anatomy of ➢ Hydrophytes: *Hydrilla* stem, *Nymphaea* petiole, *Eichhornia* offset ➢ Epiphytes: Orchid ➢ Sciophytes: *Peperomia* leaf ➢ Xerophytes: *Nerium* leaf, *Opuntia phylloclade* ➢ Halophytes: *Avicennia* leaf and pneumatophore, *Sesuvium* / *Sueda* leaf ➢ Mesophytes: *Vinca* leaf	
Embryology • Study of various stages of Microsporogenesis, Megasporogenesis and Embryo Development with the help of permanent slides / photomicrographs • Mounting of Monocot (Maize) and Dicot (Castor and Gram)embryo • *In vivo* growth of pollen tube in *Portulaca /Vinca*	
Plant Geography • Study of phytogeographic regions of India • Preparation of vegetation map using Garmin's GPS Instrument • Problems based on Simpson's diversity Index	
Total Credit	**3**
SEMESTER VI USBOP9 – FOR 6 UNITS	**Cr**
SEMESTER VI USBOP10 – FOR 3 UNITS	
PRACTICAL PAPER III–FORM AND FUNCTION III USBOP603 (For 3 & 6 Units)	**1.5**
Plant Biochemistry • Estimation of proteins by Biuret method • Effect of temperature on the activity of amylase • Effect of pH on the activity of amylase • Effect of substrate variation on the activity of amylase	
Plant Physiology II • Determination of alpha-amino nitrogen • Effect of GA on seed germination • Estimation of reducing sugars by DNSA method	
Genetics • Problems based on three-point crosses, construction of chromosome maps • Identification of types of mutations from given DNA sequences • Study of mitosis using pre-treated root tips of *Allium*	
Biostatistics • *t*-test (paired and unpaired) • Problems based on regression analysis • ANOVA (One Way)	
PRACTICAL PAPER IV CURRENT TRENDS IN PLANT SCIENCES USBOP 604 (For 6 Units)	
Plant Biotechnology II • DNA sequencing by Sanger's Method and Pyro Sequencing Method • DNA barcoding of plant material by using suitable data	

Bioinformatics • BLAST: nBLAST, pBLAST • Multiple sequence alignment • Phylogenetic analysis • RASMOL/SPDBV	
Economic Botany • Demonstration: Extraction of essential oil using Clevenger • Thin layer chromatography of essential oil of *Patchouli* and *Citronella* • Saponification value of Palm oil	
Post-Harvest Technology • Preparation of ➢ Squash ➢ Jam ➢ Jelly ➢ Pickle	
Total Credit	**3**

Scheme of Examinations:

Theory Course: Semester End Assessment	**100 Marks Each Theory Paper**
Practical Course	**50 Marks Each Practical Paper**

- **Students offering Double major (3 Units) will study Paper II and III**

Semester End Theory Examination Question Paper Pattern:

Q.1 – Four (4) Long Answer Questions on Unit – I out of which Two (2) to be solved.	**10 Marks Each**
Q.2 – Four (4) Long Answer Questions on Unit – II out of which Two (2) to be solved.	**10 Marks Each**
Q.3 – Four (4) Long Answer Questions on Unit – III out of which Two (2) to be solved.	**10 Marks Each**
Q.4 – Four (4) Long Answer Questions on Unit – IV out of which Two (2) to be solved.	**10 Marks Each**
Q.5 – Six (6) Short Answer Questions on all four (4) Units out of which Four (4) to be solved.	**05 Marks Each**

Note:

1. Minimum Marks of 20 are required in Every Practical Paper Examination in each semester.
2. A minimum of four field excursions (with at least one beyond the limits of Mumbai / Local area) for habitat studies are compulsory. Field work of not less than eight hours duration is equivalent to one period per week for a batch of fifteen students.
3. A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of T.Y.B.Sc. Botany and the Field Report or a certificate from the Head of the Department/Institute to the effect that the candidate has completed the practical course of T.Y.B.Sc. Botany as per the minimum requirements. In case of loss of journal, a candidate must produce a certificate from the Head of the Department/ Institute that the practical for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination but the marks allotted for the journal will not be granted.

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP5)

Plant Diversity III (USBOP501)

Practical Paper – I

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1	Perform the given Microbiological Experiment **'A'**	12
Q.2	Identify, Classify and Describe Specimens **B, C** and **D**. Sketch neat and labeled diagrams of Morphological / Microscopical structures seen in the specimens.	24
Q.3	Identify and describe slides / specimens **E, F** and **G**.	09
Q.4	Journal	05

KEY:

A– Any one experiment out of four as prescribed in syllabus.

B & **C**– Algae.

D– Fungi.

E, F & **G**– Plant Pathology, Algae or Fungi not asked above in random order.

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP5)

Plant Diversity IV (USBOP502)

Practical Paper – II

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q. 1A. Classify specimen **'A'** up to their families giving reasons. Give floral formula. Sketch neat and labeled L. S. of flower and T.S. ovary. 10

Q. 1B. Identify genus and species of specimen **'B'** using flora. 05

Q.2 Make a temporary double stained preparation of T.S. specimen **'C'** and comment on the type of secondary growth. 06

Q.3 Perform the Palynology experiment **'D'** allotted to you. 07

Q.4 Identify and describe slide/ specimen **'E', 'F', 'G'** & **'H'**. 12

Q.5 Field report 05

Q.6 Viva voce (based on Paper I and Paper II). 05

KEY

A– Families of T.Y.B.Sc only

B– Plants from F.Y & S.Y. B. Sc Families to be included

C– Anatomy Anomalous Secondary Growth

D– As per slip

E, F, G & **H**– Fossils, Types of Stomata, Morphology of flower & Morphology of Fruits Studied in Theory – in random order

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP6)

FORMS AND FUNCTION III (USBOP503)

Practical Paper – III

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1	Make a smear preparation of material **'A'** and show the slide to the Examiner. Comment on your observation / Expose the giant chromosomes from the salivary glands of *Chironomous* larva.	08
Q. 2	Perform the experiment **'B'** allotted to you (Physiology).	12
Q. 3	Perform the experiment **'C'** allotted to you (Ecology).	12
Q. 4.	Calculate the_____of the given solution **'D'** to prepare the required solution.	07
Q. 5.	Identify and describe slide/specimen **'E'** & **'F'**.	06
Q.6.	Journal.	05

KEY

B– Physiology experiment.

C– Ecology experiment.

D– Plant Tissue Culture.

E & **F**– Multiple shoot culture, Hairy root culture, Somatic embryogenesis, Amino acid sequencing.

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP6)

CURRENT TRENDS IN PLANT SCIENCE II (USBOP504)

Practical Paper – IV

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1.	Perform the experiment **A**– growth curve of *E.coli* / Isolate plasmid DNA and separate using AGE.	12
Q.2.	Perform the experiment **'B'** allotted to you.	10
Q.3.	Describe macroscopical /microscopical character with the help of neat and labelled sketches of specimens **'C'** and **'D'**. Perform the chemical test / TLC to identify the active constituents.	14
Q. 4	Identify and explain the specimens/ photographs **'E', 'F'** and **'G'**.	09
Q. 5.	Journal.	05

KEY

B– Experiment based on Beer- Lambert's Law Experiment on separation of dyes/pigments using silica gel column chromatography

C & **D**–*Allium sativum, Acorus calamus, Curcuma longa, Senna angustifolia, Strychnos nux-vomica Eugenia caryophyllata*

E, F & **G**– any stage of mushroom cultivation, any Plant from ethnobotany, problems on restriction mapping

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP7)

Plant Diversity IV (USBOP502) (For 3 Units)

Practical Paper – II

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q. 1A.	Classify specimen **'A'** up to their families giving reasons. Give floral formula. Sketch neat and labelled L.S. of flower and T.S. of ovary.	10
Q. 1B.	Identify genus and species of specimen **'B'** using flora.	05
Q.2	Make a temporary double stained preparation of T.S. specimen **'C'** and comment on the type of secondary growth.	06
Q.3	Perform the Palynology experiment **'D'** allotted to you.	07
Q.4	Identify and describe slide/ specimen **'E', 'F', 'G' & 'H'**.	12
Q.5	Field report	05
Q.6	Journal.	05

KEY

A– Families of T.Y.B.Sc only

B– Plants from F.Y & S.Y. B. Sc Families to be included

C– Anatomy Anomalous Secondary Growth

D– As per slip

E, F, G & **H**– Fossils, Types of Stomata, Morphology of flower & Morphology of Fruits Studied in Theory – in random order

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP7)

FORMS AND FUNCTION III (USBOP503) (For 3 Units)

Practical Paper – III

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1	Make a smear preparation of material **'A'** and show the slide to the Examiner. Comment on your observation / Expose the giant Chromosomes from the salivary glands of *Chironomous* larva.	08
Q. 2	Perform the experiment **'B'** allotted to you (Physiology).	12
Q. 3	Perform the experiment **'C'** allotted to you (Ecology).	12
Q. 4	Calculate the_____of the given solution **'D'** to prepare the required solution.	07
Q. 5	Identify and describe slide/specimen **'E'**& **'F'**.	06
Q.6.	Viva voce (based on Paper II and Paper III).	05

KEY

B– Physiology experiment.

C– Ecology experiment.

D– Plant Tissue Culture.

E & **F**– Multiple shoot culture, Hairy root culture, Somatic embryogenesis, Amino acid sequencing.

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER VI

(USBOP8)

Plant Diversity III (USBOP601)

Practical Paper – I

Duration: 9:00 am to 01:00 pm Max. Marks:50

1	Identify, classify and describe specimen **'A'** and **'B'**. Sketch neat and labelled diagrams of Morphological/Microscopical structures seen in the specimens.	12
2	Identify, classify and describe specimen **'C'** and **'D'**. Sketch neat and labeled diagrams of Morphological/Microscopical structures seen in the specimens.	12
Q.3	Identify, classify and describe specimen **'E'**. Sketch neat and labeled diagrams of Morphological/Microscopical structures seen in the specimens.	06
Q.4	Identify and describe slides/specimen **'F', 'G' 'H', 'I'** & **'J'**.	15
Q.5	Journal.	05

KEY

A & **B**– Bryophytes: *Marchantia, Pellia & Sphagnum*

C & **D**– Pteridophytes: *Lycopodium, Equisetum, Adiantum* & *Marsilea*

E– Gymnosperm: *Thuja, Gnetum & Ephedra*

F, G, H, I & **J**– Economic importance of Bryophytes, Economic importance of Pteridophytes Types of Sporophytes in Bryophyta, Types of Sori in Pteridophytes, Soral arrangement in Pteridophytes, Economic importance of Gymnosperms. (In random order)

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER VI

(USBOP8)

Plant Diversity IV (USBOP602)

Practical Paper – II

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q. 1 A.	Classify specimen **'A'** up to its family giving reasons. Give floral formula. Sketch neat and labeled L.S. of flower and T.S. ovary.	08
Q. 1.B.	Identify genus and species of specimen **'B'** using flora.	04
Q. 2	Make a stained preparation of specimen **'C'** and comment on its ecological anatomy.	06
Q.3.A	Calculate Simpson's Diversity Index from the given data **'D'**.	08
Q.3.B	Mark the Phytogeographic region **'E'** in the map of India and Comment on the same.	05
Q.4	Identify and describe slide/specimen **'F', 'G' & 'H'**.	09
Q.5	Field Report.	05
Q.6	Viva voce (based on Paper I and Paper II)	05

KEY

A– Families of T.Y.B.Sc Sem – VI only

B– Plants from F.Y., S.Y. & T.Y. B. Sc**.(**Sem – V Families to be included**)**.

C– Ecological anatomy.

F, G & **H**– Economic importance of specimen from prescribe families (Sem VI only)**,** Morphological Peculiarities of prescribed families (Sem – VI only), Embryology. (In random order)

UNIVERSITY OF MUMBAI

T.Y.B.Sc. BOTANY SEMESTER VI (USBOP9)

FORM AND FUNCTION III (USBOP603)

PRACTICAL III

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1	Perform the experiment **'A'** allotted to you.	10
Q.2	Perform the experiment **'B'** allotted to you.	10
Q.3	Make a squash preparation to show the stage of mitosis from the pre-treated root tips **'C'**.	05
Q.4	Construct a chromosome map from the given data **'D'** / Identify the type of mutation and comment on them (any two types of mutations)	10
Q.5	From the given data/ material **'E'** determine test of significance using students t-test/ Regression Analysis /ANOVA	10
Q.6	Journal.	05

KEY

A– Plant Biochemistry Experiment.

B– Plant Physiology Experiment.

UNIVERSITY OF MUMBAI

T.Y.B.Sc. BOTANY SEMESTER VI (USBOP9)

CURRENT TRENDS IN PLANT SCIENCE II (USBOP604)

PRACTICAL IV

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1	Perform the DNA barcoding of plant material using given data **'A'**.	12
	OR	
	Perform DNA sequencing by Sanger's method of the given sequence **'A'**.	12
Q.3	Perform the experiment **'B'** allotted to you.	12
Q.4	Perform the given analysis of data **'C'** using computer(Bioinformatics).	08
Q.5	Prepare the squash/Jam/jelly/pickle from the given material **'D'**.	12
Q.6	Viva voce. (Based on Paper III and Paper IV)	06

KEY

B– TLC of *Patchouli* or *Citronella* / Saponification value

C– BLAST / Multiple Sequence Alignment (MSA) / Phylogenetic Analysis / RASMOL / SPDBV

UNIVERSITY OF MUMBAI

T.Y.B.SC. BOTANY SEMESTER V (USBOP10)

Plant Diversity IV (USBOP602) (For 3 Units)

Practical Paper – II

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q. 1A.	Classify specimen **'A'** up to its family giving reasons. Give floral formula. Sketch neat and labeled L.S. of flower and T.S. ovary.	08
Q. 1.B.	Identify genus and species of specimen **'B'** using flora.	04
Q. 2	Make a stained preparation of specimen **'C'** and comment on its ecological anatomy.	06
Q.3.A	Calculate Simpson's Diversity Index from the given data **'D'**.	08
Q.3.B	Mark the Phytogeographic region **'E'** in the map of India and Comment on the same.	05
Q.4	Identify and describe slide/specimen **'F', 'G'** & **'H'.**	09
Q.5	Field Report.	05
Q.6	Journal	05

KEY

A– Families of T.Y.B.Sc Sem – VI only

B– Plants from F.Y., S.Y. & T.Y. B. Sc.(Sem – V Families to be included).

C– Ecological anatomy.

F, G & **H**– Economic importance of specimen from prescribe families (Sem VI only), Morphological Peculiarities of prescribed families (Sem – VI only), Embryology. (In random order)

UNIVERSITY OF MUMBAI

T.Y.B.Sc. BOTANY SEMESTER VI(USBOP10)

FORM AND FUNCTION III (USBOP603) (For 3 units)

PRACTICAL III

Duration: 9:00 am to 01:00 pm Max. Marks:50

Q.1	Perform the experiment **'A'** allotted to you.	10
Q.2	Perform the experiment **'B'** allotted to you.	10
Q.3	Make a squash preparation to show the stage of mitosis from the pre-treated root tips **'C'**.	06
Q.4	Construct a chromosome map from the given data **'D'**/ Identify the type of mutation and comment on them (any two types of mutations)	10
Q.5	From the given data/ material **'E'** determine test of significance using students t-test/ Regression Analysis /ANOVA	09
Q.6	Viva-voce. (based on Paper II and Paper III)	05

KEY

A– Plant Biochemistry Experiment.

B– Plant Physiology Experiment.

ReferenceBooks

1. A handbook of Ethnobotany by S.K. Jain, V. Mudgal
2. Plants in folk religion and mythology (Contribution to Ethnobotany by S.K.Jain3rd Rev.Ed).
3. Introduction to Plant Physiology by Noggle and Fritz, Prentice Hall Publishers(2002)
4. Plant Physiology by Salisbury and Ross CBS Publishers
5. Plant Physiology by Taiz and Zeiger Sinauer Associates Inc. Publishers,2002
6. Genetics by Russel Peter Adison Wesley Longman Inc. (5th edition)
7. An introduction to Genetic analysis Griffith Freeman and Company(2000)
8. Fundamentals of Biostatics by Rastogi, Ane Books Pvt. Ltd.(2009).
9. College Botany Vol I and II by Gangulee Das and Dutta Central Education enterprises.
10. Cryptogamic Botany Vol I and II by G M Smith, Mcg raw Hill
11. Industrial Microbiology by Cassida, New Age International, New Delhi
12. Industrial Microbiology Mac Millan Publications, New Delhi
13. Physiological Plant Anatomy by Haberlandt, Mac Millan and Company
14. Ayurveda Ahar by P H Kulkarni
15. Pharmacognosy by Kokate, Purohit and Gokhale, Nirali Publications
16. Bioinformatics by Sunder Rajan
17. Instant Notes on Bioinformatics by Westhead (2002), Taylor Francis Publications.
18. Bioinformatics by Ignasimuthu
19. DNA barcoding plants: taxonomy in a new perspective 2010. K Vijayan and C H Tsou, Current Science, 1530 –1541.
20. Introduction to Biostatistics by P K Banerjee, Chand Publication.
21. Plant Biotechnology by K. Ramawat
22. Practical Biochemistry by David Plummer, McGraw Hill Publ.
23. Economic Botany by A F Hill, TATA McGRAW-HILL Publishing Co. Ltd.
24. Post-Harvest Technology by Verma and Joshi, Indus Publication
25. Embryology of Plants by Bhojwani and Bhatnagar
26. Pollen Morphology and Plant Taxonomy by G. Erdtman, Hafner Publ. Co., N.Y.
27. A text Book of Palynology by K Bhattacharya, New Central Book Agency Pvt. Ltd., London
28. An introduction to Embryology of Angiosperms by P Maheshwari, McGraw Hill Book Co.
29. Plant Systematics by Gurcharan Singh, Oxford and IBH Publ.
30. Taxonomy of Vascular Plants by Lawrence George, H M, Oxford and IBH Publ.

AC 19-3-2012

Item No. 4.30

UNIVERSITY OF MUMBAI

Revised Syllabus for the S.Y.B.A./B.Sc.

Program: B.A./B.Sc.

Course: Foundation Course

Semester III & IV

(As Per Credit Based Semester and Grading System

with effect from the academic year 2012–2013)

Foundation Course
Semester III and IV
B.A. and B.Sc Programme
From the academic year 2013-14

Objectives

- Develop a basic understanding about issues related to human rights violations, ecology and urban-rural disparities in access to health and education
- Gain an overview of significant skills required to address competition in career choices
- Appreciate the importance of developing a scientific temper towards technology and its use in everyday life

Semester III Total Marks: 100 Lectures: 45

Unit 1 Human Rights Violations and Redressal (10 lectures)

A. **Types and nature** of human rights violations faced by vulnerable groups, namely the Scheduled Castes, Scheduled tribes, Women, Children and Minority communities
(3 lectures)

B. **Human Rights violations** faced by People with Disabilities and by the Elderly population
(1 lecture)

C. **Constitutional provisions and laws** protecting the rights of vulnerable groups-***(4 lectures)***
Right to Equality, Right to Freedom, Right against Exploitation.
Salient features ofsome important Acts like
The Prevention of Atrocities (Against SC/ST) Act, 1989;
The Domestic Violence Act, 2005; Vishakha Guidelines for Preventing Sexual Harassment at Workplace, 1997;
The Child Labour (Prohibition and Regulation) Act, 1986;
The Persons With Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995;

D. **Redressal mechanisms at the National and State levels- (2 lectures)**
The National Human Rights Commission (NHRC), the SC/ST Commission, the National Commission for Women; the Minorities Commission

Unit 2 Dealing With Environmental Concerns (10 lectures)

A. Threats to the environment arising from extinction, loss of habitat, degradation of environment, pollution, climate change ***(2 lectures)***

B. Some locally relevant case studies of environmental disasters ***(3 lectures)***

C. Concept of Disaster and general effects of Disasters on human life- physical, psychological,economic and social ***(2 lectures)***

D. Dealing with Disasters - Factors to be considered in Prevention, Mitigation (Relief and Rehabilitation) and disaster Preparedness ***(2 lectures)***

E. Human Rights issues in addressing disasters- issues related to compensation , equitable and fair distribution of relief and humanitarian approach to resettlement and rehabilitation ***(1 lecture)***

Unit 3Science and Technology I (10 lectures)

A. Development of Science- the ancient cultures, the Classical era, the Middle Ages, the Renaissance, the Age of Reason and Enlightenment ***(2 lectures)***

B. Nature of science- its principles and characteristics; Science as empirical, practical, theoretical, validated knowledge ***(1 lecture)***

C. Science and scientific temper- significance of observation and experimentation, empirical explanation and objectivity; scientific temper as a fundamental duty of the Indian citizen ***(2 lectures)***

D. Science and Superstition- the role of science in exploding myths, blind beliefs and prejudices; role of science and scientific temper in promoting tolerance and harmony in social groups ***(3 lectures)***

E. **Science in everyday life**- technology, its meaning and role in development; Interrelation and distinction between science and technology ***(2 lectures)***

Unit 4 Soft Skills for Effective Interpersonal Communication (8 lectures)

A

I) Effective Listening- importance and features
II) Verbal and non-verbal communication; public-speaking and presentation skills
III) Barriers to effective communication; importance of self-awareness and body language

(3 lectures)

B

I) Formal and Informal communication- purpose and types
II) Writing formal applications, Statement of Purpose (SOP) and resume
III) Preparing for Group Discussions, Interviews and Presentations ***(3 lectures)***

C

I) Leadership Skills and Self-improvement- characteristics of effective leadership
II) Styles of leadership and team building ***(2 lectures)***

Unit 5 Understanding Issues of Right to Health and Education(7 lectures)

A

I) Concept and Determinants of Health- holistic health including physical and mental well-being;
food security, adequate nutrition, safe drinking water and sanitation, healthy environment and working conditions, availability of healthcare and medical services, gender equality
II) Right to Health- right to a system of health protection to all without discrimination; right to prevention, treatment and control of diseases; Access to essential medicines;
III) Issues of access, affordability and availability in promoting Right to Health***(4 lectures)***

B

I) Right to Education- universalization of education and obstacles to free and compulsory education for all
II) Issues of access, affordability and availability in the education sector
III) Contemporary challenges in the Education sector-increasing privatisation of education, decreasing fund allocation by Government ***(3 lectures)***

Unit 6 Projects/Assignments (15 lectures)

Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Unit 1 to Unit 5**. Students should be given a list of possible topics- at least 3 from each unit at the beginning of the semester. The project/assignment can take the form of street-

plays/power-point presentations/poster exhibitions and similar other modes of presentation appropriate to the topic; students can work in groups of not more than 8 per topic. Students must submit a hard/soft copy of the project/assignment before appearing for the semester end exam.

15 lectures will be assigned for project guidance.
Unit 6 will not be assessed in the semester end exam.

Assessment Pattern

The student will be assessed on the basis of Internal Assessment of 40 marks and a Semester End Exam of 60 marks. The student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 16 out of 40 in Internal Assessment and 24 out of 60 in Semester End Exam.

Internal Assessment:

- There will **be one mid-semester test of 10 marks on Units 1 and 2;**
- The test will, as far as possible, comprise of objective questions and/or short notes.
- The student will have to submit **an assignment/project for 20 marks** before appearing for the Semester End Exam. This assignment/project will be **on any topic from Units 1 to 5** (as explained in Unit 6 in the syllabus) and can take the form of street-plays/exhibition/power-point presentations or similar other modes suitable to the topic selected; students can work in groups of not more than 8 for the purpose of this assignment. Students will have to **submit a hard/soft copy** of the assignment before appearing for the Semester End Exam. The assignment/project will be assessed **for 20 marks of which 10 marks will be allotted for the presentation OR a viva,** to assess the level of engagement of the student with the topic assigned.
- **10 marks will be allotted to the overall participation** in classroom learning, and skills of articulation, teamwork and leadership exhibited during the course in organizing related learning activities, as clarified in the University manual for Credit-Based Semester System.

Question Paper Pattern

There will be four questions in all with internal divisions as follows:

Question Number 1, 2 and 3 will be on Unit Numbers 1, 2 and 3 respectively each carrying 15 marks.

Each of these questions will be sub-divided into one long answer question for 9 marks, having internal choice; and one short answer question for 6 marks having internal choice.

Question number 4 will be on Unit Numbers 4 and 5 and will be short notes, each carrying 5 marks. Students will have a choice of answering 3 short notes out of 6.

The Question paper therefore will read as follows:

Question 1 (on unit 1) **15 marks**

1a) or 1b) long answer	**(9 marks)**
1c)or 1d) short answer	**(6 marks)**

Question 2 (on unit 2) **15 marks**

2a) or2b) long answer	**(9 marks)**
2c) or 2d) short answer	**(6 marks)**

Question 3 (on unit 3) **15 marks**

3a) or3b) long answer	**(9 marks)**
3c) or3d) short answer	**(6 marks)**

Question 4 (on units 4 and 5) **15 marks**

Any three short notes

4a, 4b, 4c, 4d, 4e, 4f, 4g	**(5 marks each)**

NOTE: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Arts and the Faculty of Science and passed by the Academic Council from time to time.

Semester IV **Total Marks: 100** **Lectures: 60**

Unit 1Significant Rights of Citizens (10lectures)

A. **Rights of Consumers**-right to safety, right to be informed, right to choose, right to be heard,right to seek redressal, right to consumer education;
Violations of consumer rights and important provisions of the Consumer Protection Act, 1986;
Other important laws to protect consumers, like- Indian Contract Act, 1872, Sale of Goods Act, 1930, The Essential Commodities Act, 1955, The Prevention of Food Adulteration Act, 1955, The Standards of Weights and Measures Act, 1976
Consumer courts and consumer movements ***(4 lectures)***

B. **Right to Information**- Genesis and relation with transparency and accountability; important provisions of the Right to Information Act, 2005; some success stories
(3 lectures)

C. **Protection of Citizens'/Public Interest**-Public Interest Litigation, need and procedure to file a PIL; some landmark cases. ***(3 lectures)***

Unit 2Ecology:Approaches, Ethics and Issues (9 lectures)

A. **Understanding approaches to ecology**- Anthropocentrism, Biocentrism and Eco centrism, Ecofeminism and Deep Ecology ***(3 lectures)***

B. **Environmental Ethics**- Libertarian ethics, Ecologic Extension and Conservation; concept of intrinsic and extrinsic value of human and non-human life; eco spirituality. ***(3 lectures)***

C. **Some significant principles and issues**- 'polluter pays' principle and global and local issues of fair share of carbon space ***(3 lectures)***

Unit 3Science and Technology II (10 lectures)

A. **Technology and Development**- the interconnectedness between growth of technology and development of societies ***(2 lectures)***

B. **Some significant modern technologies, their basic features and applications**:***(6 lectures)***

Laser Technology- Light Amplification by Stimulated Emission of Radiation"; use of laser in remote sensing, GIS/GPS mapping, medical use

Satellite Technology- various uses in satellite navigation systems, GPS, and inprecise climate and weather analyses

Information and Communication Technology- electronic systems such as telecommunication, radio, television, video and internet aided by computer-based information systems; convergence of various technologies like satellite, computer and digital in the information revolution of today's society

Biotechnology and Genetic engineeriong- applied biologyand uses in medicine, pharmaceuticals and agriculture; genetically modified plant, animal and human life**Nanotechnology**- definition: the study, control and application of phenomena and materials at length scales below 100 nm; uses in medicine, military intelligence and consumer products

C. Issues of Control, Access and Misuse of Technology ***(2 lectures)***

Unit 4 Introduction to Competitive Exams (9 lectures)

A. Basic information on Competitive Exams- the pattern, eligibility criteria and local centres:

Exams conducted for entry into professional courses- Graduate Record Examinations (GRE), Graduate Management Admission Test GMAT), Common Admission Test (CAT) and Scholastic Aptitude Test (SAT)

Exams conducted for entry into jobs by Union Public Service Commission, Staff Selection Commission (SSC), State Public Service Commissions, Banking and Insurance sectors, and the National and State Eligibility Tests (NET/SET) for entry into teaching profession

(3 lectures)

[NOTE: Students will not be tested on above topics]

B. Soft skills required for competitive exams-

i) Information on areas tested- Quantitative Ability, Data Interpretation, Verbal Ability and Logical Reasoning, Creativity and Lateral Thinking

ii) Motivation- concept, theories and types of motivation

iii) Goal-setting- types of goals, SMART goals, Stephen Covey's concept of human endowment

iv) Time Management- effective strategies for time management ***(6 lectures)***

Unit 5 Urban-Rural Disparities in Development (7 lectures)

A. Concept of 'rural', 'tribal', 'semi-urban' and ' urban'; disparity in availability of services like health, education, transport, electricity and employment ***(2 lectures)***

B. Distribution of natural resources like land, water and forests in rural and urban areas; changing land-use and impact on rural life ***(2 lectures)***

C. Increasing urbanisation and growth of megacities- issues of adequate water availability, affordable housing, transport/traffic congestion, waste management and social tension

(3 lectures)

Unit 6 Projects/Assignments (15 lectures)

Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Unit 1 to Unit 5**. Students should be given a list of possible topics- at least 3 from each unit at the beginning of the semester. The project/assignment can take the form of street-plays/power-point presentations/poster exhibitions and similar other modes of presentation appropriate to the topic; students can work in groups of not more than 8 per topic. Students must submit a hard/soft copy of the project/assignment before appearing for the semester end exam.

Unit 6 will not be assessed in the semester end exam.

Assessment Pattern

The student will be assessed on the basis of Internal Assessment of 40 marks and a Semester End Exam of 60 marks. The student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 16 out of 40 in Internal Assessment and 24 out of 60 in Semester End Exam.

Internal Assessment:

- There will be **one mid-semester test of 10 marks on Units 1 and 2;**
- The test will, as far as possible, comprise of objective questions and/or short notes.
- The student will have to submit an **assignment/project for 20 marks** before appearing for the Semester End Exam. This assignment/project will be **on any topic from Units 1 to 5** (as explained in Unit 6 in the syllabus) and can take the form of street-plays/exhibition/power-point presentations or similar

other modes suitable to the topic selected; students can work in groups of not more than 8 for the purpose of this assignment. Students will have to submit a hard/soft copy of the assignment before appearing for the Semester End Exam. The assignment/project will be assessed **for 20 marks of which 10 marks will be allotted for a viva**, to assess the level of engagement of the student with the topic assigned.

 10 marks will be allotted to the overall participation in classroom learning, and skills of articulation, teamwork and leadership exhibited during the course in organizing related learning activities, as clarified in the University manual for Credit-Based Semester System.

Question Paper Pattern

There will be four questions in all with internal divisions as follows:

Question Number 1, 2 and 3 will be on Unit Numbers 1, 2 and 3 respectively each carrying 15 marks.

Each of these questions will be sub-divided into one long answer question for 9 marks, having internal choice; and one short answer question for 6 marks having internal choice.

Question number 4 will be on Unit Numbers 4 and 5 and will be short notes, each carrying 5 marks. Students will have a choice of answering 3 short notes out of 6.

The Question paper therefore will read as follows:

Question 1 (on unit 1) **15 marks**

1a) or 1b) long answer **(9 marks)**

1c) or 1d) short answer **(6 marks)**

Question 2 (on unit 2) **15 marks**

2a) or 2b) long answer **(9 marks)**

2c) or 2d) short answer **(6 marks)**

Question 3 (on unit 3) **15 marks**

3a) or 3b) long answer **(9 marks)**

3c) or 3d) short answer **(6 marks)**

Question 4 (on units 4 and 5) **15 marks**

Any three short notes

4a, 4b, 4c, 4d, 4e, 4f, 4g **(5 marks each)**

NOTE: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Arts and the Faculty of Science and passed by the Academic Council from time to time.

Suggested Readings for Foundation Course Semester III and IV

[Note: This is not an exhaustive or prescriptive list; it is merely suggested reading]

Unit 1 (Human Rights, Consumer Rights, Public Interest)

Shivananda, J. **Human Rights. Alfa Publications, New Delhi,. 2006**

Rajawat, M. **Human Rights and Dalits.Anmol Publications, New Delhi, 2005**

Kaushal, R. **Women & Human Rights in India; Kaveri Books, New Delhi, 2000**

Bajpai, A. **Child Rights in India; Oxford University Press; New Delhi; 2003**

Biju, M.R. **Human Rights in a Developing Society; Mittal Publications, New Delhi, 2005**

Prakash Kumar &Rai, K. B. **Right to Know; Vikas Publishing House, NOIDA, 2008**

Naib, Sudhir **The Right to Information Act,2005: A Handbook; OUP, New Delhi; 2011**

Sathe, S. P. **Judicial Activism in India; OUP; New Delhi, 2002**

Unit 2 (Ecology)

Satpathy, N. Sustainable Development (An Alternative Paradigm); Karnavati Publications, Ahmedabad,

Pachauri R.K & 1998Srivastava L. (eds.)Global Partners for Sustainable Development; Tata Energy Research Institute, New Delhi; 1994

Shiva, Vandana Ecology and the Politics of Survival: Conflict over Natural Resources in India; Sage Publications, California, 1991

Pereira, W Inhuman Rights: The Western System and Global Human Rights Abuse; Apex Press; 1997

Pereira, W & Seabrook J Asking the Earth: Farms, Forestry and Survival in India; Earthscan Publications; 1991

Goel, S.L. Encyclopedia of Disaster Management, Vol. I, II & III; Deep and Deep Publications Pvt. Ltd., New Delhi; 2006

Parasuraman S. & Unnikrishnan P.V: India Disasters Report; Oxford University Press, New Delhi, 2000

Unit 3 (Science and Technology)

Encyclopaedia of Science and Technology; McGraw - Hill Publication

J B S Haldane Science and Everyday Life ; Macmillan, 1941. Penguin, Ayer Co. 1975

reprint: ISBN 0-405-06595-7

Kleinman Daniel Lee Science and Technology in Society; John Wiley and Sons; 2005

Unit 4 (Effective Communications Skills)

Covey, Stephen 7 Habits of Highly Effective People; Free Press, 2004

Iyer, Prakash **The Habit of Winning; Penguin, India; 2011**

Goldratt, Eliyahu **The Goal; The Northriver Press; 3rd Edition; 2004**

Goldratt, Eliyahu **It's Not Luck; The Northriver Press; 1994**

Unit 5 (Health, Education, Urban-Rural Issues)

AzimPremji Foundation **The Social Context of Education in India;2004. www.azimpremjifoundation.org/;**

Higher Education in India; UGC Report; 2003

Chaterjee, C &Sheoran, Gunjan **Health and Human Rights; Vulnerable Groups in India, CEHAT, Mumbai May 2007**

Datta, Prabhat **The Great Indian Divide; Frontline;Volume 21 - Issue 14, Jul. 03 - 16, 2004**

Kundu, Amitabh **Rural Urban Economic Disparities in India: Database and Trends; December 2010; http://www.indiapolicyforum.org/node/21**

UNIVERSITY OF MUMBAI
No. UG/17 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office Circular No. UG/153 of 2017-18, dated 3rd August, 2017 relating to syllabus of the Bachelor of Science (B.Sc.) degree course.

They are hereby informed that the recommendations made by the Board of Studies in Zoology at its meeting held on 9th April, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.32 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.Sc. in Zoology (Sem -V & VI), has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
14th June, 2018

To

The Principals of the affiliated Colleges & Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.32/05/05/2018

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No. UG/17 -A of 2018 MUMBAI-400 032 14th June, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Zoology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

UNIVERSITY OF MUMBAI

Program: B.Sc.

Course: Zoology

Syllabus for Semester V & VI

(with effect from the academic year 2018-19)

Credit Based Semester and Grading System
- with a Choice for Additional Credits

Syllabus Framing Committee Members' List 2018-2019

Vinayak Dalvie (Convenor)
Capt. Dr. A. A. Dalvi (Co-Convenor)
Dr. Mrinalini Kagwade (Co-Convenor)
Dr. Vinod Ragade (Co-Convenor)
Dr. Sharad Mahajan (Co-Convenor)
Dr. Kishori Sinnarkar (Co-Convenor)
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Ms. Neha Vajandar
Ms. Uma Bandekar
Ms. Shagufa Shaikh
Ms. Reena Patil
Ms. Nausheen Shaikh
Ms. Kranti Patil

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6. Practical Syllabus for Semester V (Course code: USZOP05)

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PREFACE

Revision of Syllabus, an integral part of educational institutions and one of the important functions of Board of Studies of any University, is an opportunity to revisit what is being taught and what ought to be taught to learners in the landscape of changing times.

A great initiative in the form of, prior to and during the process of curriculum design, involving various stakeholders has been a hallmark of the syllabus committee for Zoology in general and the committee for T. Y. B. Sc. Zoology, SEM V and SEM VI in particular. It is after a lot of hard work in a true team spirit that this syllabus has been prepared and presented for coming into force from the Academic Year 2018-2019.

Human beings are an intricate and unique entity of the 'Kingdom Animalia.' It is no wonder that students of yore and the present day are drawn to the subject of Zoology in all aspects of life and living, like iron to magnet. This poses a challenge while designing a curriculum since the young minds attracted to the subject, thought passionate about the subject may possess differential abilities to grasp the subject and may do so at their own pace.

The curriculum has thus to be designed not only to engage interest, to stimulate and inspire the learner but also to kindle the spirit of inquiry. The syllabus presented herewith for implementation with effect from the academic year 2018-19, in the subject of Zoology also is an instrument to inculcate in the learner the culture of critical thinking.

The scope of the curriculum therefore has to be wider incorporating elements of traditional as well as contemporary and even futuristic dimensions of the particular area of study. This aspect of curriculum design has been exemplarily met with by this syllabus in Zoology for SEM V and SEM VI at T. Y. B. Sc.

Another important consideration for the syllabus committee is to incorporate in the architectural design of the curriculum, the scope for teachers to use classical as well as contemporary technological tools of pedagogy with an aim to connect and cater to all types of learners including slow learners as well as the advanced ones. This syllabus with clearly stated objectives and outcomes, unit-wise, is one of the best examples of being an instrument of mixed pedagogy available to the teachers.

In spite of constraints in the form of having to teach curricula without including any dissection in the course of study, the syllabus committee has designed the syllabus keeping the classical flavour of the subject intact.

A unique feature of this syllabus is its unique blend of standardization and customization creating a vibrant ecosystem of teaching-learning for the teacher to function as a facilitator and mentor and for the student to take a few steps towards being a motivated student and an autonomous learner.

I place on record, appreciation for all members of the syllabus committee as well as the dynamic and visionary leader in the form of convenor of the syllabus committee, and congratulate them all, on behalf of faculty members and students of Zoology, for having designed this progressive syllabus for T. Y. B. Sc. (SEM V and SEM VI) in Zoology, to be implemented from the academic year 2018-19.

Dr. (Mrs.) V. I. Katchi
Convenor,
Interim BOS in Zoology.

PREAMBLE

Zoology has emerged as a progressive subject in the last decade with innovations in curricular designing and unique initiatives which attracted students, both from urban as well as rural colleges, in large numbers towards this subject. Experiments such as Need Based Flexi Syllabus, Open Unit to include latest topics any time before revision of syllabus, Pyramid Committee for continuity from Semester I to Semester VI, Workshop with Indian Merchants' Chamber for industry - academia interface, Workshop with the meritorious past students and current students for their inputs, uploading Draft Syllabus on the University website for Public Criticism, one month prior to BoS, etc., fetched rich dividends. The fundamental challenge however, was to design curricula without dissections, the backbone of the subject. We Zoologists though are firmly against cruelty to animals and practice conservation, had to take it with a pinch of salt that the dead table fish from the market and pests were also banned for dissection.

In keeping with the traditions this time the learners' space has been incorporated in the syllabus for the advanced learners and Research Based Pedagogical Tools (RBPT) are recommended for a unit after three days workshop organised by IISER and British Council Library, attended by good number of Zoology teachers from the rural area. Application of RBPT is optional. RBPT will be explained again in the post amendment workshop.

After conducting workshops for teachers and students, both in urban and rural areas, it was felt that the research project may be incorporated for additional credits only for the students who wish to pursue higher specialised studies and who may opt for a career in research oriented fields. Apart from a project in the Applied Component such students may present a research project under the guidance of a teacher from their college or any other college or from the industry or may do so on their own which shall be evaluated by the examiners at the time of the practical examinations and that the performance shall be considered separately as additional optional credits, based on the free choice of student and if permitted by the authorities then the same could be transferred to the other / higher programs if desired. It's a modest attempt of bringing choice based credit system with an option of transfer in the main stream academics of the University on the lines of the pioneering effort successfully launched in the subject of NCC, when introduced as an elective in academics.

Care has also been taken to include a unit on muscles which was much neglected so far in anatomy. Possibility cannot be ruled out that it may give further impetus to Zoology students to enter the career of Gym and Fitness. This niche of students shall have upper hand over other personnel in the fitness industry in passing international exams since they already have knowledge of physiology to a desired extent.

I am happy to present this syllabus for consideration of the authorities and I sincerely thank all the members who represented teachers, students, rank holders, people from the industry and interdisciplinary background, scientists from India and abroad, and a journalist from Sawantwadi who is an activist in biodiversity conservation. The draft was on University website for 2 months which gave ample opportunity to the society in general and teachers in particular to criticise. I thank all those who contributed suggestions. Lastly, on behalf of all the Zoologists, I thank the staff of Academic Authorities Unit who has blended so well with teachers that the product is innovations experimented successfully.

- Vinayak Dalvie
Convenor,
T. Y. B. Sc. Syllabus Committee in Zoology

PEDAGOGY

The syllabus framed by taking views of all the stakeholders, both from urban and rural areas into consideration and providing scope to the advanced learners without posing challenges before the average and above average students, certainly needs dynamic pedagogy with range of variations to deliver the objectives with desired outcome.

Course codes USZO501 and USZO601 attempt to make the learners understand the principles of taxonomy, levels of organisations, modern classification up to class and the evolutionary significance of various levels of organization like symmetry, coelom, segmentation, etc. It is desirable to take students in the field, rather than the classroom, and practice experiential learning making taxonomy live and interesting. It won't be an exaggeration if one feels that even protozoans could be observed from natural sample in the field by carrying a microscope. Ideally students should draw diagram of an organism / animal as they perceive through observation rather than copying a diagram from a book into the journal. Various schools of classification make it debatable. Care has been taken to adopt the latest approach and through appropriate pedagogical tools students should be able to attribute characters of a specimen up to specific class.

Course USZO502 introduces various aspects of human blood, clinical disorders and their diagnosis. The significance of the diagnostic tools must be stressed upon as they are relevant to human health. Teachers are expected to elucidate the scope of haematology and immunology as career options in the field of pathology. IISER, Pune in collaboration with British Council is advocating Research Based Pedagogical Tools through workshops sponsored by MHRD government of India. It is suggested that Unit II - Applied Haematology, of this course can also be taught, alternatively, using RBPT. The subtopics are in context to the real life and have a scope of research-based learning through actual laboratory work under the observation of their teachers. The knowledge base of blood and its components that the learners already have can be further enhanced through various activities that learners can undertake in order to relate the theory with the practicals and understand the clinical significance of various diagnostic tests. Course USZO602 includes enzymology, homeostasis and animal tissue culture. Documentaries based on nature and wild life can be effectively used to create interest in the learners about adaptive responses of animals to environment for their survival. Industrial visits, invited talks from industry persons will help in generating awareness about industrial significance of enzymes. Theory supplemented with hands-on practical on sterilization and culture techniques will help the learner to appreciate the importance of animal tissue culture. Visits to departments of microbiology and biotechnology in the institution may be encouraged to interact with teachers & students so as to create more interest. Student led seminars are a self-learning interactive method that may be encouraged.

The topics covered under course USZO503 includes Mammalian Histology, Basic Toxicology, General Pathology and Biostatistics. Microtomy, reintroduced, could be effectively used not only as a histo-pathological tool for clinical pathology but also to emphasize its applications in research. The toxicology studies can be made interesting by emphasizing its importance in pharmaceuticals and additionally the insights into regulatory aspect can be given to understand the practical difficulties and the norms associated with toxicity testing. Study visit to the pathological laboratory planned for unit II could also cover these aspects. Application of biostatistics in interpretation and validation of experimental data should be highlighted. The learners could be introduced to statistical software which have their applications in biostatistics. Course USZO603 includes Molecular Biology, Genetic Engineering, Human Genetics and Bioinformatics. Molecular biology and genetic engineering could be taught using ICT and videos available online. It is recommended to have an

industrial interface. Teachers are expected to explain the scope of gene manipulation techniques in medical science as well as industry. Through ICT, various concepts of bioinformatics such as protein sequencing, construction of evolutionary trees etc. can be taught. Use of available software in public domain to study human diseases could be focused on. The practical utilization of bioinformatics in preparing probes using database could be stressed.

A synergistic pedagogical approach between the theory and practical course of USZO504 could help in better understanding of the various subtopics such as integumentary system, osteology and the developmental stages of chick embryo. There is a scope for using ICT related teaching tools that would help in understanding the structural and the functional aspects of epidermal and dermal derivatives, various fore limb and hind limb muscles and their arrangement etc. Syllabus of the USZO604 deals with the various environmental issues and their management. Guest lectures could be arranged of the experts from such fields who can provide additional insights to these aspects. Informative documentaries based on wildlife conservation as well as human-animal conflict could make the topics relevant and interesting. Apart from formal teaching group discussion and experience sharing could be practiced for bioprospecting and zoopharmacognosy. Case studies could be supplemented with to understand the patterns of distribution of different animal species throughout the globe.

The learners' space provided in the syllabus is an effort to shift the pedagogy from being teacher-centric to learner-centric. It will be supportive to enthusiastic learners in gaining extra knowledge through various suggested activities to make their concepts impeccable and gain additional subject knowledge. Research project (USZOR01 and USZOR02), which is optional having additional credits could be mentored by the teachers encouraging more and more students to opt with a view to inculcate research culture.

- Co-Convenors

Syllabus for T. Y. B. Sc. Course: ZOOLOGY
Credit Based Semester and Grading System - with a Choice for Additional Credits
(To be implemented from the Academic Year 2018-2019)

SEMESTER - V					
THEORY					
COURSE NO.	**COURSE CODE**	**UNIT**	**TOPICS**	**CREDITS**	**LECTURES/ WEEK**
11	USZO501	I	Principles of Taxonomy	2.5	1
		II	Kingdom: Animalia I		1
		III	Kingdom: Animalia II		1
		IV	Type study: *Sepia*		1
12	USZO502	I	Basic Haematology	2.5	1
		II	Applied Haematology		1
		III	Basic Immunology		1
		IV	Applied Immunology		1
13	USZO503	I	Mammalian Histology	2.5	1
		II	Toxicology		1
		III	General Pathology		1
		IV	Biostatistics		1
14	USZO504	I	Integumentary system and derivatives	2.5	1
		II	Human Osteology		1
		III	Muscles of long bones of Human limbs		1
		IV	Developmental biology of Chick		1
				10	**16**
PRACTICAL					
USZOP05	Practicals based on all four courses			**06**	**16**
Total Number of Credits and Workload				**16**	**32**
Research Project					
USZOR01	Additional Credits (Choice Based / Optional)			**1**	**No Workload for Teachers**

Syllabus for T. Y. B. Sc. Course: ZOOLOGY
Credit Based Semester and Grading System - with a Choice for Additional Credits
(To be implemented from the Academic Year 2018-2019)

SEMESTER - VI					
THEORY					
COURSE NO.	**COURSE CODE**	**UNIT**	**TOPICS**	**CREDITS**	**LECTURES/ WEEK**
15	USZO601	I	Phylum Chordata: Group Protochordata and Group Euchordata I	2.5	1
		II	Group Euchordata II		1
		III	Group Euchordata III		1
		IV	Type study: Shark		1
16	USZO602	I	Enzymology	2.5	1
		II	Homeostasis		1
		III	Endocrinology		1
		IV	Animal Tissue Culture		1
17	USZO603	I	Molecular Biology	2.5	1
		II	Genetic Engineering		1
		III	Human Genetics		1
		IV	Bioinformatics		1
18	USZO604	I	Environment management	2.5	1
		II	Wildlife management		1
		III	Bioprospecting and Zoopharmacognosy		1
		IV	Zoogeography		1
				10	**16**
PRACTICAL					
USZOP06	Practicals based on all four courses			**06**	**16**
Total Number of Credits and Workload				**16**	**32**
Research Project					
USZOR02	Additional Credits (Choice Based / Optional)			**1**	**No Workload for Teachers**

T. Y. B. Sc. Zoology: Semester V (Theory)
Course Code: USZO501:
Taxonomy - Invertebrates and Type Study
Course 11

Unit I: Principles of Taxonomy (15L)

Objective:

- *To introduce the principles of taxonomy and modern system of classification in animal kingdom with evolution point of view.*

Desired outcome:

- *Learners will apprehend the basis of classification and modern classification up to class of the lower invertebrate animals.*

1.1: Levels of Organization:

1.1.1: Unicellularity, colonization of cells, multicellularity

1.1.2: Levels of Organization: Acellular, Cellular, Tissue level, Organ level and 'Organ-system' level

1.2: Symmetry

1.2.1: Basic concept and definition

1.2.2: Types:

a. Asymmetry: e.g. *Amoeba*
b. Radial symmetry: e.g. Starfish
c. Bi-lateral symmetry: e.g. Invertebrate - Planaria
Vertebrate - Man

1.2.3: Evolutionary significance of symmetry

1.3: Coelom

1.3.1: Basic concept and definition

1.3.2: Formation of coelom

1.3.3: Types:

a. Acoelomate: Platyhelminthes e.g. Liverfluke
b. Pseudocoelomate: Nematoda e.g. Roundworm
c. Coelomate: e.g. Frog

1.3.4: Evolutionary significance of coelom

1.4: Metamerism

1.4.1: Basic concept and definition

1.4.2: Types:

a. Pseudometamerism: e.g. Tapeworm

b. True metamerism:
   i. Homonomous - Annelida e.g. *Nereis*
   ii. Heteronomous - Cephalization - Insecta e.g. Dragonfly
   Cephalothorax - Crustacean e.g. Lobster

1.4.3: Evolutionary significance of metamerism

1.5: Taxonomy

1.5.1: Basic concept, definition and objectives

1.5.2: Linnaean Hierarchy, Binomial Nomenclature

1.5.3: Six Kingdom classification:

General characters of each Kingdom with examples:

- Kingdom Archaebacteria
- Kingdom Eubacteria
- Kingdom Protista
- Kingdom Fungi
- Kingdom Plantae
- Kingdom Animalia

1.6: Kingdom Protista: Animal like Protists: Protozoa

1.6.1: General characters of Protozoa

1.6.2: Classification of Protozoa with distinguishing features and suitable examples:

- Phylum Sarcomastigophora
  - Class Sarcodina e.g. *Amoeba*
  - Class Mastigophora e.g. *Trypanosoma*
- Phylum Ciliophora
  - Class Ciliata e.g. *Opalina*
  - Class Phyllopharyngea e.g. *Dysteria*
- Phylum Sporozoa
  - Class Aconoidasida e.g. *Plasmodium*
  - Class Conoidasida e.g. *Toxoplasma*

Unit II: Kingdom Animalia I **(15L)**

Objective:

- *To comprehend the general characters and classification of Kingdom Animalia from Porifera to Nematoda and specific characters of organisms belonging to these phyla.*

Desired outcome:

- *The learners will be familiarized with classification up to phylum Nematoda along with their examples.*

2.1: Phylum Porifera

a. General characters
b. Classification up to class with distinguishing features and suitable examples:
   - Class Calcarea e.g. *Leucosolenia (Branched sponge)*

- Class Hexactinellida e.g. *Hyalonema* (Glass-rope sponge)
- Class Demospongia e.g. *Euspongia* (Bath sponge)

2.2: Phylum Cnidaria

a. General characters
b. Classification up to class with distinguishing features and examples
   - Class Hydrozoa e.g. *Hydra*
   - Class Scyphozoa e.g. *Aurelia* (Jelly fish)
   - Class Anthozoa e.g. *Meandrina* (Maze Coral)

2.3: Phylum Platyhelminthes

a. General characters
b. Classification up to class with distinguishing features and examples
   - Class Turbellaria e.g. *Dugesia* (Planaria)
   - Class Trematoda e.g. *Schistosoma* (Blood-fluke)
   - Class Cestoda e.g. *Taenia* (Tapeworm)
c. Morphology, life cycle and pathogenicity of *Fasciola hepatica*

2.4: Phylum Nematoda

a. General characters
b. Classification up to class with distinguishing features and examples
   - Class: Aphasmida (Adenophorea) e.g. *Trichinella* (Trichina worm)
   - Class: Phasmida (Secernentea) e.g. *Ascaris* (Roundworm)

Unit III: Kingdom Animalia II **(15L)**

Objective:

- *To introduce basic concepts of classification up to class in animal kingdom from phylum Annelida to Hemichordata and to familiarize with their characters.*

Desired outcome:

- *Learners will get an idea of higher groups of invertebrate animal life, their classification and their peculiar aspects.*

3.1: Phylum Annelida

3.1.1: General characters

3.1.2: Classification up to class with distinguishing features and examples
   - Class Polychaeta e.g. *Neries* (Clamworm)
   - Class Oligochaeta e.g. *Pheretima* (Earthworm)
   - Class Hirudinea e.g. *Hirudinaria* (Leech)

3.2: Phylum Arthropoda

3.2.1: General characters

3.2.2: Classification up to class with distinguishing features and examples
   - Subphylum Chelicerata
     - Class Arachnida e.g. *Hottentotta* (Scorpion)
     - Class Merostomata e.g. *Limulus* (Horse-shoe crab)
     - Class Pycnogonida e.g. *Nymphon* (Sea spider)

- Subphylum Crustacea
  - Class Malacostraca e.g. *Scylla* (Crab)
  - Class Maxillipoda e.g. *Balanus* (Barnacle)
- Subphylum Uniramia
  - Class Chilopoda e.g. *Scolopendra* (Centipede)
  - Class Diplopoda e.g. *Xenobolus* (Millipede) ·

  Class Insecta e.g. *Attacus* (Moth)

3.3: Phylum Mollusca

3.3.1: General characters of the Phylum

3.3.2: Classification up to class with distinguishing features and examples

- Class Aplacophora e.g. *Chaetoderma* (Glisten worm solenogaster)
- Class Polyplycophora e.g. *Chiton* (Coat-of-mail shell)
- Class Monoplacophora e.g. *Neopilina*
- Class Gastropoda e.g. *Nerita* (Nerit)
- Class Pelecypoda e.g. *Solen* (Razor clam)
- Class Scaphopoda e.g. *Dentalium* (Tusk shell)
- Class Cephalopoda e.g. *Nautilus* (Pearly nautilus)

3.4: Phylum Echinodermata

3.4.1 General characters

3.4.2 Classification up to class with distinguishing features and examples

- Class Asteroidea e.g. *Protoreaster* (Starfish)
- Class Ophiuroidea e.g. *Ophiothrix* (Brittle star)
- Class Echinoidea e.g. *Clypeaster* (Sand dollar)
- Class Holothuroidea e.g. *Cucumaria* (Sea cucumber)
- Class Crinoidea e.g. *Antedon* (Sea lily)

3.5 Minor phyla

3.5.1: General characters along with examples of

- Phylum Acanthocephala e.g. *Moniliformis*
- Phylum Onychophora e.g. *Peripatus* (Velvet worm)
- Phylum Chaetognatha e.g. *Sagitta* (Arrow worm)

3.5.2: *Peripatus*, a connecting link - Affinities with Phylum Annelida, Arthropoda and Mollusca.

3.6 Phylum Hemichordata

3.6.1: General characters, classification with distinguishing features and examples

- Class Enteropneusta e.g. *Balanoglossus* (Acorn worm)
- Class Pterobranchia e.g. *Rhabdopleura*
- Class Planctosphaeroidea e.g. *Planctosphera*

3.7 Basic concepts of phylogeny: Phylogenetic tree of invertebrates

Unit IV: Type study: *Sepia* **(15L)**

Objective

- *To acquaint learners with the details of Sepia as a representative of invertebrate animals.*

***Desired* outcome**

- *Learners will get an idea of general characteristics and details of invertebrate animal systems.*

4.1: General characters and classification, Habit and habitat, External characters, mantle cavity, locomotion, economic importance

4.2: Digestive system, Respiratory system, Circulatory system, Excretory system, Nervous system and Sense organs, Reproductive system

Course Code: USZO502:
Haematology and Immunology
Course 12

Unit I: Basic Haematology (15L)

Objectives:

- *To introduce to the learner the composition of blood, haemorrhage and haematopoiesis.*
- *To acquaint the learner with the physiology of blood clotting and clinical aspects of haematology.*

Desired outcome:

- *The learner shall comprehend basic haematology.*
- *The learner will be able to identify various components of haemostatic systems.*

1.1: Composition of plasma: Water, respiratory gases, dissolved salts, plasma proteins, nutrients, enzymes, hormones, nitrogenous waste products

1.2: Haematopoiesis: Erythropoiesis, leucopoiesis and thrombopoiesis

1.3: Erythrocytes: Structure and functions, abnormalities in structure, total count, variation in number; ESR; types of anaemia

1.4: Haemoglobin: Structure, formation and degradation; variants of haemoglobin (foetal, adult), abnormalities in haemoglobin (sickle cell and thalassemia)

1.5: Leucocytes: Types and functions, total count and variation in number; leukaemia and its types

1.6: Thrombocytes: Structure, factors and mechanism of clotting, failure of clotting mechanism

1.7: Blood volume: Total quantity and regulation; haemorrhage

Unit II: Applied Haematology (15L)

Objective:

- *To introduce to the learner the basics of applied haematology and to impart knowledge of diagnostic techniques used in pathology.*

Desired outcome:

- *The learner will be familiar with the terminology used and diagnostic tests performed in a pathological laboratory.*
- *The learner shall be acquainted with diagnostic approaches in haematological disorders.*
- *The learner will be better equipped for further pathological course or working in a diagnostic laboratory.*

2.1: Introduction and scope of Applied Haematology: Clinical, microbiological, oncological and forensic haematology

2.2: Clinical significance of Diagnostic Techniques

2.2.1: Microscopic examination of blood:

- Blood cancer (lymphoma, myeloma),
- Infectious diseases (malaria, leishmaniasis),
- Haemoglobinopathies (sickle cell anaemia, thalassemia)

2.2.2**:** Coagulopathies: Haemophilia and purpura

2.2.3**:** Biochemical examination of blood:

- Liver function tests: AST, ALT, LDH, Alkaline phosphatase , Total and direct bilirubin
- Kidney function test**:** Serum creatinine, Blood Urea Nitrogen (BUN)
- Carbohydrate metabolism tests: Blood sugar, Glucose tolerance test, Glycosylated haemoglobin test
- Other biochemical tests: Blood hormones - TSH, FSH, LH.

Unit III: Basic Immunology (15L)

Objective:

- *To introduce the topic of immunology by emphasizing the basic concepts to build a strong foundation and to give an overview of the immune system that plays an important role in disease resistance.*

Desired outcome:

- *The learner shall comprehend the types of immunity and the components of immune system.*
- *The learner will realize the significant role of immune system in giving resistance against diseases.*

3.1: Overview of Immunology

3.1.1: Concept of immunity

3.1.2: Innate immunity - Definition, factors affecting innate immunity, Mechanisms of innate immunity - First line of defence - physical and chemical barriers; Second line of defence - phagocytosis, inflammatory responses and fever

3.1.3: Adaptive or Acquired immunity, Antibody mediated and cell mediated immunity; Active Acquired immunity - Natural and Artificial; Passive Acquired immunity - Natural and Artificial

3.2: Cells and Organs of immune system

3.2.1: Cells of immune system - B cells, T cells and null cells, macrophages, dendritic cells and mast cells

3.2.2: Organs of immune system

- Primary: Thymus and bone marrow
- Secondary: Lymph nodes and spleen

3.3: Antigens: Definition and properties; haptens

3.4: Antibodies: Definition, basic structure, classes of antibodies - IgG, IgA, IgM, IgD and IgE

3.5: Antigen processing and presentation

3.5.1: Endogenous antigens - cytosolic pathways

3.5.2: Exogenous antigens - endocytic pathways

Unit IV: Applied Immunology (15L)

Objectives:

- *To introduce immunopathology to the learner*
- *To introduce the concept of vaccines and vaccination.*
- *To familiarise the learner to immunological perspectives of organ transplantation.*

Desired outcome:

- *The learner shall understand immunopathology and the principles and applications of vaccines.*
- *The learner will develop basic understanding of immunology of organ transplantation.*

4.1: Antigen-Antibody interaction

4.1.1**:** General features of antigen-antibody interaction

4.1.2**:** Precipitation reaction - Definition, characteristics and mechanism.

- Precipitation in gels (slide test)
- Radial immunodiffusion (Mancini method)
- Double immunodiffusion (Ouchterlony method)

4.1.3**:** Immunoelectrophoresis - Counter-current and Laurel's Rocket electrophoresis

4.1.4**:** Agglutination reaction definition, characteristics and mechanism.

- Haemagglutination (slide and micro-tray agglutination)
- Passive agglutination
- Coomb's test

4.1.5**:** Immunoassay - ELISA

4.2: Vaccines and Vaccination

4.2.1**:** Principles of vaccines - active and passive immunization, Routes of vaccine administration

4.2.2**:** Classification of vaccines:

- Live attenuated
- Whole-Killed or inactivated
- Sub-unit vaccines: Toxoids, Protein vaccines, Viral-like particles, DNA vaccines

4.2.3**:** Adjuvants used for human vaccines:

- Virosomes and Liposomes
- Saponins

- Water-in-oil emulsions

4.2.4**:** Vaccines against human pathogens:

- Polio
- Hepatitis A and B
- Tuberculosis (BCG)

4.3: Transplantation Immunology: Introduction to transplantation; Types of grafts; Immunologic basis of graft rejection: MHC compatibility in organ transplantation, Lymphocyte and Antibody mediated graft rejection; Precautionary measures against graft rejection

Course Code: USZO503:
Histology, Toxicology, Pathology and Biostatistics
Course 13

Unit I: Mammalian Histology (15L)

Objectives:

- *To familiarize the learner with the cellular architecture of the various organs in the body.*
- *To make the learner understand the need and importance of different types of tissues in the vital organs and their functions.*

Desired outcome:

- *Learner would appreciate the well planned organization of tissues and cells in the organ systems.*

1.1: Vertical section (V.S.) of skin: Layers and cells of epidermis; papillary and reticular layers of dermis; sweat glands, sebaceous glands and skin receptors

1.2: Digestive System

1.2.1: Vertical section (V.S.) of tooth; hard tissue - dentine and enamel; soft tissue - dentinal pulp and periodontal ligaments

1.2.2: Transverse section (T.S.) of tongue - mucosal papillae and taste buds

1.2.3: Alimentary canal - Transverse section (T.S.) of stomach, small intestine, large intestine of mammal.

1.2.4: Glands associated with digestive system - Transverse section (T.S.) of salivary glands, liver.

Unit II: Toxicology (15 L)

Objectives:

- *To introduce the learner to the principles of toxicology with particular emphasis on toxic responses to chemical exposures, nature and effect of toxicity and toxicity testing.*
- *It also intends to develop amongst students an introductory understanding of regulatory affairs in toxicology.*

Desired outcome:

- *The course will prepare learner to develop broad understanding of the different areas of toxicology.*
- *It will also develop critical thinking and assist students in preparation for employment in pharmaceutical industry and related areas.*

2.1: Basic toxicology

2.1.1: Introduction to toxicology - brief history, different areas of toxicology, principles and scope of toxicology

2.1.2: Toxins and Toxicants - Phytotoxins (caffeine, nicotine), Mycotoxins (aflatoxins),

Zootoxins (cnidarian toxin, bee venom, scorpion venom, snake venom)

2.1.3: Characteristics of Exposure - Duration of exposure, Frequency of exposure, Site of exposure and Routes of exposure

2.1.4: Types of Toxicity - Acute toxicity, Sub-acute toxicity, Sub-chronic toxicity and Chronic toxicity

2.1.5: Concept of LD_{50}, $^{LC}_{50}$, $^{ED}_{50}$

2.1.6: Dose Response relationship - Individual / Graded dose response, Quantal dose response, shape of dose response curves, Therapeutic index, Margin of safety

2.1.7: Dose translation from animals to human - Concept of extrapolation of dose, NOAEL (No Observed Adverse Effect Level), Safety factor, ADI (Acceptable Daily Intake)

2.1.8: Target organ toxicity:
Hepatotoxicity: susceptibility of the liver, types of liver injury, examples of hepatotoxicants;
Neurotoxicity: vulnerability of nervous system, examples of neurotoxicants;
Nephrotoxicity: susceptibility of kidney, examples of nephrotoxicants

2.2: Regulatory toxicology

2.2.1: OECD guidelines for testing of chemicals (an overview)

2.2.2: CPCSEA guidelines for animal testing centre, ethical issues in animal studies

2.2.3: Animal models used in regulatory toxicology studies

2.2.4: Alternative methods in toxicology (*in vitro* tests)

Unit III: General Pathology (15L)

Objectives:

- *To introduce the learner to basics of general pathology.*
- *To impart knowledge of retrogressive, necrotic, pathological conditions in the body.*
- *To explain repair mechanism of the body.*

Desired outcome:

- *Learner will be familiar with various medical terminology pertaining to pathological condition of the body caused due to diseases.*

3.1: General Pathology: Introduction and scope

3.2: Cell injury: Mechanisms of cell injury: ischemic, hypoxic, free radical mediated and chemical

3.3: Retrogressive changes: Definition, cloudy swelling, degeneration: fatty, mucoid and amyloid (causes and effects)

3.4: Disorders of pigmentation: Endogenous: Brief ideas about normal process of pigmentation, melanosis, jaundice (causes and effects)

3.5: Necrosis: Definition and causes; nuclear and cytoplasmic changes; types: coagulative, liquefactive, caseous, fat and fibroid

3.6: Gangrene: Definition and types - dry, moist and gas gangrene

Unit IV: Biostatistics (15L)

Objective:

- *To make learner familiar with biostatistics as an important tool of analysis and its applications.*

Desired outcome:

- *The learner will be able to collect, organize and analyse data using parametric and non-parametric tests.*
- *They will also be able to set up a hypothesis and verify the same using limits of significance.*

4.1: Probability Distributions: Normal, Binomial, Poisson distribution, Z-transformation, p-value, Probability - Addition and multiplication rules and their applications

4.2: Measures of Variation: Variance, standard deviation, standard error

4.3: Testing of Hypothesis: Basic concepts, types of hypothesis: Null hypothesis and Alternate hypothesis, Levels of significance and testing of hypothesis

4.4: Parametric and non-parametric test: Parametric tests: two-tailed Z-test and t-test Non-parametric test: Chi-square test and its applications

4.5: Correlation: Correlation coefficient and its significance

Course Code: USZO504:
Anatomy and Developmental Biology
Course 14

Unit I: Integumentary system and derivatives (15L)

Objective:

- *To introduce the learner to understand different integumentary structures and derivatives in the vertebrates and to acquaint learners with special derivatives of integument.*

Desired outcome:

- *Learner will be able to understand the importance of various types of epidermal and dermal derivatives along with their functions.*

1.1: Basic structure of integument: Epidermis and dermis

1.2: Epidermal derivatives of Vertebrates

1.2.1: Hair, hoof, horn, claw, teeth, beak and epidermal scales (small scales, large scales, modified scales - spine)

1.2.2: Glands - types (mucous, serous, ceruminous, poison, uropygial and salt gland) and functions

1.2.3: Type of feathers

1.3: Dermal derivatives of Vertebrates: Scales in fish; scutes in reptiles and birds; dermal scales in mammals - Armadillo, Antler - Caribou

1.4: Special derivatives of integument: Wart in toad, rattle in snake, whale bone in baleen whale, kneepads in camel.

Unit II: Human Osteology (15L)

Objective:

- *To introduce the learner to different bones of human skeleton and their functional importance.*

Desired outcome:

- *Learner will be able to understand the structure, types and functions of human skeleton.*

2.1: Introduction: Bone structure (Histology), physical properties, chemical composition and general functions of bones.
Cartilage: General structure, functions

2.2: Axial skeleton

2.2.1: Skull: General characteristics of skull bones - Cranial and facial bones

2.2.2: Vertebral column: General characteristics of a vertebra, structure of different types of vertebrae (cervical, thoracic, lumbar, sacrum and coccyx)

2.2.3: Ribs and sternum: General skeleton of ribs and sternum

2.2.4: Hyoid bone: Structure and function.

2.3: Appendicular skeleton
2.3.1: Pectoral girdle and bones of forelimbs

2.3.2: Pelvic girdle and bones of hind limbs

Unit III: Muscles of long bones of Human limbs (15L)

Objectives:
- *To study long limb muscles involved in body movements.*
- *To identify various arrangements of the long limb muscles and to relate the arrangement with contraction and motion.*
- *To study muscle injuries and syndromes.*

Desired outcome:
- *Learner will be able to understand the types of long limb muscles, its arrangement and their role in body movements.*

3.1: Introduction and types of long limb muscles
3.1.1: Flexors, Extensor, Rotator, Abductors, Adductors

3.2: Muscles of forelimbs
3.2.1: Muscles that move the arm (Humerus) - *Triceps brachii, Biceps brachii, brachialis* and *brachioradialis*

3.2.2: Muscles that move the forearm (Radius-ulna) - *Flexor carpi radialis, Flexor carpi ulnaris* and *Extensor carpi ulnaris*

3.2.3: Muscles that move the wrist, hand and fingers - *Flexor digitorium superficialis, Extensor carpi radialis* and *Extensor digitorum*

3.3: Muscles of hindlimbs
3.3.1: Muscles that move the thigh (Femur) - Sartorius, Adductor group, Quadriceps group (*Rectus femoris, Vastus lateralis, Vastus medialis*), Hamstring group (*Biceps femoris, Semimembranosus, Semitendinosus*)

3.3.2: Muscles that move the lower leg (tibia-fibula) - *Fibularis longus, Gastrocnemius, Tibialis anterior, Soleus, Extensor digitorum longus* and *Fibularis tertius*

3.3.3: Muscles that move the ankle, foot and toes - *Tibialis anterior, Extensor digitorum, Longus* and *Fibularis* muscles

Unit IV: Developmental biology of Chick (15L)

Objective:

- *To introduce the learner to the basics of developmental biology with reference to chick as a model and also familiarize with experiments related to it.*

Desired outcome:

- *Learner will be able to understand the processes involved in embryonic development and practical applications of studying the chick embryology.*

4.1: Introduction to Developmental Biology: Basic concept and principles of developmental biology - morphogenesis, organogenesis, fate maps, cell adhesion, cell affinity and cell differentiation.

4.2: Development of Chick embryo

4.2.1: Structure of Hen's egg, physico-chemical nature and forms of yolk - granular, platelets and spheres; fertilization, cleavage, blastulation, gastrulation

4.2.2: Structure of chick embryo - 18hours, 24 hours, 33 hours, 48 hours and 72 hours

4.2.3: Extra embryonic membranes

4.2.4: Organizer: Introduction, Spemann Mangold experiment, Hensen's node as an organizer

Practical Syllabus for Semester V
Course code: USZOP05; Course 11

1. Classification of phyla up to class and study of the general characters up to class.
   Kingdom Protista - Animal-like Protists: Protozoa
   A. Phylum: Sarcomastigophora
      - Class Sarcodina e.g. *Amoeba*
      - Class Mastigophora e.g. *Euglena*

   B. Phylum: Ciliophora
      - Class Ciliata e.g. *Paramoecium*
      - Class Phyllopharyngea e.g. *Dysteria*

   C. Phylum: Sporozoa,
      - Class Aconoidasida e.g. *Eimeria*
      - Class Conoidasida e.g. *Sarcocystis*

   Kingdom Animalia

   D. Phylum: Porifera
      - Class Calcarea e.g. *Scypha* (Little vase sponge)
      - Class Hexactinellida e.g. *Hyalonemma* (Glass-rope sponge)
      - Class Demospongia e.g. *Spongilla* (Freshwater sponge)

   E. Phylum Cnidaria
      - Class Hydrozoa e.g. *Vellela* (By-the-wind sailor)
      - Class Scyphozoa e.g. *Rhizostoma* (Barrel jellyfish)
      - Class Anthozoa e.g. *Corallium* (Coral)

   F. Phylum Platyhelminthes
      - Class Turbellaria e.g. *Dugesia* (Planaria)
      - Class Trematoda e.g. *Fasciola* (Liverfluke)
      - Class Cestoda e.g. *Taenia* (Tapeworm)

   G. Phylum Nematoda
      - Class Aphasmida (Adenophorea) e.g. *Trichinella* (Trichina worm)
      - Class Phasmida (Secernentea) e.g. *Ascaris* (Roundworm)

   H. Phylum Annelida
      - Class Polychaeta e.g. *Arenicola* (Lugworm)
      - Class Oligochaeta e.g. *Tubifex* (Sludge worm)
      - Class Hirudinea e.g. *Pontobdella* (Marine leech)

   I. Phylum Arthropoda
   Subphylum Chelicerata
      - Class Arachnida e.g. *Hotentotta* (Scorpion)
      - Class Merostomata e.g. *Limulus* (Horseshoe crab)
      - Class Pycnogonida e.g. *Nymphon* (Sea spider)

Subphylum Crustacea

- Class Malacostraca e.g. *Panulirus* (Lobster)
- Class Maxillipoda e.g. Cyclops (Copepods)

Subphylum Uniramia

- Class Chilopoda e.g. *Scolopendra* (Centipedes)
- Class Diplopoda e.g. *Xenobolus* (Millipedes)

Class Insecta e.g. *Attacus* (Moth)

J. Phylum Mollusca

- Class Aplacophora e.g. *Chaetoderma* (Glisten worm solenogaster)
- Class Polyplacophora e.g. *Tonicella* (Lined Chiton)
- Class Monoplacophora e.g. *Neopilina*
- Class Gastropoda e.g. *Turbo* (Turban shell)
- Class Pelycypoda e.g. *Donax* (Wedge shell)
- Class Scaphopoda e.g. *Dentalium* (Tusk shell)
- Class Cephalopoda e.g. *Octopus*

K. Phylum Echinodermata

- Class Asteroidea e.g. *Asterias* (Starfish)
- Class Ophiuroidea e.g. *Ophiothrix* (Brittle star)
- Class Echinoidea e.g. *Echinus* (Sea urchin)
- Class Holothuroidea e.g. *Cucumaria* (Sea cucumber)
- Class Crinoidea e.g. *Crinoid* (Sea lily)

L. Phylum Hemichordata

- Class Enteropneusta e.g. *Saccoglossus*
- Class Pterobranchia e.g. *Rhabdopleura*
- Class Planctosphaeroidea e.g. *Planctosphaera*

2. Minor Phyla

Acoelomate

M. Phylum Acanthocephala e.g. *Echinorhynchus*

Coelomate

N. Phylum Chaetognatha e.g. *Sagitta*

O. Phylum Onychophora e.g. *Peripatus* (Velvet worm)

3. Study of *Sepia* with the help of diagram / Photograph / Simulation whichever possible. No animal shall be dissected.
   a) Digestive system,
   b) Reproductive system
   c) Nervous system
   d) Jaws
   e) Radula
   f) Chromatophores
   g) Spermatophores
   h) Statocyst

4. Study tour - Visit to fish market / Aquarium / Local Gardens / Local available niche / National Parks / Sanctuaries / and such other places to observe invertebrates with special emphasis on Western Ghats and coast of Maharashtra and submit a report. College may conduct more than one field visit for wide exposure, if feasible. However, at least one field visit should be such that it is affordable to every student.

Course code: USZOP05; Course 12

1. Enumeration of Erythrocytes - Total Count.
2. Enumeration of Leucocytes - Total Count.
3. Differential count of Leucocytes.
4. Erythrocyte Sedimentation Rate by suitable method - Westergren or Wintrobe method.
5. Estimation of haemoglobin by Sahli's acid haematin method.
6. Determination of serum LDH by using colorimeter / spectrophotometer.
7. Estimation of total serum/ plasma proteins by Folin's method.
8. Estimation of serum/ plasma total triglycerides by Phosphovanillin method.
9. Latex agglutination test - Rheumatoid Arthritis.
10. Determination of bleeding and clotting time.

Course code: USZOP05; Course 13

1. Study of mammalian tissues: V.S. of Tooth, T.S. of Stomach, T.S. of small intestine, T.S. of Liver.
2. Microtomy: Tissue preservation and fixation, dehydration, infiltration, paraffin embedding and block preparation, sectioning, staining.
3. Identification of diseases or conditions (from slides or pictures): Vitiligo, Psoriasis, Bed sores, Necrosis, Oedema
4. To study the effect of CCl_4 on the level of enzyme activity in liver on aspartate and alanine amino transferase, alkaline phosphatase (*in vitro* approach).
5. Study and interpretation of abnormal pathological reports: Blood (CBC), Urine (Routine) and Stool (Routine).
6. Following biostatistics practicals will be done using data analysis tool of Microsoft Excel (DEMONSTRATION in regular practicals) and manually:
   a. Problems based on Z-test
   b. Problems based on t-test
   c. Problems based on Chi-square test
   d. Correlation, regression analysis - demonstration only.
   e. Problems based on ANOVA - demonstration only.

(Learner is expected to identify appropriate test for the given problem)

Course code: USZOP05; Course 14

1. Study of integumentary systems - V. S. of Skin of Shark, Frog, *Calotes*, Pigeon and Human
2. Study of Human Axial Skeleton - Skull (whole) and Vertebral column (axis, atlas, typical cervical, typical thoracic, typical lumbar, sacrum, coccyx)
3. Study of Human Appendicular Skeleton - Pectoral and pelvic girdle with limb bones
4. Study of muscles of forelimbs - *Biceps brachii, Brachialis, Brachio radialis, Triceps brachii, Flexor carpi radialis, Flexor carpi ulnaris* and *Extensor carpi ulnaris*
5. Study of muscles of hind limbs - Sartorius, Adductor group, Quadriceps group *Rectus femoris, Vastus lateralis, Vastus medialis, Hamstring* group (*Biceps femoris, Semimembranosus, Semitendinosus*), *Fibularis longus, Gastrocnemius Tibialis anterior, Soleus, Extensor digitorum longus, Fibularis tertius*
6. Study of ontogeny of chick embryo using permanent slides - 18 hours, 24 hours, 33 hours, 48 hours and 72 hours.
7. Preparation of temporary mounting of chick embryo up to 48 hours of incubation.

References and Additional Reading for Semester V

Course 11:

REFERENCES

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- Instant Notes in Animal Biology by Richard D. Jurd.
- Introduction to Zoology - Vol I: K. K. Chaki, G. Kundu and S. Sarkar, New Crystal Book Agency.
- Modern text book of Zoology - Invertebrates; Eleventh; Edition Professor R.L. Kotpal; Rastogi publication
- Invertebrate Zoology by E. L. Jordan & P. S. Verma Rev. edition,2009, Chand publications
- Invertebrate Zoology by P. S. Verma, edition, 2009, Chand publications
- Zoology for degree students, Non chordates by V.K. Agarwal 2011, S. Chand Publication
- Zoology for Degree Students, B.Sc. First Year, by V. K. Agarwal, Pub. S. Chand Coy.
- B. Sc. Zoology, Invertebrate Zoology by V.K. Aggarwal2017, S. Chand publications
- Invertebrate Zoology by Fatik Baran 2012, PHI Learning
- A Textbook of Invertebrates by N.C. Nair et al. 2010 Saras publications
- Practical Zoology: Invertebrate, by S. S. Lal, 2016
- Invertebrate Zoology by Ruppert, Fox, Barnes, 7thedition,2003 publications Cengage Learning
- Invertebrate Zoology by D.T. Anderson 2nd edition 2002, publications Oxford
- Invertebrates by Richard C. Brusca et. al, 3rdedition2016, publications Oxford
- Biology of the invertebrates by Jan A. Pechenik, 7th edition,2014 publications McGraw Hill
- An introduction to the invertebrates by Janet Moore, 2ndedition2006, publications Cambridge
- Protozoology, by S. V. Nikam & S. T. Tanveer ed. 2011, Pub. Oxford Book Company(N.B.: This book includes Phylum Sarcomastigophora)

ADDITIONAL READING

- https://www.earthlife.net/inverts/an-phyla.html
- http://www.biologydiscussion.com/invertebrate-zoology/invertebrates-phyla/study-notes-on-invertebrates-phyla/28077
- http://www.asfa.k12.al.us/ourpages/auto/2014/4/23/64232119/invertebrate-animal-phyla-notes.pdf
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- http://instruction2.mtsac.edu/mcooper/Biology%202/Labs/Protistalab1.pdf
- http://www.faculty.ucr.edu/~legneref/invertebrate/inverteb.htm
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- http://bioweb.uwlax.edu/bio203/s2009/maiers_andr/Classification.htm
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- http://www.fossilmuseum.net/Tree_of_Life/PhylumAnnelida.htm
- http://www.austincc.edu/sziser/Biol%201413/LectureNotes/lnexamIII/Phylum%20Annelida.pdf
- http://animaldiversity.org/accounts/Annelida/classification/

- http://faculty.college-prep.org/~bernie/sciproject/project/Kingdoms/Animal%20Kingdom%20-%205/Local%20copy/classification/arthropoda.html
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LEARNERS' SPACE

Course 11

1. Learners can visit different websites to get information about the invertebrates discovered recently in Maharashtra as well as in the world.
2. Learners can play games to identify kingdom, phylum or class based on the characters of animals.
3. Investigate the process of formation of first life/cell on earth
4. List the names of places in India where corals are found.
5. Study the corals as an indicator of healthy ecosystem.
6. Enlist medicinal uses of leech.
7. State the differences between *Loligo* and *Sepia*.
8. Collect information on differences between minor phyla and major phyla.
9. Study the economic importance of molluscs.
10. Collect the information on torsion-detorsion in gastropods.

Course 12

1. Study the latest medical applications of haemopoietic cells.
2. Prepare a report on thrombosis, its causes, risk factors, symptoms and prevention.
3. Other than haemophilia, there are many more coagulation factor disorders. Explore this area.
4. Investigate the traditional and recent methods of grouping and cross matching of blood.
5. Compile information on Bombay blood group.
6. Study the recent advancements in organ transplantation.
7. Autoimmune diseases are on the rise. Explore the reasons, types as well as its mechanisms.
8. Distinguish different types of hypersensitivity.
9. Make a detailed report on bone marrow transplantation.
10. Explain the application of radiation technology in vaccine development.
11. Attempt to understand immune mechanisms in invertebrates.
12. Attempt to understand immune mechanisms in pets.

Course 13

1. Define- Histopathology. Name the cytological techniques used to stain DNA in the tissues.
2. Prepare a chart as follows

Sr. No.	Type of Embryonic origin	Tissues/Organ/Gland	Position in the body of vertebrates
1.	Ectoderm		
2.	Endoderm		
3.	Mesoderm		
4.	Dual origin		

3. From internet, survey types of stains used in temporary and permanent preparation of slides.
4. Find the ways to prevent post mortem changes in histological preparation of experimental animals.
5. Enumerate sub-lethal dose or sub-lethal concentration of a toxicant.
6. Give the significance of probit analysis and comment on Finney method of toxicity evaluation.

7. Find the differences between bioaccumulation, biotransformation and bio-magnification in the trophic levels. Do search for bioremediation against pollutants.
8. Discuss the various routes of intoxication in vertebrate animals.
9. Enlist the common inflammatory diseases.
10. Define - Metastasis and Neoplasia
11. Explain the procedure of biopsy. Give its significance.
12. Prepare a chart as follows:

Sr. No.	Samples	Types of pathological test conducted.	Confirmation of diseases
1.	Blood		
2.	Urine		
3.	Sputum		
4.	Semen		
5.	Root hair somatic cell		
6.	Bone marrow		
7.	Stool		

13. Give the use of standard error in biological research.
14. Explain various types of correlations possibilities in biological events.
15. Differentiate between primary and secondary data.
16. Study computer spreadsheet programme. Find software programmes for statistical tests used in biological research.

Course 14

1. Distinguish between holocrine, merocrine and apocrine glands.
2. Explain the difference between plastic and cosmetic surgery.
3. Comment on skin cancer and its preventive measures.
4. Find the ABCD rule for recognizing melanoma
5. Elaborate the term cyanosis.
6. Find the correlation between biological clock/rhythm melanin secretion and sleep.
7. List various applications of forensic osteology and human osteoarchaeology.
8. Role of osteology in understanding human evolution and taxonomy.
9. Give the correlation between age, nutrition and growth of bones.
10. Find out the following:
    a) Correlation between muscles and body building
    b) Smallest muscle, strongest muscle and the muscle that is never tired in our body.
    c) Number of muscles required for taking one step
11. Name three muscles or muscle groups used as sites for intramuscular injections especially used in babies.
12. Distinguish between the effect of exercises on muscles of a marathon runner and a weight lifter.
13. Describe different theories of experimental embryology.
14. Collect the brief information regarding the human embryogenesis.
15. Explain recapitulation theory.
16. Use of French flag model to understand developmental biology.
17. Complete the following table:

Drosophila body Patterning		
Category of genes	**Name of genes**	**Role of genes**
Egg-polarity genes	----------	Establish the Antero-posterior axis
Gap genes	----------	Establish 3 broad segments of the embryo
Pair-rule genes	----------	Establishes odd and even segments
Segment-polarity genes	----------	Establishes anterior posterior polarity of each segment
Homeotic genes	----------	Establishes segmental identity

T. Y. B. Sc. Zoology: Semester VI (Theory)
Course Code: USZO601:
Taxonomy - Chordates and Type Study
Course 15

Unit I: Phylum Chordata: Group Protochordata and Group Euchordata I (**15L**)

Objective:

- *To introduce basic concepts of modern Chordate classification with evolution point of view and to understand the concept of taxonomy in higher animal kingdom.*

Desired outcome:

- *Learners will get an idea of origin of Chordates, its taxonomy up to class with reference to phylogeny and their special features.*

1.1: General characters, Difference between non-chordates and chordates

Origin of chordates: Annelids as ancestors, Arachnids as ancestors and affinities with Echinodermata

1.2: **Protochordata**

1.2.1: General characters of Group Protochordata

1.2.2: Distinguishing characters of Subphylum Urochordata and Cephalochordata

1.2.3: Subphylum Urochordata

- Class Ascidiacea e.g. *Herdmania*
- Class Thaliacea e.g. *Salpa*
- Class Larvacea e.g. *Oikopleura*

1.2.4: Subphylum Cephalochordata

- Class Leptocardii e.g. *Branchiostoma* (*Amphioxus*)

1.3: Group Euchordata I

Group Euchordata: General characters

- Subphylum Vertebrata: General characters
- Division Agnatha and Gnathostomata: Distinguishing characters.

General characters with examples of:

- Class Ostracodermii e.g. *Cephalaspis*
- Class Cyclostomata e.g. *Petromyzon* (Lamprey)

Unit II: Group Euchordata II **(15L)**

2.2.1: Division: Gnathostomata

- Superclass: Pisces and Tetrapoda
- Superclass - Pisces: Distinguishing characters
  - Class Placodermi e.g. *Climatius*
  - Class Chondrichthyes e.g. *Rhinobatos* (Guitar fish)
  - Class Osteichthyes e.g. *Exocetus* (Flying fish)

2.2.2: Dipnoi (Lung fish): Distribution, habit and habitat, external and internal characters, affinities with super class Pisces, affinities and differences with class Amphibia

2.3: Superclass Tetrapoda

- Class Amphibia: General characters

  Examples:

  a. Limbless amphibian e.g. *Ichthyophis* (Caecilian)
  b. Tailed amphibian e.g. *Amphiuma*
  c. Tailless amphibian e.g. *Hyla* (Tree frog)

Unit III: Group Euchordata III **(15L)**

Objective:

- *To introduce the learners to the distinguishing characters of classes Reptilia, Aves and Mammalia and their adaptive features with reference to their habitat.*

Desired outcome:

- *Learners will understand the characteristic features and examples of class of Reptilia, Aves and Mammalia.*

3.1: Class Reptilia: General characters

Examples

a. Extinct reptile e.g. *Ichthyosaurus*
b. Living fossil e.g. *Sphenodon* (Tuatara)
c. Aquatic reptile e.g. *Chelonia* (*Sea turtle*)
d. Arboreal reptile e.g. *Chamaeleo* (Chamaeleon)

3.2: Class Aves: General Characters

Examples

a. Arboreal bird e.g. *Melanerpes* (Wood pecker)
b. Terrestrial bird e.g. *Gallus* (Fowl)
c. Swimming bird e.g. *Phalacrocorax* (Cormorant)
d. Wading bird e.gs. *Ardeola* (Heron)
e. Birds of prey e.g. *Tyto* (Owl)
f. Flightless birds e.g. *Dromaius* (Emu)

3.3: Class Mammalia: General characters

Examples

a. Egg-laying mammals e.g. *Ornithorhyncus* (Duck-billed platypus)
b. Pouched mammals e.g. *Macropus* (Kangaroo)
c. Insect eating mammals e.g. *Sorex* (Common shrew)
d. Toothless mammals e.g. *Bradypus* (Sloth)
e. Gnawing mammals e.g. *Funambulus* (Squirrel)
f. Primates e.g. *Macaca* (Monkey)

Unit IV: Type study: Shark (15L)

Objective:

- *To study in depth one vertebrate animal type i. e. general characteristics and salient features of animal type - shark.*

Desired outcome:

- *Learners will get an idea of vertebrate animal life after studying one representative animal - shark.*

4.1: Habit & habitat, distribution, external characters, classification and economic importance.

4.2: Skin, exoskeleton, endoskeleton and systems

a) Digestive system
b) Respiratory system
c) Blood vascular system
d) Nervous system and receptor organs
e) Urinogenital system, copulation, fertilization and development

Course Code: USZO602:
Physiology and Tissue Culture
Course 16

Unit I: Enzymology **(15L)**

Objective:

- *To introduce to the learner the fundamental concepts of enzyme biochemistry and to enable the learner realize applications of enzymes in basic and applied sciences.*

Desired outcome:

- *The learner shall understand fundamentals of enzyme structure, action and kinetics.*
- *The learner shall appreciate the enzyme assay procedures and the therapeutic applications of enzymes.*

1.1: Introduction and Nomenclature: Definition; concept of activation energy; nomenclature and classification (based on IUB - Enzyme Commission) of enzymes; chemical nature of enzyme, co-factors and co-enzymes

1.2: Enzyme Action and Kinetics: Mechanism; Factors affecting enzyme activity - substrate, pH and temperature. Derivation of Michaelis-Menten equation and Lineweaver-Burk plot; Concept and significance of K_m, V_{max} and K_{cat}

1.3: Enzyme Inhibition: Competitive and non-competitive inhibitors and their kinetics; therapeutic applications of enzyme inhibitors

1.4: Regulation of Enzyme Activity: Allosteric regulation and regulation by covalent modification of enzymes; Isozymes (LDH)

1.5: **Industrial applications of enzymes**: Food and detergents

Unit II: Homeostasis **(15L)**

Objective:

- *To introduce to the learner the concept of homeostasis-thermoregulation and osmoregulation*

Desired outcome:

- *The learner shall comprehend the adaptive responses of animals to environmental changes for their survival.*

2.1: Homeostasis

2.1.1: External and internal environment; Acclimation and acclimatization

2.1.2: Body clock - Circadian & Diurnal rhythm

2.2: Thermoregulation

2.2.1: Endothermy and ectothermy

2.2.2: Temperature balance: Heat production - shivering and non-shivering thermogenesis; brown fat, mechanisms of heat loss

2.2.3: Adaptive response to temperature - daily torpor, hibernation, aestivation

2.3: Osmotic and Ionic Regulation

2.3.1: Living in hypo-osmotic, hyper-osmotic and terrestrial environment - Water absorption, salt water ingestion and salt excretion, salt glands, metabolic water

2.3.2: Role of kidney in ionic regulation

Unit III: Endocrinology (15L)

Objective:

- *To introduce to the learner the details of endocrine glands and its disorders.*

Desired outcome:

- *The learner shall understand the types and secretions of endocrine glands and their functions.*

3.1: General organization of mammalian endocrine system

3.2: Hormones: Classification, properties, mechanism of hormone action

3.3: Histology, functions and disorders of the following endocrine glands:

- Pituitary
- Thyroid
- Parathyroid
- Pancreas
- Adrenal

Unit IV: Animal Tissue Culture (15L)

Objective*:*

- To *introduce to the learner the fundamental concepts of tissue culture and guide them progressively to certain areas of animal tissue culture.*

Desired outcome*:*

- *The learner shall understand the significance of tissue culture as a tool in specialized areas of research.*
- *The learner will appreciate its applications in various industries.*

4.1: Aseptic techniques

4.1.1**:** Sterilization - basic principles of sterilization, importance of sterility in cell culture

4.1.2**:** Sterile handling - swabbing, capping, flaming, handling bottles and flasks, pipetting, pouring

4.2: Culture media

4.2.1: Types of media - Natural and Artificial media

4.2.2: Balanced Salt Solutions

4.2.3: Complete Media - amino acids, vitamins, salts, glucose, oxygen supplements, hormones and growth factors, antibiotics

4.2.4: Factors influencing cell culture - surface tension and foaming, viscosity, temperature, osmolality, pH, CO_2, bicarbonate and O_2

4.3: Advantages of tissue culture - control of the environment, *in vitro* modelling of *in vivo* conditions

4.4: Limitations of tissue culture

4.5: Culture techniques

4.5.1: Preparation of cells / organs for culture

4.5.2**:** Cover slip, Flask and Tube culture

4.5.3: Primary and established cell lines

4.5.4: Hybridoma technology

Course Code: USZO603:
Genetics and Bioinformatics
Course 17

Unit I: Molecular Biology **(15 L)**

Objectives:

- *To introduce learner to chemical and molecular processes that affect genetic material.*
- *To make learner understand the concept of DNA damage and repair, and how gene control is necessary for cell survival.*

Desired outcome:

- *Learner shall get an insight into the intricacies of chemical and molecular processes that affect genetic material.*
- *The course shall prepare learner to recognize the significance of molecular biology as a basis for the study of other areas of biology and biochemistry.*
- *Learner shall also understand related areas in relatively new fields of genetic engineering and biotechnology.*

1.1: Types of mutation

1.1.1**:** Point mutations - substitution, deletion and insertion mutations

Substitution mutations - silent, missense and nonsense mutations, transition and transversion

Deletion and Insertion mutations - frameshift mutations

1.1.2**:** Trinucleotide repeat expansions - fragile X syndrome, Huntington disease

1.1.3**:** Spontaneous mutation - tautomeric shifts, spontaneous lesions

1.2: Induced mutations

1.2.1**:** Physical agents:

- Ionizing radiation (X-rays, α, β and γ rays)
- Non-ionizing radiation (UV light)

1.2.2**:** Chemical agents:

- Base analogs (5-bromouracil)
- Intercalating agents (ethidium bromide)
- Deaminating agents (nitrous acid)
- Hydroxylating agents (hydroxylamine)
- Alkylating agents (mustard gas)
- Aflatoxin (aflatoxin B_1)

1.3: Preventative and repair mechanisms for DNA damage

1.3.1: Mechanisms that prevent DNA damage - superoxide dismutase and catalase

1.3.2: Mechanisms that repair damaged DNA - direct DNA repair (alkyl transferases, photoreactivation, excision repair)

1.3.3: Postreplication repair - recombination repair, mismatch repair, SOS repair

1.4: Eukaryotic gene expression

1.4.1: Regulatory protein domains - zinc fingers, helix-turn-helix domain and leucine zipper

1.4.2**:** DNA methylation

Unit II: Genetic Engineering (15 L)

Objective:

- *To introduce learner to a set of techniques to modify an organism's genome to produce improved or novel genes and organisms.*

Desired outcome:

- *The learner shall get acquainted with the vast array of techniques used to manipulate genes which can be applied in numerous fields like medicine, research, etc. for human benefit.*

2.1: Tools in Genetic Engineering

2.1.1: Enzymes involved in Genetic Engineering: Introduction, nomenclature and types of restriction enzymes with examples, Ligases - *E. coli* DNA ligase, T4 DNA ligase, polynucleotide kinase, phosphatases, DNA polymerases, reverse transcriptase, terminal transferase

2.1.2: Vectors for gene cloning: General properties, advantages and disadvantages of cloning vectors - plasmid vectors (pBR322), phage vectors (λ Phage), cosmid vectors (c2XB)

2.1.3**:** Cloning techniques: Cloning after restriction digestion - blunt and cohesive end ligation, creation of restriction sites using linkers and adapters, cloning after homopolymer tailing, cDNA synthesis (Reverse transcription), genomic and cDNA libraries

2.2: Techniques in Genetic Engineering

2.2.1**:** PCR techniques: Principle of polymerase chain reaction (PCR), Applications of PCR

2.2.2**:** Sequencing techniques: DNA sequencing: Maxam-Gilbert method, Sanger's method Protein sequencing: Sanger's method, Edman's method Applications of sequencing techniques

2.2.3**:** Detection techniques: Blotting techniques - Southern blotting, Northern blotting and Western blotting Applications of blotting techniques

Unit III: Human Genetics (15L)

Objective:

- *To introduce learner with genetic alterations in human genome and their diagnosis.*

Desired outcome:

- *The learner shall become aware of the impact of changes occurring at gene level on human health and its diagnosis.*

3.1: Non-disjunction during mitosis and meiosis

3.1.1**:** Chromosomal Aberrations: Structural: Deletion: types, effects and disorders;
Translocation: types: Robertsonian and non-Robertsonian disorders;
Inversion: types, effects and significance;
Duplication and their evolutionary significance (multigene families)
Numerical: Aneuploidy and Polyploidy (Autopolyploidy and Allopolyploidy)

3.2: Genetic Disorders

3.2.1**:** Inborn Errors of Metabolism: Phenylketonuria, G-6-PD deficiency, Alkaptonuria, Albinism

3.2.2**:** Single gene mutation: Cystic fibrosis

3.2.3**:** Multifactorial: Breast Cancer

3.2.4**:** Uniparental Disomy: Angelman Syndrome and Prader-Willi Syndrome

3.3: Diagnosis

3.3.1**:** Prenatal Diagnosis: Amniocentesis and Chorionic villus sampling, Banding techniques (G, C, Q), FISH, Protein truncation test (PTT)

3.3.2**:** Genetic counselling

Unit IV: Bioinformatics (15L)

Objective:

- *To introduce learner to bioinformatics - a computational approach to learning the structure and organization of genomes, phylogeny and metabolism.*

Desired outcome:

- *Learner shall become aware of the computational point of view of studying the genomes.*

4.1: Introduction

4.1.1**:** Introduction to Bioinformatics and Bioinformatics web resource (NCBI, EBI, OMIM, PubMed)

4.1.2**:** Applications of Bioinformatics

4.2: Databases - Tools and their uses

4.2.1**:** Biological databases;
Primary sequence databases: Nucleic acid sequence databases **(**GenBank, EMBLEBI, DDBJ) Protein sequence databases (UniProtKB, PIR)
Secondary sequence databases
Derived databases - PROSITE, BLOCKS
Structure databases and bibliographic databases

4.3: Sequence alignment methods

4.3.1**:** BLAST, FASTA

4.3.2: Types of sequence alignment (Pairwise & Multiple sequence alignment)

4.3.3: Significance of sequence alignment

4.4: Predictive applications using DNA and protein sequences
4.4.1: Evolutionary studies: Concept of phylogenetic tree, convergent and parallel evolution

4.4.2**:** Pharmacogenomics: Discovering a drug: Target identification

4.4.3**:** Protein Chips and Functional Proteomics: Different types of protein chip (detecting and quantifying), applications of Proteomics

4.4.4: Metabolomics: Concept and applications

Course Code: USZO604:
Environmental Biology and Zoopharmacognosy
Course 18

Unit I: Environment management (15L)

Objective:

- *Learner should understand different factors affecting the environment and various methods to improve environmental stewardship.*

Desired outcome:

- *Learner will understand the different factors affecting environment, its impact and environment management laws.*

1.1: Natural resources and their Classification

1.1.1: Forest resources, water resources (surface and ground) and mineral resources

1.1.2: Energy resources: renewable (solar, tidal, wind, biofuel) and non-renewable resources (coal, petroleum oil, natural gas)

1.2: Exploitation and Modification of Natural Resources: Impact on climate, flora and fauna

1.3: Waste Management

1.3.1: Technologies in solid waste management:

a) Traditional methods for solid waste management: Composting, Incineration, Landfill Recycling, Windrow composting

b) Modern methods for solid waste management: Anaerobic digestion, ethanol production, biodrying, pyrolysis, Upflow anaerobic sludge blanket (UASB) technology, waste autoclave

1.3.2: e-waste and hazardous waste (biological, chemical, medical and nuclear) management

1.4: Water management

1.4.1: Rainwater harvesting: Definition ways of harvesting, components, model of rain water harvesting: Rural and Urban, Advantages and disadvantages

1.4.2: Watershed management: Definition, need and objectives, classification (mini, micro, mili, sub-watershed, macro-watershed), Watershed management practices: Contour, gully control, stone bunds. Growing greenery and integrated watershed approach (IWA).

1.4.3: Case study: Ice-stupa artificial glaciers by Sonam Wangchuk

1.4.4: Effluent treatment, recycling plants, control and treatment of sewage water.

1.5: Acts and Rules of Environment Management

1.5.1: Environment Protection Act - 1986, Air (Prevention and Control of Pollution) Act - 1981, Water (Prevention and Control of Pollution) Act - 1974

1.5.2: Hazardous Wastes (Management and Handling) Rules - 1989

1.5.3: EIA (Environmental Impact Assessment)

1.5.4: Role of Central and State Government (Pollution Control Board) and NGOs

Unit II: Wildlife Management (15L)

Objectives:

- *To sensitize learner regarding the various threats to the wildlife*
- *To introduce learner various ways that can help in the protection, conservation, management, and enhancement of wildlife populations and habitat.*

Desired outcome:

- *Learner will be able to understand various methods for wildlife conservation.*
- *Learner will be able to apply knowledge to overcome the issues related to wildlife conservation and management.*

2.1: Habit, Habitat, Territory and Niche of Wild Animals: Herbivores, carnivores, solitary, social (flock, pod, community), pack and herd, types of habitats and territories, niche concept

2.2: Threats to Wildlife

2.2.1: Poaching and hunting, deforestation, encroachment, competition (intra-specific and inter-specific), overgrazing and climate change, diseases (zoonosis and reverse zoonosis)

2.2.2: Tourism and human animal conflict

2.3: Wildlife Conservation

2.3.1: Techniques and methods used for wildlife census: Aerial counts, camera trap, line transect census and track surveys, capture mark recapture method, wildlife radio telemetry

2.3.2: Forest management, policies and Acts:
Harvesting Trees, Thinning harvest, Clearcut Harvest, Shelterwood harvest, Seed tree harvest, Group selection harvest, Single-tree selection harvest, Prescribed burning, Reforestation
Forest policy 1894, 1952, 1988;
The Indian Forest Act, 1927; Forest (Conservation) Act, 1980

Unit III: Bioprospecting and Zoopharmacognosy (15L)

Objectives:

- *To introduce the learner to the concepts of bioprospecting and zoopharmacognosy.*
- *Learner will be made aware of the process of discovery and commercialization of new products based on biological resources.*
- *To introduce learner with various ethological aspects by which non-human animals apparently self-medicate themselves.*

Desired outcome:

- *Learner will understand the paradigms of discovery and commercialization of biological resources and knowledge gained from self-medication observed in animals.*

3.1: Bioprospecting

3.1.1: Traditional and modern bioprospecting, economic value of bioprospecting

3.1.2: Bioprospecting and conservation, advantages and disadvantages

3.2: Zoopharmacognosy

3.2.1: Definition and types

3.2.2: Self-medication and its mechanism

3.2.3: Methods of self-medication through:

a) Ingestion - ants and mammals
b) Geophagy - invertebrates and birds
c) Absorption and adsorption

3.2.4: Applications - Social and trans-generational aspects of insects, birds and mammals

3.2.5: Contribution to human medicines

Unit IV: Zoogeography (15L)

O*bjectives:*

- *To introduce learner to the geographic distribution (present and past) of animal species.*
- *To introduce learner to various ways of animal distribution.*

Desired outcome:

- *The learners will become acquainted with how and why different animal species are distributed around the globe.*

4.1: Introduction: Plate tectonics and continental drift theory

4.2: Animal Distribution and Barriers

4.2.1: Isolating Mechanisms

4.2.2: Patterns of animal distribution - continuous, discontinuous and bipolar

4.2.3: Barriers of distribution -Topographic, climatic, vegetative, large water masses, land mass, lack of salinity and special characteristic habit (homing instinct).

4.2.4: Means of dispersal - land bridges, natural rafts and drift wood, favouring gales, migration by host, accidental transportation and by human agencies

4.3: Zoogeographical Realms: Palearctic, Ethiopian, Oriental, Australian, Neotropical, Nearctic and Antarctic

Practical Syllabus for Semester VI
Course code: USZOP06: COURSE 15

1. Group Protochordata

- Subphylum Urochordata
  - Class Larvacea e.g. *Oikopleura* (Sea squirt)
  - Class Ascidiacea e.g. *Ciona* (Transparent Sea squirt)
  - Class Thaliacea e.g. *Salpa* (Common salp)

- Subphylum Cephalochordata
  - Class Leptocardii e.g. *Branchiostoma* (*Amphioxus*)

- Subphylum Vertebrata: Division Agnatha
  - Class Ostracodermi e.g. *Pharyngolepis*
  - Class Cyclostomata e.g. *Petromyzon* (Lamprey)

2. Division Gnathostomata

- Superclass Pisces:
  - Class Placodermi e.g. *Bothriolepis*
  - Class Chondrichthyes e.g. *Rhinobatos* (Guitar fish), *Chimaera* (Rabbitfish)
  - Class Osteichthyes e.g. *Protopterus, Clarius* (Catfish)
- Superclass Tetrapoda:
  - Class Amphibia e.g. *Alytes* (Midwife toad) and *Triton* (Salamander)
  - Class Reptilia e.g. *Varanus* (Monitor lizard) and *Crocodylus* (Crocodile)

3. Class Aves: Examples: *Eudyptes* (Penguin), *Phoenicopterus* (Flamingo) and *Gyps* (Vulture)

4. Class Mammalia: Examples: *Dasyurus* (Quoll), *Petaurista* (Flying squirrel) and *Macaca* (Monkey).

5. Study of Shark with the help of diagram / Photograph / Simulation whichever possible. No animal shall be dissected.

a) Digestive system
b) Heart and Aortic arches
c) Urinogenital System
d) Endoskeleton of shark:
   i. Axial - Skull and vertebral column
   ii. Appendicular - Pelvic and pectoral fins, pelvic and pectoral girdle

6. Visit to fish market / Aquarium / Zoo/ National Park / Local Gardens / Local available niche / Sanctuaries / and such other places in Maharashtra and / or India and / or abroad to observe chordates and prepare a report. College may conduct more than one field visit for wide exposure, if feasible. However, at least one field visit should be such that it is affordable to every student.

Course code: USZOP06: COURSE 16

1. Effect of varying pH on activity of enzyme Acid Phosphatase.
2. Effect of varying enzyme concentration on activity of enzyme Acid Phosphatase.
3. Effect of varying substrate concentration on activity of enzyme Acid Phosphatase.
4. Effect of inhibitor on the activity of enzyme Acid Phosphatase.
5. Separation of LDH isozymes by agarose / polyacrylamide gel electrophoresis.
6. Histology of endocrine glands: T.S. of pituitary, thyroid, parathyroid, pancreas, adrenal.
7. Instruments for tissue culture - Autoclave Millipore filter, CO_2 incubator, Laminar air-flow. (Principle and use).
8. Packaging of glassware for tissue culture.
9. Aseptic transfer techniques.
10. Trypsinization and vital staining using Trypan blue stain.

Course code: USZOP06: COURSE 17

1. Quantitative Estimation of RNA by Orcinol method.
2. Quantitative Estimation of DNA by Diphenylamine method.
3. Separation of Genomic DNA by Agarose gel electrophoresis.
4. Colorimetric estimation of proteins from given sample by Folin-Lowry's method.
5. Problems based on Restriction endonucleases.
6. Karyotype (Idiogram) analysis for the following syndromes with comments on numerical and / or structural variations in chromosomes (no cutting of chromosomes):
    a. Turner's syndrome
    b. Klinefelter's syndrome
    c. Down's syndrome
    d. Cri-du-chat syndrome
    e. D-G translocation
    f. Edward's syndrome
    g. Patau's syndrome

7. Interpretation of genetic formulae: Deletion, duplication, inversion and translocation.
8. Calculation of mitotic index from the photograph or stained preparation of onion root tip or cancer cells.
9. Explore BLAST for nucleotide sequence comparison.
10. Explore the databases (Nucleotide, Protein) at NCBI for querying a nucleotide or protein sequence.
11. Exploring bibliographic database PubMed for downloading a research paper on subject of interest with the use of operators.

Course code: USZOP06: Course 18

1. Estimation of phosphates from sample water.
2. Estimation of BOD from sample water.
3. Estimation of COD from sample water.
4. Estimation of Nitrates from sample water.
5. Estimation of acidity and alkalinity of sample water by methyl orange and phenolphthalein indicator.
6. Comparative study of sound intensity in different places by Decibel meter.
7. Study of bioprospecting:
   a. Tumour suppression compounds e.g. Sponge.
   b. Skin erythema treatment from gel - *Aloe vera, Aloe ferox.*
8. Study of Zoopharmacognosy in ants, cats, elephants and dogs.
9. Indicate the distribution of fauna in the world map with respect to its realm and comment on the pattern of distribution.
   a. Palearctic: Giant Panda and Japanese Macaque
   b. Ethiopian: Common ostrich and African bush elephant
   c. Oriental: Indian one-horned Rhinoceros and Gharial
   d. Australian: Platypus and Red Kangaroo
   e. Neotropical: Guanaco and South American Tapir
   f. Nearctic: Virginia opossum and Sea otter
   g. Antarctic: Emperor Penguin and Antarctic Minke Whale
10. Excursion (Study tour / Visit) to Zoo / Sanctuary / National park / Research institute, etc. and submit a report. College may conduct more than one field visit for wide exposure, if feasible. However, at least one field visit should be such that it is affordable to every student.

References and Additional Reading for Semester VI

Course 15

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- Introduction to Zoology - Vol II: K. K. Chaki, G. Kundu and S. Sarkar, New Crystal Book Agency.
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- Practical Zoology: Vertebrate, by S. S. Lal, 2015.
- A Textbook of Invertebrate Zoology & Cell Biology, by V. S. Kanwate, A. N. Kulkarni et al. ed. Alka Prakashan.
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ADDITIONAL READING

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- http://www.nhptv.org/wild/chordata.asp
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- Zoopharmacognosy by Jesse Russell, Ronald Cohn.
- News Feature: Animals that self-medicate by Joel Shurkin.
- Zoopharmacognosy and Herbal Pharmacology by Thomas H. Ingraham.
- How Animals Heal Themselves: Self-Selection: Self-Selection: Giving Animals the Choice to Select Their Own Natural Medicines: Ingraham Applied Zoopharmacognosy by Caroline Ingraham.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4267359/.
- Zoopharmacognosy: The Use of Medicinal Plants by Animals by Eloy Rodriguez and Richard Wrangham https://link.springer.com/chapter/10.1007/978-1-4899-1783-6_4
- http://www.calmercreatures.co.uk/zoopharmacognosy-dogs/.
- Zoopharmacognosy, The Self-Medication Behavior Of Animals by Eraldo Medeiros Costa-Neto. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.940.6592&rep=rep1&type=pdf

LEARNERS' SPACE

Course 15

1. Organize a lecture and interaction of an expert working in the field of vertebrate study like wild photography, research project etc.
2. Collect information on phylogeny and geological time scale.
3. Did you notice that the number of frogs or earthworms is decreasing? Find out the probable reasons.
4. Comprehend the benefits of frog to farmer.
5. Study the reasons of extinction of dinosaurs
6. Enlist names of extinct birds.
7. Find out the reasons the *Archaeopteryx* is a connecting link between reptiles and birds.
8. Name the largest terrestrial and aquatic mammal.
9. List the scientific names of sharks found in Indian Ocean.
10. Study how is the age of the fossil decided.

Course 16

1. Elucidate on the Nobel Prize winning research work in the field of enzymology.
2. Study Eadie-Augustinsson plot and Hanes-Woolf plot of enzyme kinetics.
3. Make a report of isoenzymes (other than LDH) and their role in human body.
4. Kangaroo rats do not need to drink water at all. Explore the reason.
5. Collect information on:
   - Allen's rule
   - Bergman's rule
   - Gloger's rule
   - Jordan's rule
   - Rensch's rule
6. Review the mechanism and role of hormones like ecdysone and juvenile hormone in invertebrates.
7. Pineal gland has received attention as a 'mystery gland'. Find the reasons for it.
8. Prepare a report on therapeutic applications of hormones.
9. Present an account on recent advances in animal tissue culture.
10. 'HeLa' cells make the oldest immortal human cell line. Trace its history and significance.
11. Compare mortal and immortal cell lines.

Course 17

1. Study various types of genetic recombination. Explain any one mechanism.
2. Enlist enzymes involved in the central dogma of molecular biology. Comment on the specific biochemical reaction they catalyze.
3. Collect the information on satellite DNA. Discuss several forms of DNAs.
4. Give significance of telomere.
5. Gain information on chimeric DNA. Give its applications.
6. Comment on gene splicing.
7. Explore DNA microarray applications.
8. Comment on role of transgenic bacteria in pharmaceuticals.
9. Give interesting output of HGP.
10. Give examples of lysosomal storage disorders.
11. Explore information on lethal genes and jumping genes.
12. Enlist the variations in BLAST and FASTA.
13. Find the structure of a protein of your choice using UNIPROT.
14. Give role of bioinformatics in clinical biology.

15. Browse through website OMIA.

Course 18

1. Find out the role of an ISO 14001 environmental management system.
2. Explain environmental audit and carbon footprint.
3. Collect information on life cycle assessment (LCA) as an environmental management tool.
4. Collect the information about institutes those provide environmental management education.
5. Find out the role of industries such as TATA steel in environmental management.
6. Explain the benefits of environmental monitoring for an industry.
7. Comment on ethics of Wildlife Management and Conservation.
8. Role of WTI in wildlife research and management.
9. Comment on Sustainable Wildlife Management (SWM).
10. Convention on Biological Diversity (CBD)
11. Find the following:
    - Bioprospecting and Maya ICBG controversy.
    - Contribution of Babu Kalunde in self-medication.
12. Link the study of human evolution with Zoopharmacognosy.
13. Explain Wallace's Line and Weber's line.
14. Role of zoogeography in speciation.
15. List the animal species which exhibit homing instincts.

***Note - The practicals may be conducted by using specimens authorized by the wild life and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/simulations/ models etc. as recommended by the UGC and as envisaged in the regulation of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in above.**

N.B:

I) It is pertinent to note that we have to adhere strictly to the directions as given in the UGC Circular F14-4/2006 (CPP-II).

II) Apart from the Institutional Animal Ethics Committee (IAEC) and any other Committee appointed by a Competent Authority / Body from time to time, every college should constitute the following Committees:

1) A Committee for the Purpose of Care and Supervision of Experimental Animals (CPCSEA) and
2) A Dissection Monitoring Committee (DMC) to ensure that no dissections are done.

Composition of DMC shall be as follows:

i) Head of the Concerned Department (Convener / Chairperson)
ii) Two Senior Faculty Members of the concerned Department
iii) One Faculty of related department from the same College
iv) One or two members of related department from neighbouring colleges.

Use of animals for any experiment / dissection /mounting is banned. Simulations, authorized permanent specimens / slides, charts, models and other innovative methods are encouraged.

Scheme of Examination (Theory and Practical)

(a) External assessment of one hundred (100) marks per course per semester should be conducted as per the following skeleton question paper pattern.

(c) One practical examination of fifty (50) marks per course each should be conducted at the end of every semester.

SKELETON- EXAMINATION PATTERN (THEORY)

Time: 3 hours **Total marks: 100**

Q1	Based on Unit 1	20 marks
Q.2.	Based on Unit 2	20 marks
Q.3.	Based on Unit 3	20 marks
Q.4.	Based on Unit 4	20 marks
Q.5.	Based on all four Units	20 marks

***Internal option scheme shall be followed from time to time as per university guidelines for T. Y. B. Sc.**

T. Y. B. Sc. Zoology: Semester V (Practical)
Course Code: USZOP05: Course 11

Skeleton of Practical Examination Question Paper

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1	Sepia: Sketch and label _____ system. (Digestive / Reproductive system / Nervous system) **OR** Identify and Describe: a, b & c (Jaws / Radula / Chromatophores / Spermatophores / Statocyst) **OR** Perform virtual dissection of _____ system.	09
Q.2.	Identify and classify giving reasons: a) Protozoa / Porifera / Cnidaria b) Platyhelminthes / Nematoda c) Annelida / Arthropoda d) Mollusca / Echinodermata	12
Q.3	Identify, classify and describe a) Acanthocephala / Chaetognatha / Onychophora b) Hemichordata c) Observe the animal* (photo/existing preserved specimen) and identify phylum giving reasons. *A suitable animal which is not prescribed in the syllabus	09
Q.4	Field report - Submission and Discussion based on any one field visit which is attended by the student to avoid disparity due to financial constraints.	10
Q.5	Viva voce	05
Q.6	Journal	05

T. Y. B. Sc. Zoology: Semester V (Practical)
Course Code: USZOP05: Course 12

Skeleton of Practical Examination Question Paper

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1 Enumerate erythrocytes in the given sample and comment on clinical condition. 15

OR

Q.1 Enumerate leucocytes in the given sample and comment on clinical condition.

OR

Q.1 Present a report on differential count of leucocytes and comment on clinical condition.

Q.2 Estimate total plasma proteins by Folin's method. 10

OR

Q.2 Estimate serum/plasma total triglycerides by Phosphovanillin method.

Q.3 Estimate haemoglobin by Sahli's acid haematin method. 10

OR

Q.3 Record Erythrocyte Sedimentation Rate by Westergren / Wintrobe method.

OR

Q.3 Determine serum LDH by colorimetric/spectrophotometric method.

Q.4 Perform Latex agglutination test - Rheumatoid Arthritis. 05

OR

Q.4 Record bleeding / clotting time and comment on clinical significance.

Q.5 Viva voce 05

Q.6 Journal 05

T. Y. B. Sc. Zoology: Semester V (Practical)
Course Code: USZOP05: Course 13

Skeleton of Practical Examination Question Paper

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1	Demonstrate the effect of CCl_4 on the level of enzyme activity of aspartate/ alanine amino transferase / alkaline phosphatase in liver (*in vitro* approach)	10
Q.2	From the infiltrated tissue prepare block, trim and mount it on the block holder.	09
	OR	
Q.2	Mount the ribbon on slide from the given block.	
	OR	
Q.2	Stain the given histological slide and identify the tissue.	
Q.3	Identify and describe a, b, c, d. a) & b) based on study of mammalian tissues c) & d) based on diseases or conditions	08
Q.4	Interpret the pathological report - blood / urine / stool.	05
Q.5	Problems in Biostatistics (Any one)	08
Q.6	Viva voce	05
Q.7	Journal	05

T.Y.B. Sc. Zoology: Semester V (Practical)
Course Code: USZOP05: Course 14

Skeleton Question Paper for Practical Examination

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1	Make a temporary mounting of chick embryo (up to 48 hours)	10
Q.2	Identify and describe a) and b) Based on integumentary system c) and d) Based on forelimb muscle e) and f) Based on hind limbs muscle g) and h) Based on osteology - human axial skeleton i) Based on osteology - human appendicular skeleton j) Chick embryo up to 72 hours	30
Q.3	Viva-voce	05
Q.4	Journal	05

T. Y. B. Sc. Zoology: Semester VI (Practical)
Course Code: USZOP06: Course 15

Skeleton of Practical Examination Question Paper

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1	Identify, classify giving reasons a) Urochordata / Cephalochordata / Ostachodermi / Cyclostomata b) Observe the animal* (photo/existing preserved specimen) and state its class giving reasons. * The animal should be other than prescribed in the syllabus	06
Q.2.	Identify, classify and describe a) Pisces b) Amphibia c) Reptilia d) Aves e) Mammalia	15
Q.3	Study of shark with the help of Specimen / Photograph / Simulation (Digestive system / Urinogenital system / Heart and aortic arches)	06
Q.4	Identify, sketch and label / Identify and describe marked portion in given diagram Skull or vertebra of shark / Fin of shark (Pectoral / Pelvic) / Girdle of shark (Pectoral / Pelvic)	03
Q.5	Field report - Submission and Discussion based on any one field visit which is attended by the student to avoid disparity due to financial constraints.	10
Q. 6	Viva Voce	05
Q.7	Journal	05

T. Y. B. Sc. Zoology: Semester VI (Practical)
Course Code: USZOP06: Course 16

Skeleton of Practical Examination Question Paper

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1 Demonstrate the effect of _____ on the activity of acid phosphatase (Substrate concentration / pH variation / Enzyme concentration / Inhibitor concentration) 15

OR

Q.1 Perform trypsinization and show the isolated cells using suitable vital stain.

Q.2 Separate LDH isozymes from the given sample by agarose / polyacrylamide gel electrophoresis 10

OR

Q.2 Demonstrate the packaging of glassware for tissue culture (any 3)

OR

Q.2 Demonstrate the technique of aseptic transfer.

Q.3 Identify and describe a, b, c, d, e 15

a to d: Slides / Photographs of based on histology of endocrine glands
e: Instruments for tissue culture (any one)

Q.4 Viva voce 05

Q.5 Journal 05

T. Y. B. Sc. Zoology: Semester VI (Practical)
Course Code: USZOP06: Course 17

Skeleton of Practical Examination Question Paper

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1	Isolation & Estimation of RNA by Orcinol method.	15
	OR	
Q.1	Isolation & Estimation of DNA by Diphenylamine method.	
Q.2	Separation of Genomic DNA by Agarose gel electrophoresis.	09
	OR	
Q.2	Colorimetric estimation of proteins from given sample by Folin's method.	
Q.3	Problems based on Restriction endonucleases (any two).	08
	OR	
Q.3	Calculation of mitotic index from the photograph or stained preparation of onion root tip or cancer cells.	
	OR	
Q.3a	Analyse the given syndrome and comment on numerical and/or structural variations in chromosomes.	04
Q.3b	Interpretation of a genetic formula.	04
Q.4	Demonstrate the use of bioinformatics tool:	08
	BLAST for nucleotide sequence comparison.	
	OR	
	Databases at NCBI for querying a nucleotide / protein sequence with the help of suitable operator.	
	OR	
	PubMed for downloading a research paper of interest with the help of suitable operator.	
Q.5	Viva voce	05
Q.6	Journal	05

T.Y. B. Sc. Zoology: Semester VI (Practical)
Course Code: USZOP06: Course 18

Skeleton Question Paper for Practical Examination

Time: 9.30 AM to 2.30 PM **Total Marks: 50**

Q.1	Estimation of BOD / COD / nitrates from the given water sample	10
Q.2	Estimation of phosphates / acidity / alkalinity of sample water.	08
Q.3	Identification a) Based on bioprospecting (*Sponge / Aloe ferox / Aloe vera* - any one) b) Zoopharmacognosy (ants, cats, elephants and dogs - any one)	06
Q.4	Identify the given animals with respect to their realms and comment (any two).	06
Q.5	Study tour Visit Report - Submission and Discussion based on any one field visit which is attended by the student to avoid disparity due to financial constraints.	10
Q.7	Journal	05
Q.6	Viva voce	05

Research Project (Optional with Additional Credits)
Course Code: USZOR01 and USZOR02

There shall be a component of 'Research Project' which will be optional, catering to the needs of the advanced learners and those desirous of pursuing higher studies and / or career in research. Since Research Project is optional, its credits are in addition to the credits otherwise allotted to B.Sc. program in Zoology. The credits of Research Project shall therefore be considered as additional credits, performance of which shall be separately evaluated. Needless to say that the marks / GPA / grade obtained by the learner in the Research Project shall appear separately in the marksheet or shall be certified separately by the University of Mumbai in both the semesters viz. Semester V and Semester VI. These marks shall not be added to the total / grand total of the program and shall not be considered for class / Grade / GPA / merit / rank towards this program of the University of Mumbai. Research Project shall be evaluated by allotting duty to the examiners at a centre / centres in each district where the learners who have completed the projects shall be invited for assessment on a day scheduled for the purpose by the Chairman of Practical Examinations who would plan, coordinate and notify the same officially through the University. The remuneration for assessment of the Research Project shall be as decided by the University from time to time.

The learners may seek guidance for the research work from a mentor who could be a teacher from his/her college or any other college or from the industry; though it is not mandatory to have a mentor since Research Project can also be done independently, However no leniency will be shown during assessment to maintain quality defining the candidate as advanced learner. Assessment will be based on the spiral bound Proposal submitted in Semester V and Dissertation submitted in Semester VI along with *Viva voce* conducted by the examiner, details of which shall be as follows:

In semester V the learners will submit an outline / scheme / project proposal to be evaluated by the external examiner. Evaluation will be based on the following guidelines such as Literature Search / Survey, Objectives, Work plan, Materials and Methods, Rationale, Hypothesis, Expected Outcome, Relevance and Bibliography, etc., as presented in the spiral bound research proposal which shall carry 25 marks, in Semester V. *Viva voce* conducted by the concerned external examiner on the said proposal shall carry 25 marks. Learner may opt for PowerPoint presentation on the said research proposal, if desired. Thus Research Proposal shall carry total 50 marks with a credit of (01), in Semester V.

Actual execution / practical work of this project will be completed before the Semester VI examination. The external examiner will evaluate the 'Printed Dissertation' in Semester VI, carrying 25 marks based generally on guidelines such as Abstract / Synopsis, Materials and methods, Observations, Interpretations of Results, Discussion, Conclusion and Relevance of work, Recommendation, Future scope, etc., incorporated in the Dissertation. *Viva voce* conducted by the external examiner based on the dissertation presented with the PowerPoint presentation or otherwise shall carry 25 marks. Thus Research Project with dissertation shall carry 50 marks having credit of (01) in semester VI.

A list of the candidates offering the project and the titles of their respective project should be forwarded by the College along with the examination application form in SEM-V and SEM-VI.

The total credits (02) of Research Project in Semester V and Semester VI, are additional and may be transferred to the other relevant program and/or for post-graduation program, if desired by the learner, wherever applicable and if permitted by the ordinances of the University of Mumbai, as prescribed therein, if promulgated.

UNIVERSITY OF MUMBAI

No. UG/91 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Commerce & Management Faculty is invited to this office Circular No. UG/28 of 2015, dated 22nd July, 2015 relating to syllabus of Bachelor of Commerce (Accounting and Finance) degree programme.

Their attention is also invited to University Circular No. UG/106 of 2016-17 dated 25th October, 2016 for F.Y.B.Com. (Accounting & Finance) Sem. I & II and University Circular No. UG/166 of 2017-18 dated 8th August, 2017 for S.Y.B.Com. (Accounting & Finance) Sem. III & IV respectively.

They are hereby informed that the recommendations made by the Board of Studies in Accountancy at its meeting held on 28th February, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.42 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.Com. in Accountancy (Accounting and Finance) (Sem. V & VI), has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
27th July, 2018

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Commerce & Management Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.42/05/05/2018

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No. UG/ 91 -A of 2018 MUMBAI-400 032 27th July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Commerce & Management,
2) The Director, Board of Examinations and Evaluation,
3) The Director, Board of Students Development,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. (Accounting and Finance)
Programme at
Third Year
Semester V and VI

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Accountancy

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

T.Y.B.Com. (Accounting and Finance)

(To be implemented from Academic Year 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 &4	*Any four courses from the following list of the courses	**12**	1,2,3 &4	**Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Financial Accounting - V	**04**	5	Financial Accounting - VII	**04**
6	Financial Accounting - VI	**04**	6	Project Work-II	**04**
	Total Credits	**20**		**Total Credits**	**20**

- ✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ Study Area*

****List of Elective Courses for Semester V (Any Four)***		*****List of Elective Courses for Semester VI (Any Four)***	
01	Cost Accounting - III	01	Cost Accounting - IV
02	Financial Management - II	02	Financial Management - III
03	Taxation - IV (Indirect Taxes - II)	03	Taxation - V (Indirect Taxes- III)
04	International Finance	04	Security Analysis and Portfolio Management
05	Financial Analysis and Business Valuation	05	Management Control Systems
06	Management -II (Management Applications)	06	Economics Paper – III (Indian Economy)
Note: Course selected in Semester V will continue in Semester VI			

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester V

No. of Courses	Semester V	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Financial Accounting - V	**04**
6	Financial Accounting - VI	**04**
	Total Credits	**20**

****List of Elective Courses for Semester V (Any Four)***	
01	Cost Accounting - III
02	Financial Management - II
03	Taxation - IV (Indirect Taxes - II)
04	International Finance
05	Financial Analysis and Business Valuation Management
06	Management -II (Management Applications)I

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

1. Cost Accounting – III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Uniform Costing and Inter-Firm Comparison	05
02	Integrated System and Non Integrated System of Accounts	15
03	Operating Costing	10
04	Process Costing- Equivalent Units of Production and Inter-process Profit	15
05	Activity Based Costing System	15
	Total	**60**

Sr. No.	Modules / Units
1	**Uniform Costing and Inter –Firm Comparison**
	Uniform costing Meaning of and need for Uniform costing Essentials for success of Uniform costing Advantages and limitations of Uniform costing Areas of Uniformity, Uniform cost manual **Inter Firm Comparison** Pre-requisites of inter firm comparison; Advantages and limitations Practical problems
2	**Integrated System and Non- integrated System of Accounts**
	Integrated System Meaning; Features, Advantages and Disadvantages Journal Entries and Preparing Integrated Ledgers. Practical problems **Non-Integrated system** Meaning; Features, Advantages and disadvantages Journal entries and Preparing Cost Control Accounts Practical problems
3	**Operating Costing**
	Meaning of operating costing; Determination of per unit cost ; Pricing of services Collection of costing data Note-Practical problems based on costing of hospitals, hotels, goods and passengers transport service
4	**Process Costing – Equivalent units of Production and Inter Process Profit**
	Valuation of Work in progress and Equivalent production (FIFO Method and Weighted Average Method)) Inter Process transfer at Profit Practical problems
5	**Activity Based Costing System**
	Activity Based Costing – Introduction, Advantages, Limitations, Identification of cost drivers, Practical Problems on Traditional V/s Activity Based Costing System.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Financial Management -II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Strategic Financial Management	05
02	Capital Budgeting – Project Planning & Risk Analysis	15
03	Capital Structure Theories and Dividend Decisions	15
04	Mutual Fund and Bond Valuation	15
05	Credit Management	10
	Total	**60**

Sr. No.	Modules / Units
1	**Strategic Financial Management**
	Strategic Financial Management – Need and Importance Corporate, Business and Functional Strategy Financial Planning - Need and Importance Profit Maximization Wealth Maximization Interface of Financial Policy and Strategic Management Relationship of Finance to Economics and Accounting Role of Financial Manager
2	**Capital Budgeting – Project Planning & Risk Analysis**
	Introduction - Capital Budgeting Process, Project Classification and Investment Criteria. Techniques of Capital Budgeting - NPV, Benefit Cost Ratio, Internal Rate of Return, Modified Internal Rate of Return, Payback period, Discounted Payback Period and ARR. (Inclusive of Estimation of Project Cash Flows) Capital Rationing – Meaning, Need and Dealing with Capital Rationing Problems Risk Analysis in Capital Budgeting – Sources and Perspectives of Risk, Sensitivity Analysis, Scenario Analysis, Simulation Model, Decision Tree Analysis and Break - Even Analysis.
3	**Capital Structure Theories and Dividend Decisions**
	Capital Structure Theories – Background, Assumptions, Definitions and Taxation and Capital Structure Types – Net Operating Income, Net Operating Income Approach, Traditional Position, Modigliani and Miller Approach, Trade off Theory and Signalling Theory. Dividend Decisions- Need, Importance, Formulation, Legal and Procedural Aspects. Dividend Decision Models - Walter, Gordon, Graham & Dodd Model and M-M Model
4	**Mutual Fund and Bond Valuation**
	Introduction to Mutual Fund- History & Origin, Definition, Meaning, Characteristics, Advantages, Disadvantages, Limitations of Mutual Funds, Ethics in Mutual Fund. Entities involved – Sponsor, Trust, Trustee, Asset Management Company, Registrar and Transfer Agent (RTA) and Fund Houses in India. Classification of Mutual Fund - Functional/Operational – Open ended, close ended, Interval, Portfolio – Income, Growth, Balanced, MMMF, Geographical/ Location – Domestic and Offshore, Tax Saving Funds, Exchange Traded Funds , Balance Funds , Fixed Term Plan Debt Funds and SIP. Calculations of NAV, Entry Load and Exit Load. Bond Valuation - Meaning, Measuring Bond Returns – Yield to Maturity, Yield to call and Bond Pricing. Bond Pricing Theorems, Bond Risks and Bond Duration. (Practical Problems on YTM and Bond Duration.)
5	**Credit Management**
	Credit Management – Terms of Payment, Credit Policy Variables, Credit Evaluation, Credit Granting Decision, Control of Accounts Receivables ie Receivables Management, Ageing Schedule and Credit Management in India

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Taxation – IV (Indirect Taxes – II)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Indirect Taxation and GST	10
02	Levy and Collection of GST	08
03	Concept of Supply	08
04	Documentation	08
05	Input Tax Credit and Computation of GST	20
06	Registration	06
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Indirect Taxation and GST**
	Basics for Taxation - Direct Taxes and Indirect Taxes – Features of Indirect taxes, Difference, Advantages and Disadvantages, Sources and Authority of Taxes in India (Art 246 of the Indian Constitution) **Introduction to GST** – Genesis of GST in India, Power to tax GST (Constitutional Provisions), Extent and Commencement, Meaning and Definition of GST, Benefits of GST, Conceptual Framework – CGST, IGST,SGST,UTGST, Imports of goods or services or both, Export of goods or services or both, Taxes subsumed and not subsumed under GST. **GST Council and GST Network** **Definitions** under CGST Act
2	**Levy and Collection of GST**
	Charge of GST, Levy and Collection GST, Composite and Mixed Supplies under GST, Power to Grant Exemption, Negative list of GST, GST Rate Schedule for Goods and Services
3	**Concept of Supply**
	Taxable Event Supply Place of Supply Time of Supply Value of Supply
4	**Documentation**
	Tax Invoices, Credit and Debit notes
5	**Input Tax Credit and Computation of GST**
	Eligibility and conditions for taking Input Tax Credit Apportionment of credit & Blocked credits Credit in special circumstances Computation of GST under Inter State supplies and Intra State Supplies
6	**Registration**
	Registration – Persons liable for Registration, Persons not liable for Registration, Procedure for Registration, Deemed Registration,, Amendment, Cancellation and Revocation of Registration.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

4. International Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Derivatives – Futures	15
02	Derivatives – Options	15
03	Foreign Exchange Markets and Dealings	15
04	Foreign Exchange Exposure and Risk Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Derivatives – Futures**
	Derivatives – Need and Importance, Major Players in Derivative Markets, Features of Forward Contracts, Features of Future Contract, Forward V/s Future, Theoretical Future Price, Pricing Index Futures, Initial Margin and Maintenance Margin, Marking to Market and Variation Margin.
2	**Derivatives – Options**
	Options- Long Call, Short Call, Long Put, Short Put, Options V/s Futures, Writer of an Option, At the Money, In the Money and Out of The Money Options. Intrinsic and Time Value, Option Spreads and Strategies, Put Call Parity Theorem.
3	**Foreign Exchange Markets and Dealings**
	Introduction – Participants of Foreign Exchange Markets, Characteristics of Foreign Exchange Market, Major Foreign Currencies that Trade Worldwide, Foreign Currency Accounts – Nostro, Vostro and Loro (Cash Position and Currency position) Terms in Forex Market – Direct Quote and Indirect Quote, Bid, Ask and Spread, American terms, European terms, Spot, Tom, Cash and Forward Rates, Appreciation and Depreciation of currency, Premium and Discount, Swap Points, and Cross Rates.
4	**Foreign Exchange Exposure and Risk Management**
	Exchange Rate Determination Theories – The theory of Purchasing Power Parity, The Fischer effect, The International Fischer Effect and The Theory of Interest Rate Parity. Calculation of Forward Rate and Future Spot Rate. Arbitrage in Foreign Exchange Market – Covered and Uncovered Interest Arbitrage. Foreign Exchange Risk - Introduction, Types of Exposures and Strategies for Exposure Management. Hedging Transaction Exposure, Hedging Techniques, Money Market Hedge, Forward Hedge and Hedging of Futures & Options

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

5. Financial Analysis and Business Valuation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Financial Modeling for Project Appraisal	05
02	Financial Analysis	15
03	Growth Analysis and Sustainable Earning	10
04	Basics of Valuation	06
05	Valuation Models	12
06	Valuation of Assets and Liabilities	12
	Total	**60**

Sr. No.	Modules / Units
1	Financial Modeling for Project Appraisal
	Financial Modeling – concepts and application Financial statements module area Use of functions -NPV and IRR Forecasting Techniques
2	Financial Analysis
	Financial Analysis, Financial Statement Analysis, Analysis of Balance Sheet Analysis of Income Statement Analysis of Statement of Shareholder Equity Analysis of Cash flow Statement Analysis of Profitability
3	Growth Analysis and Sustainable Earning
	Concept of Growth Analysis Analysis of changes in profitability and sustainable earnings Evaluation of P/B ratios and P/E ratios
4	**Basics of Valuation**
	Introduction to valuation Value, Distinction between Price and Value Foundation of Business Valuation Purpose of business valuation Valuation Bias Uncertainties in Business Valuation Role of valuation in business acquisition, legal and tax purposes, efficient market hypothesis
5	**Valuation Models**
	Introduction to valuation models: asset based approach, Income based approach, market based approach Discounted cash flow valuation Relative valuation Free Cash Flow valuation
6	**Valuation of Assets and Liabilities**
	Valuation of Fixed Assets, Valuation of Inventories and Valuation of Investment Valuation of Shares Valuation of Goodwill, Patents, Copyrights, Brands, Real Estate Valuation of Liabilities

1. Elective Courses (EC)

6. Management- II (Management Applications)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Marketing Management	15
02	Production Management	15
03	Human Resource Management	15
04	Financial Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Marketing Management**
	Meaning and Definition of Marketing – 4 Ps of Marketing, Importance Product Management – Meaning & Definition – Product Development Strategies, Product life cycle, Branding- Meaning, Factors influencing branding Price Management – Meaning and Definition – Factors affecting pricing decisions, Pricing Strategies Place (Distribution) Management – Meaning and Definition – Factors Governing Distribution Decisions – Types of Distribution Channels Promotion Management – Meaning – Promotion Strategies, Integrated marketing communication Case studies based on the above topics
2	**Production Management**
	Meaning and Definition of Production Management – Scope of Production Management, Steps in Production Planning and Control Meaning of Productivity - Measurement of Productivity – Measure to increase Productivity – Productivity Movement in India Meaning and Definition of Quality Management – TQM – Quality Circles – ISO 9000/14000 Inventory Management – Meaning and Methods Case studies based on the above topics
3	**Human Resource Management**
	Human Resource Management – Meaning, Nature, Functions of Human Resource Management Human Resource Planning- Meaning, Process of Human Resource Planning Human Resource Development- Methods of Developing Human Resource Performance Appraisal – Meaning and Definition – Traditional and Modern Methods of Appraisal Employee retention Leadership- Traits, Styles Motivation- Factors of Motivation, Theories of Motivation- Maslow's Theory, Douglas MacGregor's Theory X and Theory Y Case studies based on the above topics
4	**Financial Management**
	Meaning and Definition of Financial Management – Functions of Financial Management Capital Budgeting- Introduction, Importance and Process Capital Structure- Meaning, Factors affecting Capital Structure Capital Market – Meaning and Constituents – Functions Fundamental Analysis – Technical Analysis - Venture Capital – DEMAT Account - Futures and Options Case studies based on the above topics

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

2. Core Courses (CC)

1. Financial Accounting - V

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Underwriting of shares & debentures	08
02	Buy-Back of shares	10
03	AS – 14 - Amalgamation, Absorption & External Reconstruction (excluding inter – company holding)	15
04	Internal Reconstruction	15
05	Liquidation of Companies	10
	Total	**60**

Sr. No.	Modules / Units
1	**Underwriting of shares & debentures**
	Introduction, Underwriting, Underwriting Commission Provision of Companies Act with respect to Payment of underwriting commission Underwriters, Sub-Underwriters, Brokers and Manager to issues Types of underwriting, Abatement Clause Marked, Unmarked and Firm-underwriting applications, Liability of the underwriters in respect of underwriting contract Practical problems
2	**Buy Back of Shares**
	Company Law / Legal provisions (including related restrictions, power, transfer to capital redemption reserve account and prohibitions). Compliance of conditions including sources, maximum limits and debt equity ratio. Cancellation of Shares Bought back(Excluding Buy Back of minority shareholding) Practical problems
3	**AS – 14 - Amalgamation, Absorption & External Reconstruction (excluding inter-company holdings)**
	In the nature of merger and purchase with corresponding accounting treatments of pooling of interests and purchase method respectively. Meaning and Computation of purchase consideration. Problems based on purchase method only. Practical problems
4	**Internal Reconstruction**
	Need for reconstruction and company law provisions. Distinction between internal and external reconstruction. Methods including alteration of share capital, variation of shareholder rights, sub division, consolidation, surrender and reissue / cancellation, reduction of share capital with relevant legal provisions and accounting treatment for same. Practical problems
5	**Liquidation of Companies**
	Meaning of liquidation or winding up Preferential payments Overriding preferential payments Preparation of statement of affairs, deficit / surplus account Liquidator's final statement of account Practical problems

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018- 2019

2. Core Courses (CC)

2. Financial Accounting – VI

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Final Accounts of Banking Company	15
02	Final Accounts of Insurance Company (Excl. Life Insurance)	15
03	Non – Banking Financial Companies	08
04	Valuation of Goodwill and Shares	12
05	Accounting for Limited Liability Partnership	10
	Total	**60**

Sr. No.	Modules / Units
1	**Final Accounts of Banking Company**
	Legal provision in Banking Regulation Act, 1949 relating to Accounts. Statutory reserves including Cash Reserve and Statutory Liquidity Ratio. Bill purchase and discounted, rebate of bill discounted. Final Accounts in prescribed form Non – performing assets and Income from non – performing assets. Capital Adequacy Classification of Advances, standard, sub – standard, doubtful and provisioning requirement.
2	**Final Accounts of Insurance Company (Excl. Life Insurance)**
	General Insurance – Various types of insurance, like fire, marine, Miscellaneous, Special terms like premium, claims, commission, Management expenses, Reserve for unexpired risk, reinsurance Final Accounts in a prescribed form. Revenue Statement – Form B – RA, Profit / Loss Account – Form B – PL and Balance Sheet Form B – BS.
3	**Non – Banking Financial Companies**
	Introduction, Definition, Registration and Regulation, Classification, Income Recognition, Accounting of Investment, Applicability of Prudential Norms, Assets classification, Non- performing Assets, Capital Adequacy, Preparation of Financial statement
4	**Valuation of Goodwill and Shares**
	Valuation of Goodwill Maintainable Profit method, Super Profit Method Capitalization method, Annuity Method **Valuation of Shares** Intrinsic Value Method, Yield method and Fair Value Method
5	**Accounting for Limited Liability Partnership**
	Statutory provisions Conversion of partnership business into Limited Liability Partnership Final accounts

Revised Syllabus of Courses of B.Com.(Accounting and Finance) Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Elective Courses (EC)
Cost Accounting- III
• *Lectures on Costing by Swaminathan: S. Chand and Company (P) Ltd., New Delhi* • *Cost Accounting by C.S. Rayudu, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting by Jawahar Lal and Seema Srivastava, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting by Ravi M. Kishore, Taxmann Ltd., New Delhi* • *Principles and Practices of Cost Accounting by N.K. Prasad, Book Syndicate Pvt. Ltd., Calcutta* • *Cost Accounting Theory and Practice by B.K. Bhar, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting Principles and Practice by M.N. Arora, Vikas Publishing House Pvt. Ltd., New Delhi* • *Advanced Cost and Management Accounting: Problems and Solutions by V.K. Saxena and C.D. Vashist, S. Chand and Company (P) Ltd., New Delhi* • *Cost Accounting by S.P. Jain and K.L. Narang, Kalyani Publishers, Ludhiana* • *Modern Cost and Management Accounting by M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
Financial Management - II
• *Fundamentals of Financial Management by D. Chandra Bose, PHI Learning Pvt. Ltd., New Delhi* • *Fundamentals of Financial Management by Bhabotosh Banerjee, PHI Learning Pvt. Ltd., New Delhi* • *Fundamentals of Financial Management by Vyuptakesh Sharma, Pearson Education, New Delhi* • *Fundamentals of Financial Management by J.C. Van Horne, Prentice Hall of India, New Delhi* • *Financial Management: Text and Problems by M.Y. Khan and P.K. Jain, Tata McGraw Hill, New Delhi* • *Financial Management: Theory and Practice by Prasanna Chandra, Tata McGraw Hill, New Delhi* • *Financial Management by I.M. Pandey, Vikas Publishing House, New Delhi* • *Financial Management byC. Paramasivan& T. Subramanian* • *Financial Management by IM Pandey* • *Financial Management by Ravi Kishor* • *Financial Management by Khan & Jain*
Taxation - Indirect Taxes - Paper IV
• *Indirect Taxes: Law and Practice by V.S. Datey, Taxmann* • *Indirect Taxes by V.S. Balchandra, Sultan Chand and Sons, New Delhi* • *GST Law & practice with Customs & FTP by V.S. Datey, Taxmann* • *GST by V.S. Datey, Taxmann* • GST & customs Law by K.M. Bansal, University Edition • *GST Law & practice with Customs & FTP by Vineet Sodhani, Snow White Publications* • *GST Law & practice with Customs & FTP by Sanjiv Agarwal, Snow White Publications* • *Indirect taxes(Containing GST, Customs & FTP) by MOhd. Rafi, Bharat Publications*
International Finance
• *P G Apte, International Financial Management, 5th Edition, The McGraw Hill* • *Cheol . S. Eun & Bruce G. Resnick, International Finance Management* • *Maurice D. Levi, International Finance – Special Indian Edition* • *Prakash G. Apte, International Finance – A Business Perspective* • *V A. Aadhani, International Finance*

Reference Books

Financial Analysis and Business Valuation

- *Valuation: Measuring and Managing the value of Companies: Thomas Copeland- Wiley*
- *The Handbook of Advance Business Valuation: Rovert F Reilly and Robert Swhweish: Mc Graw hill*
- *Business Valuation: Pitabas Mohanty- Taxmann*
- *Valuation- Measuring and Managing the value of Companies : Tim Koller- Mc Kinsey & Co*

Management II (Management Applications)

- *Kotlar, Philip, Marketing Management, Prentice Hall, New Delhi.*
- *Stanton, Etzel, Walker, Fundamentals of Marketing, Tata-McGraw Hill, New Delhi.*
- *Saxena, Rajan, Marketing Management, Tata-McGraw Hill, New Delhi.*
- *McCarthy, E.J., Basic Marketing: A managerial approach, Irwin, New York.*
- *Pillai R S, Bagavathi, Modern Marketing*
- *Principles of Management , Ramasamy , Himalya Publication , Mumbai*
- *Principles of Management , Tripathi Reddy , Tata Mc Grew Hill*
- *Management Text & Cases , VSP Rao , Excel Books, Delhi*
- *Management Concepts and OB , P S Rao & N V Shah , AjabPustakalaya*
- *Essentials of Management , Koontz II & W , Mc. Grew Hill , New York*

Principles of Management-Text and Cases –Dr..M.SakthivelMurugan, New Age Publications

Core Courses (CC)

Financial Accounting - V and VI

- *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi*
- *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi*
- *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi*
- *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi*
- *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai*
- *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi*
- *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc*
- *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida*
- *Compendium of Statement and Standard of Accounting, ICAI*
- *Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi*
- *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi*
- *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi*
- *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
- *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester VI

No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Course (CC)***	
5	Financial Accounting - VII	**04**
6	Project Work -II	**04**
	Total Credits	**20**

*****List of Elective Courses for Semester VI (Any Four)***	
01	Cost Accounting - IV
02	Financial Management - III
03	Taxation - V (Indirect Taxes- III)
04	Management Control Systems
05	Security Analysis and Portfolio Management
06	Economics Paper – III Indian Economy)

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

1. Cost Accounting - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Budgeting and Budgetary Control	15
02	Absorption Costing and Marginal Costing Cost Volume and Profit Analysis	15
03	Managerial Decision Making	15
04	Standard Costing and Variance Analysis	15
	Total	**60**

Sr. No.	Modules / Units
1	**Budgeting and Budgetary Control**
	Meaning & objectives, Advantages and limitations of budgets Functional budgets, fixed and flexible budgets Zero based budgeting, performance budgeting *Practical problems of preparing flexible budgets and functional budgets*
2	**Absorption Costing and Marginal Costing, Cost Volume and Profit Analysis**
	Absorption Costing and Marginal Costing Meaning of absorption costing, Introduction to marginal costing Distinction between absorption costing and marginal costing Advantages and limitations of marginal costing **Cost Volume and Profit Analysis** Break even analysis meaning and graphic presentation Margin of safety Key factor *Practical problems based on using the marginal costing formulae and key factor*
3	**Managerial Decision Making**
	Make or buy Sales mix decisions Exploring new markets Plant shut down decision *Practical problems*
4	**Standard Costing and Variance Analysis**
	Preliminaries in installing of a standard cost system Material Cost variance Labour cost variance Variable overhead variances Fixed Overhead variances Sales variances Profit variances *Practical problems*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Financial Management - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Business Valuation	05
02	Mergers and Acquisitions	15
03	Corporate Restructuring and Takeovers	15
04	Lease and Hire Purchase Financing	15
05	Working Capital financing	10
	Total	**60**

Sr. No.	Modules / Units
1	**Business Valuation**
	Conceptual Framework of Valuation – Book Value, Market Value, Economic Value, Liquidation Value, Replacement Value, Salvage Value, Value of Goodwill and Fair Value Approaches of Valuation – Assets Based Approach to Valuation, Earnings Based Approach to Valuation , Earnings Measure on Cash Flow Basis, Market Value Added Approach and Economic Value Added.
2	**Mergers and Acquisitions**
	Introduction- Basic modes of acquiring another firm, Synergy effects, Difference between Merger and Takeover, Advantages of Mergers and Acquisitions, Benefits of Merger for Acquiring firm, Reasons of companies to offer themselves for sale, Reasons for failure of Mergers and Reverse Merger. Commonly Used Bases for determining the Exchange Ratio – EPS, MPS, Book value and Combination of Measures and Evaluation of Mergers (Practical Problems)
3	**Corporate Restructuring and Takeovers**
	Introduction – Meaning, Need and Importance, Forms of Restructuring, Advantages and Disadvantages Takeovers – Meaning, SEBI Guidelines, Anti-takeover defences and Asset and Liability Restructuring. (Practical Problems)
4	**Lease and Hire Purchase Financing**
	Introduction – Meaning and Types of Leases, Rationale, Mechanics, Operating Leases, Leasing as Financing Decisions, Calculation of Cash flows of a finance lease. Hire Purchase – Meaning, Need and Importance, Calculation of Hire Purchase instalments. Choice between Leasing and Hire Purchase
5	**Working Capital financing**
	Introduction – Key features and Characteristics of Trade Credit, Bank Credit, Commercial Papers, Certificate of Deposits and Factoring. Practical Problems based on Factoring and calculations of yield of CP's and CD's

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Taxation - Paper V (Indirect Taxes – III)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Payment of Tax and Refunds	08
02	Returns	08
03	Accounts, Audit, Assessment and Records	08
04	Custom Act - I	12
05	Custom Act - II	12
06	Foreign Trade Policy	12
	Total	**60**

Sr. No.	Modules / Units
1	**Payment of Tax and Refunds**
	Payment of Tax, Interest and other Amounts, Interest on delayed Payment, TDS, TCS Refund of tax, Refund in certain cases, Interest on delayed refunds
2	**Returns**
	Types of Returns and Provisions relating to filing of Returns
3	**Accounts, Audit, Assessment and Records**
	Accounts and other records, Period of retention of accounts, Electronic Way Bill Self-Assessment, Provisional Assessment, Scrutiny of Returns, Assessment of non-filers of Returns, Assessment of Unregistered person, summary assessment in certain special cases, Audit by tax authorities, Special Audit.
4	**Custom Act - I**
	Introduction to customs law including Constitutional aspects Levy of and exemptions from customs duties – All provisions including application of customs law, taxable event, charge of customs duty, exceptions to levy of customs duty, exemption from custom duty Types of customs duties Classification and valuation of imported and export goods
5	**Custom Act - II**
	Import and Export Procedures – All import and export procedures including special procedures relating to baggage, goods imported or exported by post, stores Provisions relating to coastal goods and vessels carrying coastal goods Warehousing and Drawback
6	**Foreign Trade Policy**
	Introduction to FTP – legislation governing FTP, salient features of an FTP, Foreign Trade Policy 2015- 20, administration of FTP, contents of FTP, scope of FTP. Provision related to import and export of goods Basic concepts relating to export promotion schemes provided under FTP – Duty Exemption & remission Schemes, Duty Free Import Authorization Scheme, Reward scheme, Export Promotion Capital Goods Scheme, EOU, STP, BTP AND EHTP scheme.

1. Elective Courses (EC)

4. Security Analysis and Portfolio Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Portfolio Management – An Introduction & Process	12
02	Portfolio Management – Valuation	12
03	Fundamental Analysis	12
04	Technical Analysis	12
05	Efficient Market Theory & CAPM	12
	Total	**60**

Sr. No.	Modules / Units
1	**Portfolio Management – An Introduction & Process**
	Investment - Meaning, Characteristics, Objectives, Investment V/s Speculation, Investment V/s Gambling and Types of Investors Portfolio Management – Meaning, Evolution, Phases, Role of Portfolio Managers, Advantages of Portfolio Management. Investment Environment in India and factors conducive for investment in India. Portfolio Analysis – Meaning and its Components, Calculation of Expected Return and Risk, Calculation of Covariance, Risk – Return Trade off. Portfolio Selection – Meaning, Feasible Set of Portfolios, Efficient Set of Portfolios, Selection of Optimal Portfolio, Markowitz Model, Limitations of Markowitz Model, Measuring Security Return and Portfolio Return and Risk under Single Index Model and Multi Index Model.
2	**Portfolio Management – Valuation**
	Portfolio Revision – Meaning, Need, Constraints and Strategies. Portfolio Evaluation – Meaning, Need, Measuring Returns (Sharpe, Treynor and Jensen Ratios) and Decomposition of Performance.
3	**Fundamental Analysis**
	Economy Analysis – Meaning, Framework, Economic Analysis, Forecasting, Barometric or Indicator Approach, Econometric Model Building and Opportunistic Model Building. Industry Analysis – Concept of Analysis, Industry Life Cycle, Industry Characteristics Company Analysis – Financial Statements, Analysis of Financial Statements, (Practical questions on Debt equity ratios, total debt ratio, proprietary ratios, interest coverage ratio, Profitability ratios related to sales, investment and equity shares Efficiency or Activity Ratios) and Assessment of risk (Leverages)
4	**Technical Analysis**
	Dow Theory Meaning and Principles of Technical Analysis, Price Chart, Line Chart, Bar Chart, Japanese Candlestick Chart, Trends and Trend Reversals, Chart Patterns, Support and Resistance, Reversal Patterns, Continuation Patterns and Elliot Wave Theory Mathematical Indicators – Calculation of Moving Averages (Simple and Exponential Moving Average), Oscillators and Relative Strength Index Market Indicators Fundamental Analysis V/s Technical Analysis

Sr. No.	Modules / Units
5	**Efficient Market Theory & CAPM**
	Random Walk Theory The Efficient Market Hypothesis Forms of Market Efficiency Competitive Market Hypothesis CAPM – Fundamental Notions of Portfolio Theory, Assumption of CAPM, Efficient Frontier with Riskless Lending and Borrowing, Capital Market Line, Security Market Line and Pricing of Securities with CAPM. Arbitrage Pricing Theory (APT) – The Return Generating Model, Factors Affecting Stock Return, Expected Return on Stock, APT V/s CAPM.

1. Elective Courses (EC)

5. Management Control Systems

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Developments in Management Accounting and Control Systems	08
02	Financial Goal Setting	12
03	Responsibility Centres	15
04	Transfer Pricing	15
05	Inflation Accounting	10
	Total	**60**

Sr. No.	Modules / Units
1	**Developments in Management Accounting and Control Systems**
	–Introduction- The Modern economic environment, Traditional production processes, The background to change, The new manufacturing computer-aided design, Computer-aided manufacturing, Computer-integrated manufacturing, Flexible manufacturing systems, Value chain, Production operations systems and Management strategies, Material requirements planning, Manufacturing Resources Planning, Optimised Production Technology (OPT), ERP, CRM and SCM Just-in-time concept , Total Quality Management (TQM) and Synchronous Manufacturing. Control in special sectors: Scrap Control, Control of R & D – Project Control, Administrative Cost Control and the emphasis on continuous improvement.
2	**Financial Goal Setting**
	Analysis of Incremental ROI, Sensitivity Analysis, Developing Financial Goals along Organizational Hierarchy. Concept and Technique of Responsibility Budgeting - Analytical framework for Developing Responsibility Budgets - Integrating Responsibility Budgets Integrating Responsibility Budgeting with MBO System.
3	**Responsibility Centres**
	Introduction to Cost, Revenue, Profit and Investment Centres, Reporting of Responsibility Centre. Performance Measures -Investment Centres/Strategic Business Units, Return on Investment, The problems with ROI and Residual income (RI)
4	**Transfer Pricing**
	Introduction - Aims and Features, General rules, Cost-based prices, Market-based prices, Marginal cost, Dual pricing, Profit-maximising transfer prices, Negotiated transfer prices and other behavioural considerations
5	**Inflation Accounting**
	Introduction - Need, Brief History, Methods of Inflation Accounting (Current Purchasing Power and Current Cost Accounting), Inflation Accounting and Corporate Taxation. Financial Reporting to Management under conditions of change in price level.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

6. Economics Paper – III (Indian Economy)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction Agricultural Sector	15
02	Industrial Sector	15
03	Service Sector and External Sector	15
04	Money and Banking	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction Agricultural Sector**
	Introduction Demographic features- Poverty, Income inequality and Unemployment Urbanization and its effects Agricultural Sector Institutional Structure- Land reforms in India Technological changes in agriculture Agricultural pricing and agricultural finance Agricultural marketing National agricultural policy
2	**Industrial Sector**
	Growth and pattern of industrialization Industrial Policy of 1991.Public sector enterprises and disinvestment policy Small scale sector- problems and prospects
3	**Service Sector and External Sector**
	Service Sector Nature and scope of service industry Recent trends in Banking industry, Insurance Industry, Healthcare Industry and Tourism Industry External Sector Structure and directions of Foreign trade India's Balance of payments since 1991 FDI, foreign capital and transnational companies in India. Role and impact of SAARC, ASEAN and WTO
4	**Money and Banking**
	Money market and its features Monetary policy of RBI Progress of commercial banking in India Development of capital markets SEBI and its functions

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester VI with effect from the Academic Year 2018-2019

2. Core Courses (EC)

1. Financial Accounting – VII

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Final Account for Electricity Company	15
02	Final Accounts for Co-Operative Society: (Co-Operative Housing Society and Consumer Co-Operative Society)	15
03	Investment Accounting (w.r.t. Accounting Standard - 13)	10
04	Mutual Fund	08
05	Introduction to IFRS and Indian Accounting Standards	12
	Total	**60**

Sr. No.	Modules / Units
1	**Final Account for Electricity Company**
	Final Accounts as per Double Account System • Final Accounts as per Electricity Rules • Receipt & Expenditure on Capital Account • General Balance Sheet • Contingency Reserve Disposal of Surplus (As per Electricity Rules): Norms regarding Disposal of Surplus Replacement of Assets Simple practical problems
2	**Final Accounts for Co-Operative Society** **(Co-Operative Housing Society and Consumer Co-Operative Society)**
	Provisions of Maharashtra State Co-Operative Societies Act and rules. Accounting provisions including appropriation to various funds Format of Final Accounts – Form N Simple practical problems on preparation of final accounts of a Co-Operative housing society & Consumer Co-Operative Society
3	**Investment Accounting (w.r.t. Accounting Standard- 13)**
	For shares (variable income bearing securities) For debentures/Preference. shares (fixed income bearing securities) Accounting for transactions of purchase and sale of investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method (Excl. brokerage). Columnar format for investment account.
4	**Mutual Fund**
	Introduction, Historical Background SEBI Guidelines, Organisation, NAC Scheme, Types of Mutual Fund Schemes, , FOF Scheme, Load or No-Load Scheme, Investment Valuation norms, Pricing of units, Contents of Balance sheet and revenue Account, Evaluation of mutual funds, Disposal of Investments, Recognition of Income, Accounting policies and entries.
5	**Introduction to IFRS**
	Accounting standards: Role/objectives of accounting standards, Development of accounting standards in India - Requirements of international accounting standards - International organizations engaged in accounting harmonization - IASB - FASB - Role of IASB in developing IFRS, Applicability, Interpretation, Scope and compliance of Accounting Standards **Indian Accounting standards (Ind AS)** : Introduction, Road map, First time adaptation of Indian Accounting Standard, Conceptual framework **Comparison of Ind AS, IFRS and AS** **IFRS** : Introduction, scope Purpose & Objective of financial statement-its Frame work-its assumption, characteristics, element, recognition & measurement., first time adoption of IFRS Convergence of Ind-As and IFRS

Reference Books

Reference Books

Elective Courses (EC)

Cost Accounting- IV

- *Lectures on Costing by Swaminathan: S. Chand and Company (P) Ltd., New Delhi*
- *Cost Accounting by C.S. Rayudu, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Cost Accounting by Jawahar Lal and Seema Srivastava, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Cost Accounting by Ravi M. Kishore, Taxmann Ltd., New Delhi*
- *Principles and Practices of Cost Accounting by N.K. Prasad, Book Syndicate Pvt. Ltd., Calcutta*
- *Cost Accounting Theory and Practice by B.K. Bhar, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Cost Accounting Principles and Practice by M.N. Arora, Vikas Publishing House Pvt. Ltd., New Delhi*
- *Advanced Cost and Management Accounting: Problems and Solutions by V.K. Saxena and C.D. Vashist, S. Chand and Company (P) Ltd., New Delhi*
- *Cost Accounting by S.P. Jain and K.L. Narang, Kalyani Publishers, Ludhiana*
- *Modern Cost and Management Accounting by M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi*

Financial Management - III

- *Fundamentals of Financial Management by D. Chandra Bose, PHI Learning Pvt. Ltd., New Delhi*
- *Fundamentals of Financial Management by Bhabotosh Banerjee, PHI Learning Pvt. Ltd., New Delhi*
- *Fundamentals of Financial Management by Vyuptakesh Sharma, Pearson Education, New Delhi*
- *Fundamentals of Financial Management by J.C. Van Horne, Prentice Hall of India, New Delhi*
- *Financial Management: Text and Problems by M.Y. Khan and P.K. Jain, Tata McGraw Hill, New Delhi*
- *Financial Management: Theory and Practice by Prasanna Chandra, Tata McGraw Hill, New Delhi*
- *Financial Management by I.M. Pandey, Vikas Publishing House, New Delhi*
- *Financial Management byC. Paramasivan& T. Subramanian*
- *Financial Management by IM Pandey*
- *Financial Management by Ravi Kishor*
- *Financial Management by Khan & Jain*

Taxation - Indirect Taxes - III

- *Indirect Taxes: Law and Practice by V.S. Datey, Taxmann*
- *Indirect Taxes by V.S. Balchandra, Sultan Chand and Sons, New Delhi*
- *GST Law & practice with Customs & FTP by V.S. Datey, Taxmann*
- *GST by V.S. Datey, Taxmann*
- GST & customs Law by K.M. Bansal, University Edition
- *GST Law & practice with Customs & FTP by Vineet Sodhani, Snow White Publications*
- *GST Law & practice with Customs & FTP by Sanjiv Agarwal, Snow White Publications*
- *Indirect taxes(Containing GST, Customs & FTP) by MOhd. Rafi, Bharat Publications*

Security Analysis And Portfolio Management

- *Blake, David 1992, Financial Market Analysis , McGraw Hill London*
- *Francis J.C Investments, Analysis and Management McGraw Hill New York.*
- *Pistolese Clifford Using Technical Analysis Vision Books*
- *Reilly Frank K* and Keith Brown Investment Analysis and Portfolio Management.

Reference Books

Management Control Systems

- *Anthony & Govindrajan - Management Control Systems (TATA McGraw Hill), 12th Edition, 2006.*
- *Bob Scarlett – Management Accounting and Performance Evaluation, Oxford Press, 2006 Edition*
- *Maciarirllo& Kirby – Management Control Systems (Prentice Hall India), 2th Edition*

Economics

- *Indian Economic Survey Reports (Annual), Ministry of Finance, Government of India*
- *Indian Economy by Misra and Puri, Himalaya Publishing House - Delhi*
- *Gaurav Dutt & Ashwini Mahajan, (2016) Indian Economy, S.Chand& company PVT LTD New Delhi*
- *A.N.Agarwal – Indian Economy problems of Development and Planning New Age International Publisher*
- *RuddarDatt K.P.M Sundharam – Indian Economy S. Chand E-co LTD. Delhi*

Core Courses (CC)

Financial Accounting - VII

- *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi*
- *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi*
- *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi*
- *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi*
- *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai*
- *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi*
- *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc*
- *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida*
- *Compendium of Statement and Standard of Accounting, ICAI*
- *Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai*
- *Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi*
- *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi*
- *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi*
- *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
- *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*

University of Mumbai

B.Com. (Accounting and Finance) Programme
Guidelines for Project Work
at
Third Year
Semester VI

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Accountancy

Introduction

Inclusion of project work in the course curriculum of the B.Com. (Accounting & Finance) programme is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research analyse and scientific temperament challenging the potential of learner as regards to his/ her eager to enquire and ability to interpret particular aspect of the study. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

- There are two modes of preparation of project work
  1. Project work based on research methodology in the study area
  2. Project work based on internship in the study area

Guidelines for preparation of Project Work

1. General guidelines for preparation of project work based on Research Methodology

- The project topic may be undertaken in any area of Elective Courses.
- Each of the learner has to undertake a Project individually under the supervision of a teacher-guide.
- The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.
- University/college shall allot a guiding teacher for guidance to the students based on her / his specialization.
- The project report shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be 80 to 100 pages

Format

1st page (Main Page)

Title of the problem of the Project

A Project Submitted to

University of Mumbai for partial completion of the degree of

Bachelor in Commerce (Accounting and Finance)

Under the Faculty of Commerce

By

Name of the Learner

Under the Guidance of

Name of the Guiding Teacher

Name and address of the College

Month and Year

2nd Page
This page to be repeated on 2nd page (i.e. inside after main page)

On separate page

Index

Chapter No. 1 (sub point 1.1, 1.1.1, ... And so on)	Title of the Chapter	Page No.
Chapter No. 2	Title of the Chapter	
Chapter No. 3	Title of the Chapter	
Chapter No. 4	Title of the Chapter	
Chapter No. 5	Title of the Chapter	

List of tables, if any, with page numbers.

List of Graphs, if any, with page numbers.

List of Appendix, if any, with page numbers.

Abbreviations used:

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work

(Model Structure of the Project Work)

- **Chapter No. 1: Introduction**

  In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.

- **Chapter No. 2: Research Methodology**

  This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.

- **Chapter No. 3: Literature Review**

  This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue.

- **Chapter No. 4: Data Analysis, Interpretation and Presentation**

  This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of information's, presentation of graphs etc. can be provided with interpretation by the learner.

- **Chapter No. 5: Conclusions and Suggestions**

  In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

- **Bibliography**
- **Appendix**

On separate page

Name and address of the college

Certificate

This is to certify that Ms/Mr _____has worked and duly completed her/his Project Work for the degree of Bachelor in Commerce (Accounting & Finance) under the Faculty of Commerce in the subject of _____ and her/his project is entitled, "_____*Title of the Project*_____" under my supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University.

It is her/ his own work and facts reported by her/his personal findings and investigations.

Seal of the College

Name and Signature of
Guiding Teacher

Date of submission:

On separate page

Declaration by learner

I the undersigned Miss / Mr. _____*Name of the learner*_____here by, declare that the work embodied in this project work titled "_____ _____*Title of the Project*_____", forms my own contribution to the research work carried out under the guidance of _____*Name of the guiding teacher*_____ is a result of my own research work and has not been previously submitted to any other University for any other Degree/ Diploma to this or any other University.

Wherever reference has been made to previous works of others, it has been clearly indicated as such and included in the bibliography.

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by

Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I take this opportunity to thank the **University of Mumbai** for giving me chance to do this project.

I would like to thank my **Principal, _____**for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our **Coordinator_____**, for her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide _____ whose guidance and care made the project successful.

I would like to thank my **College Library**, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially **my Parents and Peers** who supported me throughout my project.

2. Guidelines for Internship based project work

- Minimum 20 days/ 100 hours of Internship with an Organisation/ NGO/ Charitable Organisation/ Private firm.
- The theme of the internship should be based on any study area of the elective courses
- Experience Certificate is Mandatory
- A project report has to be brief in content and must include the following aspects:
  - **Executive Summary:**

    A bird's eye view of your entire presentation has to be precisely offered under this category.
  - **Introduction on the Company:**

    A Concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
  - **Statement and Objectives:**

    The mission and vision of the organization need to be stated enshrining its broad strategies.
  - **Your Role in the Organisation during the internship:**

    The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.
  - **Challenges:**

    The challenges confronted while churning out theoretical knowledge into practical world.
  - **Conclusion:**

    A brief overview of your experience and suggestions to bridge the gap between theory and practice.
- The project report based on internship shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be of minimum 50 pages

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
• **Evaluation of Project Report (Bound Copy)**	**60 Marks**
▪ Introduction and other areas covered	20 Marks
▪ Research Methodology, Presentation, Analysis and interpretation of data	30 Marks
▪ Conclusion & Recommendations	10 Marks
• **Conduct of Viva-voce**	**40 Marks**
▪ In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
▪ Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
▪ Overall Impression (including Communication Skill)	10 Marks

Note:

- ***The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of project shall conduct the viva-voce examination as per the evaluation pattern***

Passing Standard

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester V and VI
with effect from the Academic Year 2018-2019

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: 25 %

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.

  (Detail question paper pattern has been given separately)

❖ **Passing Standard**

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

UNIVERSITY OF MUMBAI
No. UG/7 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Commerce & Management Faculty is invited to this office Circular No.UG/121 of 2016-17, dated 27th October, 2016 relating to syllabus of Bachelor of Commerce (B.Com.) degree course.

They are informed that the recommendations made by the I/c Dean, Faculty of Commerce & Management in Banking and Finance at its meeting held on 28th February, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.45 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.Com. (Banking and Insurance) (Sem. V & VI)), has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
12th June, 2018

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Commerce & Management Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.45/05/05/2018

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No. UG/ 7 -A of 2018 MUMBAI-400 032 12th June, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Commerce & Management,
2) The Director, Board of Examinations and Evaluation,
3) The Director, Board of Students Development,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. (Banking and Insurance)
Programme at
Third Year
Semester V and VI

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Banking & Finance

B.Com. (Banking and Insurance) Programme

Under Choice Based Credit, Grading and Semester System

T.Y.B.Com. (Banking and Insurance)

(To be implemented from Academic Year 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 &4	*Any four courses from the following list of the courses	**12**	1,2,3 &4	**Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	International Banking and Finance	**04**	5	Central Banking	**04**
3	***Ability Enhancement Course(AEC)***		***3***	***Ability Enhancement Course (AEC)***	
6	Research Methodology	**04**	6	***Project Work*** In Banking & Insurance	**04**
	Total Credits	**20**		**Total Credits**	**20**

- ✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ Study Area*

****List of Elective Courses for Semester V (Any Four)***		*****List of Elective Courses for Semester VI (Any Four)***	
01	Financial Reporting & Analysis(Corporate Banking & Insurance)	01	Security Analysis and Portfolio Management
02	Auditing - I	02	Auditing - II
03	Strategic Management	03	Human Resource Management
04	Financial Services Management	04	Turnaround Management
05	Business Ethics and Corporate Governance	05	International Business
06	Actuarial Analysis in Banking & Insurance	06	Marketing in Banking & Insurance
Note: Course selected in Semester V will continue in Semester VI			

B.Com. (Banking and Insurance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester V

No. of Courses	Semester V	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	International Banking and Finance	**04**
6	Research Methodology	**04**
	Total Credits	**20**

****List of Elective Courses for Semester V (Any Four)***	
01	Financial Reporting and Analysis(Corporate Banking & Insurance)
02	Auditing- I
03	Strategic Management
04	Financial Services Management
05	Business Ethics and Corporate Governance
06	Actuarial Analysis in Banking & Insurance

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

1. Financial Reporting and Analysis (Corporate Banking & Insurance)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Final Accounts of Banking Company	16
02	Final Accounts of Insurance Company	12
03	Preparation of Final Accounts of Companies	12
04	Cash Flow Analysis & Ethical Behavior and Implications for Accountants	12
05	Introduction to IFRS	08
	Total	**60**

Sr. No.	Modules / Units
1	**Final Accounts of Banking Company**
	Legal Provisions in Banking Regulation Act, 1949 relating to Accounts. Statutory Reserves including Cash Reserve and Statutory Liquidity Ratio. Bills Purchase and Discounted, Rebate on Bill Discounted. Final Accounts in Prescribed Form. Non – performing Assets and Income from Non – performing Assets. Classification of Advances: Standard, Sub – standard, Doubtful and Provisioning Requirement.
2	**Final Accounts of Insurance Company**
	(a) Preparation and Presentation of Corporate Final Accounts for Insurance Companies. (b) Final Accounts in accordance with Insurance Legislation (c) Study of Accounting Policies from Annual Reports of Listed Insurance Companies
3	**Preparation of Final Accounts of Companies**
	Relevant Provisions of Companies Act related to Preparation of Final Account (excluding cash flow statement) Preparation of Financial Statements as per Companies Act. (excluding cash flow statement) AS 1 in Relation to Final Accounts of Companies (Disclosure of Accounting Policies) Adjustment for – 1. Closing Stock 2. Depreciation 3. Outstanding expenses and income 4. Prepaid expenses and Pre received income 5. Proposed Dividend and Unclaimed Dividend 6. Provision for Tax and Advance Tax 7. Bill of exchange (Endorsement, Honour, Dishonour) 8. Capital Expenditure included in Revenue expenditure and vice versa eg- purchase of furniture included in purchases 9. Unrecorded Sales and Purchases 10. Good sold on sale or return basis 11. Managerial remuneration on Net Profit before tax 12. Transfer to Reserves 13. Bad debt and Provision for bad debts 14. Calls in Arrears 15. Loss by fire (Partly and fully insured goods) 16. Goods distributed as free samples. Any other adjustments as per the prevailing accounting standard.

Sr. No.	Modules / Units
4	**Cash Flow Analysis & Ethical Behaviour and Implications for Accountants**
	Cash Flow Analysis as per AS 3 (Indirect Method Only) **Ethical Behaviour and Implications for Accountants** Introduction, Meaning of Ethical Behaviour Financial Reports – Link between Law, Corporate Governance, Corporate Social Responsibility and Ethics. Importance and Relevance of Ethical Behavior in Accounting Profession. Implications of Ethical Values for the Principles Versus Rule Based Approaches to Accounting Standards The Principal Based Approach and Ethics The Accounting Standard Setting Process and Ethics The IFAC Code of Ethics for Professional Accountants Contents of Research Report in Ethical Practices Implications of Unethical Behavior on Financial Reports Company Codes of Ethics The increasing role of Whistle – Blowing Need to learn ethics.
5	**Introduction to IFRS**
	IFRS 1- First Time Adoption of International Financial Reporting Standards Objective, Scope, Definitions, First IFRS Financial Statements, Recognition and Measurement, Comparative Information, Explanation of Transition to IFRS, Reconciliations, Interim Financial Reports, Designation of Financial Assets or Financial Liabilities, Use of Fair Value as Deemed Cost, Use of Deemed Cost, Exceptions to Retrospective Application of other IFRS, Exemptions for Business Combination, Exemptions from other IFRS and Presentation and Disclosure. **IFRS 2**- Share Based Payment – Objective, Scope, Definitions, Recognition, Equity Settled Share Based Payment Transactions, Transactions in Which Services are Received, Treatment of Vesting Conditions, Expected Vesting Period, Determining the Fair Value of Equity Instruments granted, Modifications of terms and conditions, Cancellation, Cash Settled Share Based Payment Transactions, Share Based Payment Transactions in Which The Terms of The Arrangement Provide The Counterparty With A Choice of Settlement, Share Based Payment Transactions in which the Terms of the Arrangement Provide the Entity with a Choice of Settlement, Share Based Payment Transactions Among Group Entities (2009 Amendments) Disclosure.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Auditing-I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Auditing	15
02	Audit Planning, Procedures and Documentation	15
03	Auditing Techniques and Internal Audit Introduction	15
04	Auditing Techniques: Vouching	08
05	Auditing Techniques: Verification	07
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Auditing**
	Basics–Financial Statements, Users of Information, Definition of Auditing, Objectives of Auditing – Primary and Secondary, Expression of Opinion, Detection of Frauds and Errors, Inherent limitations of Audit. Difference between Accounting and Auditing, Investigation and Auditing. **Errors & Frauds**–Definitions, Reasons and Circumstances, Types of Error – Commission, Omission, Compensating error. Types of frauds, Risk of Fraud and Error in Audit, Auditors Duties and Responsibilities in Case of Fraud **Principles of Audit** –Integrity, Objectivity, Independence, Skills, Competence, Work Performed by Others, Documentation, Planning, Audi Evidence, Accounting System and Internal Control, Audit Conclusions and Reporting **Types of Audit** – Meaning, Advantages and Disadvantages of Balance sheet Audit, Interim Audit, Continuous Audit, Concurrent Audit and Annual Audit.
2	**Audit Planning, Procedures and Documentation**
	Audit Planning –Meaning, Objectives, Factors to be Considered, Sources of Obtaining Information, Discussion with Client, Overall Audit Approach. **Audit Program** – Meaning, Factors, Advantages and Disadvantages, Overcoming Disadvantages, Methods of Work , Instruction before Commencing Work, Overall Audit Approach **Audit Working Papers** - Meaning, Importance, Factors Determining Form and Contents, Main Functions / Importance, Features, Contents of Permanent Audit File, Temporary Audit File, Ownership, Custody, Access of Other Parties to Audit Working Papers, Auditors Lien on Working Papers, Auditors Lien on Client's Books **Audit Notebook** – Meaning, Structure, Contents, General Information, Current Information, Importance.
3	**Auditing Techniques and Internal Audit Introduction**
	Test Check-Test Checking Vs Routing Checking, Test Check meaning, Features, Factors to be Considered, When Test Checks Can be Used, Advantages, Disadvantages and Precautions. **Audit Sampling** -Audit Sampling, Meaning, Purpose, Factors in Determining Sample Size -Sampling Risk, Tolerable Error and Expected Error, Methods of Selecting Sample Items, Evaluation of Sample Results, Auditors Liability in Conducting Audit Based on Sample. **Internal Control** -Meaning and Purpose, Review of Internal Control, Advantages, Auditors Duties, Review of Internal Control, Inherent Limitations of Internal Control, Internal Control Samples for Sales and Debtors, Purchases and Creditors, Wages and Salaries. Internal Checks Vs Internal Control, Internal Checks Vs Test Checks. **Internal Audit** -Meaning, Basic Principles of Establishing Internal Audit, Objectives, Evaluation of Internal Audit by Statutory Auditor, Usefulness of Internal Audit, Internal Audit Vs External Audit, Internal Checks Vs Internal Audit.

Sr. No.	Modules / Units
4	**Auditing Techniques: Vouching**
	Audit of Income - Cash Sales, Sales on Approval, Consignment Sales, Sales Returns Recovery of Bad Debts written off, Rental Receipts, Interest and Dividends Received, Royalties Received. **Audit of Expenditure** - Purchases, Purchase Returns, Salaries and Wages, Rent, Insurance Premium, Telephone Expenses, Postage and Courier, Petty Cash Expenses, Travelling Commission, Advertisement, Interest Expenses.
5	**Auditing Techniques: Verification**
	Audit of Assets Book Debts / Debtors, Stocks -Auditors General Duties; Patterns, Dies and Loose Tools, Spare Parts, Empties and Containers, Quoted Investments and Unquoted Investment, Trade Marks / Copyrights, Patents, Know-how, Plant and Machinery, Land and Buildings, Furniture and Fixtures. **Audit of Liabilities** - Outstanding Expenses, Bills Payable, Secured loans, Unsecured Loans, Contingent Liabilities.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Strategic Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Strategic Management an Overview	15
02	Strategic Management Environment	10
03	Levels of Strategies and Analysis	10
04	Activating Strategy and Implementation	15
05	Strategic Evaluation and Control	10
	Total	**60**

Sr. No.	Modules / Units
1	**Strategic Management an Overview**
	Definitions, Strategic Decision Making, Levels of Strategic Management, Process of Strategic Management, Principles of Good Strategy, Elements of Strategic Management, Models of Strategic Management.
2	**Strategic Management Environment:**
	Importance of Politics in Strategic Management, Social, Political, and Technological forces, Role of Competition, National and Global Business Environment. Components of Environment, Environmental Scanning, Analysis of Strategies and Choice of Strategy. Ethics, Social Responsibility, Impact of Legal Factors in Strategic Management, SWOT Analysis.
3	**Levels of Strategies and Analysis**
	Corporate Level Strategies- Concentration, Integration and Diversification, Internationalization, Digitization. Process of Strategic Choice, Factors of Strategic Choice, Strategic Analysis.
4	**Activating Strategy and Implementation**
	Process and Nature of Strategy implementation, Barriers, Model of Strategy Implementation- Structural, Behavioral and Functional.
5	**Strategic Evaluation and Control**
	Standards, Benchmarking, Gap Analysis. Features and Importance of Evaluation, Barriers in Evaluation, Types. Strategic Control- Setting Standards, Comparison, Control Process, Systems, Approaches, Techniques of Evaluation and Control. Role of Information System.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

4. Financial Services Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Financial Services	12
02	Mutual Funds, Factoring and Forfeiting	12
03	Securitisation of Debts and Derivatives	12
04	Housing Finance and Consumer Finance	12
05	Depositories and Pledge	12
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Financial Services**
	Financial Services Meaning, Classification, Scope, Fund Based Activities, Non Fund Based Activities, Modern Activities, Sources of Revenue, Need for Financial Innovation, New Financial Products & Services, Innovative Financial Instruments, Challenges Facing the Financial Sector. **Merchant Banking** Definition, Origin, Merchant Banking in India, Merchant Banks and Commercial Banks, Services of Merchant Banks, Qualities of Merchant Bankers in Market Making Process, Progress of Merchant Banking in India, Problems, Scope of Merchant Banking in India.
2	**Mutual Funds, Factoring and Forfeiting**
	Mutual Funds Introduction to Mutual Funds, Structure of Mutual Fund in India, Classification of Mutual Funds, AMFI Objectives, Advantages of Mutual Funds, Disadvantages of Mutual Funds, NAV Calculation and Pricing of Mutual Funds, Mutual Funds Abroad, Mutual Funds in India, Reasons for Slow growth, Future of Mutual Funds Industry. **Factoring and Forfeiting** Factoring, Meaning, Modus Operandi, Terms and Conditions, Functions, Types of Factoring, Factoring vs. Discounting, Cost of factoring, Benefits, Factoring in India, International Factoring, Definition, Types of Export Factoring, Factoring in Other Countries, EDI Factoring, Forfeiting- Definition, Factoring vs. Forfeiting, Working of Forfeiting, Cost of Forfeiting, Benefits of Forfeiting, Drawbacks of Forfeiting.
3	**Securitisation of Debts and Derivatives**
	Securitization of Debt Meaning & Definition of Securitization, Securitization vs. Factoring, Modus Operandi, Role of Merchant Banker, Role of Other Parties, Securitization Structure Securitisable assets, Benefits of Securitization, Conditions for Successful Securitization, Securitization Abroad, Securitization in India, Reasons for non popularity of Securitization, Future Prospects of Securitization. **Derivatives** Meaning, Types of Financial Derivatives, Options, Futures, Forwards, Swaps, Futures & Options Trading System, Clearing Entities &Their Role.

Sr. No.	Modules / Units
4	**Housing Finance and Consumer Finance**
	Housing Finance Introduction, Housing Finance Industry, Housing Finance Policy Aspect, Sources of Funds, Market of Housing Finance in India, Major Issues of Housing Finance in India, Growth Factors, Housing Finance Institutions in India, National Housing Bank(NHB), Guidelines for ALM System in Housing Finance Companies, Fair Trade Practice, Code for HFC's, Housing Finance Agencies. **Consumer Finance** Introduction, Sources, Types of Products, Consumer Finance Practice in India, Mechanics of Consumer Finance, Terms, Pricing, Marketing & Insurance of Consumer Finance, Consumer Credit Scoring.
5	**Depositories & Pledge**
	Overview of Depository, Key features of Depositories Systems in India, Depository- Bank Analogy, Legal Framework, Eligibility Criteria for A Depository, Agreement between Depository & Issuers, Rights & Obligation of Depositories, Records Maintained by Depository, Services of Depository & Functions of Depository, Organization & Functions of NSDL, Pledge & Hypothecation, Procedure for Pledge/Hypothecation, Procedure of Confirmation of Creation of Pledge/Hypothecations by Pledgee, Closure of A Pledge/Hypothecation by Pledgor, Invocation of Pledge by Pledgee.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

5. Business Ethics and Corporate Governance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Business Ethics	10
02	Application of Ethical Theories in Business	10
03	Introduction to Corporate Governance	15
04	Genesis and Implementation of Corporate Governance in India	15
05	Global Scenario	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Business Ethics**
	Definition, Meaning, Nature of Ethics, Meaning of Moral & Ethics. Types of Ethics, Importance of Ethics, Business Ethics -Meaning and Nature. Importance of Ethics in Business, Areas of Business Ethics, Meaning of Functional Ethics, Types of Ethics According to Functions of Business- Marketing Ethics, Foreign Trade Ethics and Ethics Relating to Copyright. Ethics relating to Free and Perfect Competitive Market.
2	**Application of Ethical Theories in Business**
	Ethical Decision Making: Decision Making (Normal Dilemmas And Problems): (I) Utilitarianism (J. Bentham And J.S. Mill), (Ii) Deontology (I. Kant) Virtue Ethics (Aristotle). Gandhain Approach In Management And Trusteeship, Importance And Relevance of Trusteeship Principle in Modern Business. Ethical Issues in Functional Areas of Business. Ethics in Advertising (Truth In Advertising). Ethical Issues in Finance,
3	**Introduction to Corporate Governance**
	Definition & Conceptual Framework of Corporate Governance, Business Ethics - an important dimension to Corporate Governance, Fair and Unfair Business Practices. Theoretical Basis of Corporate Governance, Mechanism- Corporate Governance Systems, Indian Model of Governance, Good Corporate Governance, Obligations Towards Society and Stake holders. Theories underlying Corporate Governance (Stake holder's theory and Stewardship theory, Agency theory, Separation of Ownership and Control, Corporate Governance Mechanism: Process, Indian Model, OECD, and Emphasis on Corporate Governance, (Transparency Accountability and Empowerment).
4	**Genesis and Implementation of corporate Governance in India:**
	Introduction principles – Arthashastra and Good Governance in ancient India, Protection of Interest of Customer and Investors, Historical perspective of Corporate Governance and Issues in Corporate Governance. **Values:** Meaning, Types Teaching from Scriptures Like Gita, Quran, Bible Value Systems in Business. **Implementation of Corporate Governance** Role of Board of Directors and Board Structure, Role of the Non- executive Director, Role of Auditors, SEBI Growth of Corporate Governance. Role of Government, Corporate Governance in India. Accounting Standards and Accounting disclosures. Finance Reporting and Corporate Governance, Non Accounting Regulations in Corporate Governance, Corporate Governance &CSR, Family Owned Business - Background, Family Businesses in India, Need for Professionalization and Transparency in Family Business.
5	**Global Scenario**
	Business Ethics in Global Economy. Ethics in the Context of Global Economy, Relationship Between Business Ethics & Business Development, Role of Business Ethics in Building a Civilized Society. **Corporate Governance and Issues Related to Scams** Corruption: Meaning, Causes, Effects. Frauds and Scams in Banks, Insurance Companies, Financial Institutions, Measures to Overcome Fraud and Corruption, Zero Tolerance of Corruption.

1. Elective Courses (EC)

6. Actuarial Analysis in Banking and Insurance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Probability & Mathematical Statistics	12
02	Models	12
03	Mortality Model	12
04	Contingencies	12
05	Statistical Methods	12
	Total	**60**

Sr. No.	Modules / Units
1	**Probability & Mathematical Statistics**
	Concepts of Probability, Bayes' Theorem, Concepts of Random Variable, Probability Distribution, Distribution Function, Expected Value, Variance and Higher Moments, Basic Discrete And Continuous Distributions, Central Limit Theorem, Statistical Inference And Sampling Distribution, Confidence Intervals For Unknown Parameters. Test Hypotheses, Concepts of Analysis of Variance
2	**Models**
	The Principles of Actuarial Modelling., General Principles of Stochastic Processes, Markov Chain, Markov Process, Concept of Survival Models., Estimation Procedures for Lifetime Distributions, Maximum Likelihood Estimators For The Transition Intensities in Models of Transfers Between States With Piecewise Constant Transition Intensities.
3	**Mortality Model**
	Binomial Model of Mortality, Derive A Maximum Likelihood Estimator for The Probability of Death, How to Estimate Transition Intensities Depending on Age, Exactly or Using The Census Approximation, How To Test Crude Estimates For Consistency With A Standard Table or a Set of Graduated Estimates, The Process of Graduation.
4	**Contingencies**
	Simple Assurance and Annuity Contracts, Means and Variances of the Present Values of the Payments Under These Contracts, Assuming Constant Deterministic Interest. Expressions in the Form of Sums for the Mean and Variance of the Present Value of Benefit Payments Under Each contract Above, in terms of the curtate random future lifetime, assuming that death benefits are payable at the end of the year of death and that annuities are paid annually in advance or in arrear, and, where appropriate, Obtain expressions in the form of integrals for the mean and variance of the present value of benefit payments under each contract above, in terms of the random future lifetime, assuming that death benefits are payable at the moment of death and that annuities are paid continuously, and, where appropriate.
5	**Statistical Method**
	Concepts of Decision Theory, Decision Function and a Risk Function. Apply Decision Criteria to Determine Which Decision Functions are Best with Respect to a Specified Criterion. In particular Consider the Minimax Criterion and the Bayes Criterion. Calculate Probabilities and Moments of Loss Distributions both with and without Limits and Risk-Sharing Arrangements. The properties of the Statistical Distributions which are Suitable for Modelling Individual and Aggregate Losses. Apply the Principles of Statistical Inference to Select Suitable Loss Distributions for Sets of Claims. Concepts of Excesses (deductibles), and Retention Limits. The Operation of Simple Forms of Proportional and Excess of Loss Reinsurance.

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2. Core Course (CC)

1. International Banking and Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Fundamentals of International Finance	12
02	International Capital Markets	12
03	Foreign Exchange Markets	12
04	Risk Management	12
05	International Banking Operations	12
	Total	**60**

Sr. No.	Modules / Units
1	**Fundamentals of International Finance**
	Meaning and Scope of International Finance, Balance of Payment, Components, Deficit in Balance of Payment, Concept of Currency Convertibility. International Monetary System, Gold Standard, Features, Bretton Wood System, Background and Features, Reasons for its Failure, Smithsonian Agreement, SDRs, European Monetary System. Current Exchange Rate Systems - Fixed and Flexible Exchange Rate, Merits Demerits, Types of Fixed Exchange Rate, Hard Pegs and Soft Pegs, Types of Flexible Exchange Rate, Managed and Free Float.
2	**International Capital Markets**
	Types of Capital Flows, FDI, FPI, FII Euro Currency Markets, Origin and Reasons of growth, a Brief Understanding of Eurocurrency Deposit, Loans Bonds and Notes Market ,Concept of Offshore Banking. International Equity Markets, Concept of Depository Receipts, GDR, Characteristics, Mechanism of Issue, Participants Involved, ADR, Types and Characteristics, Concept of IDR. International Bond Market, Concepts of Domestic Bond, Concept and Types of Foreign Bonds, Concept and Types of Euro Currency Bonds, Concepts of Foreign Currency Convertible and Foreign Currency Exchangeable Bonds, Participatory Notes.
3	**Foreign Exchange Markets**
	Introduction, Market and Market Participants, Foreign Exchange Management in India, Retail and Whole Sale Component of Indian Foreign Exchange Market, Role of FEDAI, FEMA and Regulatory Framework, Dealing Room Operations. Foreign Exchange Arithmetic, Exchange Rate Quotations, Direct, Indirect and Cross rate, Percentage Spread, Arbitrage, Geographical, Triangular and Interest Rate (formula method only), Calculation of Forward Rates using Schedule of Swap Points, AFM, Determinants of Exchange Rate – Purchasing Power and Interest Rate Parity.
4	**Risk Management**
	Risk Management and Derivatives, Transaction, Translation and Economic Risk Faced by Corporates, Transaction, Position, Settlement, Pre-settlement, Gap/Mismatch Risk faced by Banks, Internal and External Hedging, Foreign Currency Derivative Instruments for Risk Management, Forward, Futures, Swaps and Options, Country Risk Management.

Sr. No.	Modules / Units
5	**International Banking Operations**
	Introduction, Definition, Features of International Banking, Reasons for Growth of International Banking, Recent Trends in International Banking, Emergence of Crypto currency - Overview, Brief Overview of Bitcoin and other Crypto Currencies, Note on Mining and Crypto Currency Exchanges, Advantages, Disadvantages of Crypto Currency. Functions of International Banking, Correspondent Banking, International Payment Systems, NRI accounts, Export Finance, Import Finance, International Merchant Banking, Financing Project Exports, Derivative Offering, Remittances, Compliance related- Interbank Functions, Internal Functions, Letter of Credit and Bank Guarantees. International Lending Operation, Loan Syndication, Parties Involved, Phases /Stages in Loan Syndication, Types of Syndication, Role of LIBOR, Risk in International Lending, Role of International Credit Rating Agencies.

3. Ability Enhancement Course (AEC)

1. Research Methodology

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Research	10
2	Data Collection and Processing	15
3	Data Analysis and Interpretation	15
4	Advanced Statistical Techniques	15
5	Research Report	05
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Research**
	• Meaning, Objectives and Importance o f Research • Types of Research • Research Process. • Characteristics of Good Research • Hypothesis-Meaning, Nature, Significance, Types and Sources. • Research Design– Meaning, Definition, Need and Importance, Steps, Scope and Essentials of a Good Research Design. • Sampling– a) Meaning of Sample and Sampling, b)Methods of Sampling i) Non-Probability Sampling–Convenient, Judgment, Quota, Snow ball ii) Probability– Simple Random, Stratified, Cluster, Multi Stage.
2	**Data Collection and Processing**
	• Types of Data and Sources-Primary and Secondary Data Sources • Methods of Collection of Primary data a. Observation- i) structured and unstructured, ii) disguised and undisguised, iii)mechanical observations (use of gadgets) b. Experimental i)Field ii) Laboratory c. Interview – i) Personal Interview ii) focused group, iii) in- depth interviews Method d. Survey– Telephonic survey, Mail, E-mail, Internet survey, Social media, and Media listening. e. Survey instrument– i) Questionnaire designing. a. Types of questions–i) structured/close ended and ii) unstructured/ open ended, iii) Dichotomous, iv) Multiple Choice Questions. b. Scaling techniques- i)Likert scale, ii) Semantic Differential scale.
3	**Data Analysis and Interpretation**
	• Processing of Data– Meaning & Essentials of i) Editing ii) Coding iii) Tabulation • Analysis of Data-Meaning, Purpose, Types. • Interpretation of Data-Essentials, Importance, Significance and Descriptive Analysis • Testing of hypothesis– One Sample T- Test, ANOVA, F- test, Chi Square and Paired Sample Test
4	**Advanced Statistical Techniques**
	Introduction, Characteristics and Application of • Correlation and Regression Analysis • Factor Analysis • Cluster Analysis • Discriminant Analysis • Multidimensional Scaling
5	**Research Report**
	• Report writing – i) Meaning, Importance, Structure, Types, Process and Essentials of a Good Report.

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Reference Books

Reference Books
Elective Courses (EC)
Financial Reporting & Analysis (Corporate Banking & Insurance)
• *Ashish K. Bhattacharyya – "Financial Accounting for Business Managers", Prentice Hall of India Pvt. Ltd.* • *Shashi K. Gupta – "Contemporary Issues in Accounting", Kalyani Publishers.* • *R. Narayanaswamy – "Financial Accounting", Prentice Hall of India, New Delhi* • *Ashok Sehgal – "Fundamentals of Financial Accounting", Taxmann's Publishers* • *IFRS – Dr Ram Mohan Bhave and Dr Anjali Bhave*
Auditing - I
• *CA SurbhiBansal – Audit and Assurance* • *Taxmann – Auditing* • *Dr.SMeenakumari – Fundamentals of Auditing* • *BaldevSachdeva&Jagwant Singh Pardeep Kumar – Auditing theory & Practice*
Strategic Management
• *Strategic Management, 12th Ed. Concepts and Cases, Arthur A. Jr. and A. .J. Strickland* • *Management Policy and Strategic Management (Concepts, Skills and Practices) , R.M.Shrivastava* • *Business Policy and Strategic Management – P. SubbaRao* • *Strategic Planning Formulation of Corporate Strategy , Ramaswamy*
Financial Services Management
• *Financial Services, Dr.S Gurusamy, The MgrawHill companies, 2 edition (26 June 2009).* • *Financial Markets and Financial services, Vasant Desai, Himalaya Publishing House, First Edition edition (2010).* • *Financial Services, M.Y.Khan, Tata Mc-Graw Hill Publishing Company Ltd, Ninth edition (2017).* • *Financial Markets and Services –E.Gordon and K.Natanrajan,Himalaya Publishing House, TenthEdition edition (2016)*
Business Ethics and Corporate Governance
• *A. C. Fernando, Corporate Governance Principles, Policies and Practices;Pearson* • *Marc Goeren, International Corporate Governance; Black wells.* • *Cristian A. Mallin, Corporate Governance.* • *Business Ethics, Crane& Matten* • *The Management and ethics omnibus, Chakraborty, Its only Business, Mitra,* • *Values and Ethics for Organizations, Chakraborty, OUP/OIP* • *Perspectives in Business Ethics, Hartman, Chatterjee*

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Reference Books

Reference Books
Actuarial Analysis in Banking & Insurance
• *"Actuarial Statistics: An Introduction Using R" by Shailaja R Deshmukh.* • *"Predictive Modeling Applications in Actuarial Science" by Richard ADerrig and Glenn Meyers* • *"Generalized Linear Models for Insurance Data (International Series on Actuarial Science)" by Piet de Jong and Gillian Z Heller* • *"Contributions to Sampling Statistics (Contributions to Statistics)" by Maria Giovanna Ranalli and FulviaMecatti* • *"Forecasting Product Liability Claims: Epidemiology and Modeling in the Manville Asbestos Case" by J B Weinstein and Eric Stallard* • *"Financial Modeling, Actuarial Valuation and Solvency in Insurance" by Mario V Wuthrich and Michael Merz* • *"Modern Actuarial Risk Theory: Using R" by Rob Kaas and Marc Goovaerts* • *"Health Insurance: Basic Actuarial Models" by ErmannoPitacco* • *"Financial and Actuarial Statistics: An Introduction" by Dale S Borowiak and Arnold F Shapiro*
Core Course (CC)
International Banking and Finance
• *Apte P.G. International Finance – A Business Perspective, New Delhi, TATA McGraw Hill , McGraw Hill Education; 2 edition, July 2017.* • *Bhalla .V.K. international Financial Management- S.Chand Publishing,* • *International Banking Operations- IIBF- MacMillan Publishers, 2007* • *International Banking Legal and Regulatory Aspects- IIBF- MacMillan Publishers, 2007*
Ability Enhancement Course (AEC)
Research Methodology
• *Exploratory and Confirmatory Factor Analysis- Understanding Concepts and Applications(2004) – Bruce Thompson First Edition* • *Interpreting Economic and Social Data – A Foundation of Descriptive Statistics (2009) - Othmar W. Winkler - Springer* • *Regression Modelling Strategies (2015) – Frank E Harrell, Jr Springer Series in Statistics.* • *Research Methodology (2014) – Deepak Chawla and Neena Sondhi, Vikas Publishing House.*

B.Com. (Banking and Insurance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester VI

No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Central Banking	**04**
3	***Ability Enhancement Course***	
6	Project Work in Banking & Insurance	**04**
	Total Credits	**20**

****List of Elective Courses for Semester V (Any Four)***	
01	Security Analysis and Portfolio Management
02	Auditing - II
03	Human Resource Management
04	Turnaround Management
05	International Business
06	Marketing in Banking & Insurance

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1. Elective Courses (EC)

1. Security Analysis and Portfolio Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Portfolio Management – An Introduction & Process	12
02	Portfolio Management – Valuation	12
03	Fundamental Analysis	12
04	Technical Analysis	12
05	Efficient Market Theory & CAPM	12
	Total	**60**

Sr. No.	Modules / Units
1	**Portfolio Management – An Introduction & Process**
	Investment, Meaning, Characteristics, Objectives, Investment V/s Speculation, Investment V/s Gambling and Types of Investors. Portfolio Management – Meaning, Evolution, Phases, Role of Portfolio Managers, Advantages of Portfolio Management. Investment Environment in India and Factors Conducive for Investment in India. Portfolio Analysis – Meaning and its Components, Calculation of Expected Return and Risk, Calculation of Covariance, Risk – Return Trade off. Portfolio Selection – Meaning, Feasible Set of Portfolios, Efficient Set of Portfolios, Selection of Optimal Portfolio, Markowitz Model, Limitations of Markowitz Model, Measuring Security Return and Portfolio Return and Risk under Single Index Model and Multi Index Model.
2	**Portfolio Management – Valuation**
	Portfolio Revision – Meaning, Need, Constraints and Strategies. Portfolio Evaluation – Meaning, Need, Measuring Returns (Sharpe, Treynor and Jensen Ratios) and Decomposition of Performance. Bond Valuation – Meaning, Measuring Bond Returns, Yield to Maturity, Yield to Call and Bond Pricing. Bond Pricing Theorems, Bond Risks and Bond Duration.
3	**Fundamental Analysis**
	Economy Analysis – Meaning, Framework, Economic Analysis, Forecasting, Barometric or Indicator Approach, Econometric Model Building and Opportunistic Model Building. Industry Analysis – Concept of Analysis, Industry Life Cycle, Industry Characteristics Company Analysis – Financial Statements, Analysis of Financial Statements, (Practical questions on Debt Equity Ratios, Total Debt Ratio, Proprietary ratios, interest coverage ratio, Profitability ratios related to sales, investment and equity shares Efficiency or Activity Ratios) and Assessment of Risk(Leverages)
4	**Technical Analysis**
	Dow Theory Meaning and Principles of Technical Analysis, Price Chart, Line Chart, Bar Chart, Japanese Candlestick Chart, Trends and Trend Reversals, Chart Patterns, Support and Resistance, Reversal Patterns, Continuation Patterns and Elliot Wave Theory Mathematical Indicators – Calculation of Moving Averages (Simple and Exponential Moving Average), Oscillators and Relative Strength Index Market Indicators Fundamental Analysis V/s Technical Analysis

Sr. No.	Modules / Units
5	**Efficient Market Theory & CAPM**
	Random Walk Theory The Efficient Market Hypothesis Forms of Market Efficiency Competitive Market Hypothesis CAPM – Fundamental Notions of Portfolio Theory, Assumption of CAPM, Efficient Frontier with Riskless Lending and Borrowing, Capital Market Line, Security Market Line and Pricing of Securities with CAPM. Arbitrage Pricing Theory (APT) – The Return Generating Model, Factors Affecting Stock Return, Expected Return on Stock, APT V/s CAPM.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Auditing - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Audit of Limited Companies	15
02	Audit of Banking Companies	15
03	Audit of Insurance Companies	15
04	New Areas of Auditing	08
05	Professional Ethics and Misconduct	07
	Total	**60**

Sr. No.	Modules / Units
1	**Audit of Limited Companies**
	Qualifications, Disqualifications, Appointment, Removal, Remuneration of Auditors, Audit Ceiling, Status, Power, Duties and Liabilities of Auditors, Branch Audit, Joint Audit, Special Audit. Maintenance of Books of Account –Related Party Disclosures, Segment Reporting, Divisible Profit, Dividend and Depreciation (Companies Act, Standards on Accounting, Legal Decisions and Auditor's Responsibility), Representations by Management, Contents of Annual Report. Definition, Distinction between Report and Certificate, Types of Reports/Opinion.
2	**Audit of Banking Companies**
	Introduction of Banking Companies, Form and Content of Financial Statements, Qualifications of Auditor, Appointment of Auditor, Remuneration of Auditor, Power of Auditor, Auditor's Report, Format of Audit Report, Long Form Audit Report, Conducting an Audit, Initial Consideration by Statutory Audit, Internal Control System, Verifications of Assets and Balances.
3	**Audit of Insurance Companies**
	Audit of Companies carrying General Insurance Business, Audit of Companies carrying Life Insurance Business, Applicability of Accounting Standards (AS 3, 4,9,13,17), Books and Registers to be maintained, Submission of Reports and Returns, Audit of Accounts, Preparation of Audit and Internal Controls.
4	**New Areas of Auditing**
	Introduction to Cost Audit, Human Resource Audit, Management Audit, Operational Audit, Forecast Audit, Social Audit, Tax Audit, Forensic Audit and Environmental (Green) Audit. Audit in an EDP Environment, Introduction, General Approach to EDP Based Audit and Special Techniques for Auditing in an EDP Environment.
5	**Professional Ethics and Misconduct**
	Introduction, Meaning of Professional Ethics Meaning of Professional Misconduct, Schedules to the Chartered Accountants Act, 1949 Relating to Professional Misconduct, Enquiry into Charges of Misconduct of Chartered Accountants.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Human Resource Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Framework of Human Resource Management	15
02	HR Procurement	10
03	HR Planning and Recruitment	10
04	Training and Development	15
05	Compensation	10
	Total	**60**

Sr. No.	Modules / Units
1	**Framework of Human Resource Management**
	Introduction to HRM, Nature of HRM, Scope of HRM, Functions and Objectives of HRM, HRM Policies and Practices, Role and Functions of HR Manager (in Banking and Insurance Sector) **HRM and Strategies,** Strategic function of HRM, Understanding and Implementing Global Competitiveness and HR, strategic HR, Linkages of Organizational and HR Strategies.
2	**HR Procurement**
	Job Analysis and Design- Job Analysis, Introduction, Importance, Purpose , Benefits, Job Evaluation, Competency Based Job Analysis **Job Design-** Introduction, Characteristics, Factor Affecting Job Design, Job Satisfaction.
3	**HR Planning and Recruitment**
	Definition, Objectives, Need and Importance of HR Planning, Preparing Manpower Inventory. Promotions and Transfers. **Recruitment-** Strategic Approach to Recruitment, Recruitment Source; Internal and External, Selection Procedure.
4	**Training and Development**
	Employee Training and Development - Nature and Process of Training, Training methods, On the job, Off the job. **Management Development Program, Performance Appraisal -**Definition, Methods. Advantages and Limitations of Appraisal.
5	**Compensation**
	Meaning, Need and Importance, Current Trends in Compensation, Team Based Incentives, Pension Schemes with Reference to Banking and Insurance, Fringe Benefits, Perquisites, Allowances and other Non – Monetary Benefits **Voluntary Retirement Scheme -** Concept, Types, Needs, Effects with reference to Banking and Insurance **Participative Management** Meaning, Levels, Types, Employee Welfare, Comparative Study of Working Conditions in Banks, Financial Institutions, Insurance Companies.

1. Elective Courses (EC)

4. Turnaround Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Business	10
02	Industrial Sickness	15
03	Turnaround Management Strategies	15
04	Business Scenario	12
05	Leadership and Turnaround Management	08
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Business**
	Meaning, Definition, Features, Importance, Symptoms, Types of Business Organization. Different approaches for Growth and Survival. • Internal Strategies • External Strategies • Survival Strategies
2	**Industrial Sickness**
	Meaning and Internal /External Reasons of Industrial Sickness • Symptoms of Industrial Sickness • Measures to Overcome Sickness by Government and Stakeholders • Role of BIFR in Sick Industries
3	**Turnaround Management Strategies**
	Turnaround – Meaning, Definition, Indicators of Successful Turnaround • TQM and Restructuring. • Selling of a sick unit • BPR - Meaning, Definition, Elements, Need, Implications - Approaches (Reengineering Team, BPR Leader, Process Owner, Kaizen, Flow Chart, 5S principles, Process Mapping)
4	**Business Scenario**
	Features, Advantages, Disadvantages, Types and Present Status of: • Outsourcing • Networking • Franchising • Free lancing • Self-Financing • Start up
5	**Leadership and Turnaround Management**
	Outfitting the Management Team, Personal Characteristic, Focusing on Present Operations, Focus on Needs in Turnarounds, Styles of Decision Making in the Turnaround Process, Organizational Change. Quality in the Managerial Process, Dilemma of Management, Turnaround Management as a Skill.

1. Elective Courses (EC)

5. International Business

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to International Business	10
02	International Economic Institutions and Regional Groupings	12
03	International Marketing, Human Resource Management	10
04	Preliminaries for Export Import and Documentation	14
05	Export Import Procedures and Foreign Trade Policy	14
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to International Business**
	Introduction to International Business- Importance, Nature and Scope of International Business, Drivers of International Business, Evolution of International Business, Strategies of Going International, Globalisation, Multi National Corporations- Nature, Goals of MNCs, India's Presence- Advantages and Disadvantages of MNCs **International Business Environment:** Economic, Political, Cultural and Legal Environments in International Business
2	**International Economic Institutions and Regional Groupings**
	Institutional Support to International Business, Role of World Bank, IMF, ILO, UNCTAD, UNIDO and ADB in International Business, World Trade Organisation (WTO), Origin, Objectives, Functions ,GATT and WTO, Principles of WTO, Transparency, MFN Treatment, National Treatment, Free Trade, Dismantling Trade Barriers, Rule Based Trading System, Treatment for LDCs ,Competition Principle, Environment Protection, Key Subjects in WTO, Agriculture, TRIPS, TRIMS, GATS, Implications for India **Integration between Countries**: Levels of Integration, Growth of Trading Blocs, Impact of Integration, Major Regional Trading Groups, The European Union, NAFTA, APEC, ASEAN, MERCOSUR, BRICS, SAARC, OPEC
3	**International Marketing, Human Resource Management**
	International Marketing, Domestic and International Marketing, Compared Benefits of International Marketing, Major Activities, International Market Assessment, International Product Strategies, Pricing Issues and Decisions, Dumping, Promotion Issues and Policies. International Human Resource Management, Nature, Growing Interest in IHRM, DHRM and IHRM compared, Managing International HR activities, Expatriation and Repatriation of employees
4	**Preliminaries for Export Import and Documentation**
	Meaning and Definition of Export, Methods of Exporting, Registration Formalities for Exports, Export Licensing, Selection of Export Product, Identification of Market for Exports – Export Pricing Quotations, FOB & CIF, Meaning and Definition of Imports, Liberalisation of Imports, Negative list of Imports ,Categories of Importers, Special Schemes for Importers. Aligned Documentation System – Commercial Invoice , Shipping Bill , Certificate of Origin, Consular Invoice, Mate's Receipt, Bill of Lading, GR Form, ISO 9000, Procedure for obtaining ISO 9000, BIS 14000 Certification ,Import Documentation, Transport Documents - Bill of Entry, Certificate of Inspection, Certificate of Measurements, Freight Declaration.

Sr. No.	Modules / Units
5	**Export Import Procedures and Foreign Trade Policy**
	Steps in Export Procedure , Export Contract, Forward Cover, Export Finance, Institutional Framework for Export Finance, Excise Clearance, Pre-shipment Inspection, Methods of Pre-shipment Inspection, Role of Clearing and Forwarding Agents, Shipping and Customs Formalities, Customs EDI System, Negotiation of Documents, Realisation of Exports Proceeds. Pre-Import Procedure- Steps in Import Procedure, Legal Dimensions of Import Procedure, Customs Formalities for Imports, Warehousing of Imported Goods, Exchange Control Provisions for Imports & Retirement of Export Documents. Foreign Trade Policy Highlights (latest), Duty Drawback, Deemed Exports, ASIDE, MAI & MDA, Star Export Houses, Town of Export Excellence, EPCG Scheme.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

6. Marketing in Banking and Insurance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Marketing	12
02	Introduction to Service Marketing	12
03	Consumer Behaviour	12
04	Rural Marketing	12
05	E- Marketing	12
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Marketing**
	Meaning, Definition, Importance, Marketing Mix, Market Segmentation, Marketing Strategy, Channels of Marketing, Marketing of Banking and Insurance Products, Marketing Research, Introduction, Process and Types.
2	**Introduction to Service Marketing**
	Meaning, Concept, Evolution and Characteristics of Service Marketing. Need and Importance of Service Marketing, 7 P's of Services Marketing Mix, Service Marketing Mix Strategies for Banking and Insurance and Marketing Logistics.
3	**Consumer Behaviour**
	Introduction to Consumer Behaviour, Consumer Expectations, Consumer Buying Behavior, Role of Consumer in Service Delivery, Consumer Responses, Consumer Delight – Concept and Importance. Consumer Behaviour and Marketing Communications: Introduction, Marketing Communication Flow, Communication Process, Interpersonal Communication, Persuasive Communication, Source, Message, Message Appeals, Communication Feedback.
4	**Rural Marketing**
	Rural Marketing -Concept and Scope ,Nature of Rural Markets , Attractiveness of Rural Markets ,Rural Vs Urban Marketing ,Characteristics of Rural Consumers ,Buying Decision Process ,Rural Marketing Information System ,Potential And Size of Rural Markets. Pricing Strategy, Pricing Policies, Innovative Pricing Methods for Rural Markets, Promotion Strategy, Appropriate Media, Designing Right Promotion Mix, Promotional Campaigns. Distribution- Logistics Management, Problems Encountered, Selection of Appropriate Channels, New Approaches to Reach Out Rural Markets – Electronic Choupal Applications.
5	**E- Marketing**
	E-marketing: Scope, Benefits and Problems, E-marketing Techniques, Internet Marketing, Digital Marketing and E-marketing E-Marketing Mix Strategy , Introduction, Objectives, the 4Ps in E-Marketing, Additional 3Ps in E-Marketing of Services, the 2P+2C+3S Formula in E-Marketing

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester VI with effect from the Academic Year 2018-2019

2. Core Course (CC)

1. Central Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	An Overview of Central Banking	12
02	RBI as the Central Bank of India	12
03	Supervisory Role of RBI	12
04	Central Banking in Other Countries	12
05	Central Banking in the Cyber World	12
	Total	**60**

Sr. No.	Modules / Units
1	**An Overview of Central Banking**
	Overview: Concept of Central Banking, Institutional Growth of Central Banking, The Changing Face of Central Banking. Role of Central Banks: Determination of Goals, Inflation Targeting, Exchange Rate Targeting, Money Supply Targeting, Money Growth Targeting, Viable Alternatives to Central Bank,Central Banking in India. Contemporary Issues, Autonomy and Independence, Credibility, Accountability and Transparency of a Central Bank.
2	**RBI as the Central Bank of India**
	Policy Framework for RBI: Organizational Framework, Operational Framework – Role as a Central Banker, Promotional Role of RBI, Regulatory Role of RBI. RBI and Monetary Policy Macroeconomic Policies: Meaning & Objectives. Monetary Policy- Meaning& Objectives Monetary Policy in India - Goals, Targets and Instruments A Brief Overview of Fiscal Policy, Striking Balance between Inflation and Growth through Monetary and Fiscal Policies
3	**Supervisory Role of RBI**
	Regulation and Supervision: Need for Regulation and Supervision, Banking Regulation Act, 1949, Banking Regulation and Supervision, Functions of the Department of Supervisory, Regulations Review Authority, Unified Regulator v/s Multiple Regulators. RBI – On-site Inspection and Off-site Monitoring and Surveillance: The Core Principles for Effective Supervision – On-site Examination – Off-site Surveillance – On-site Inspection and Off-site Monitoring in India – Off-site Monitoring in Different Countries – Computerized Off-site Monitoring and Surveillance (OSMOS). RBI and Financial System, Introduction, Functions, Characteristics of Financial System, Role of RBI in Regulating Financial System and Financial Sector Reforms.
4	**Central Bank in other Countries**
	Federal Reserve System – Bank of England – The European Central Banking, Bank of Japan, Peoples Bank of China Interconnectivity of Central Banks with Other International Financial Institutions, ADB, IMF, World Bank, and BIS,(Objectives, Role and Functions)
5	**Central Banking in Cyber World:**
	E -Banking, E- money, IT induced Changes and Monetary Policy, E- payments, Risks in the New IT Era, Impact of IT, Globalization and Central Banks.

Revised Syllabus of Courses of B.Com.(Banking and Insurance) Programme at Semester VI with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Elective Courses (EC)
Security Analysis and Portfolio Management
• *Blake, David 1992, Financial Market Analysis , McGraw Hill London* • *Francis J.C Investments, Analysis and Management McGraw Hill New York.* • *Pistolese Clifford Using Technical Analysis Vision Books* • *Reilly Frank K* and Keith Brown Investment Analysis and Portfolio Management.
Auditing - II
• *Auditing Principles & Practices – SK Basu* • *Sharma, T.R., Auditing Principles & Problems, SahityaBhavan, Agra* • *Spicer & Pegler, Practical Auditing* • *Woolf, Emile,Auditing Today* • *Basu, Sanjib Kumar, Fundamentals of Auditing, Pearson* • *Auditing Assurance Standards and Guidelines issued by IC*
Human Resource Management
• *Human Resources Management, Gary Dessler* • *Personnel Management – C.B Mamoria* • *Managing Human Resources , R.S. Dwiwedi* • *Human Resources Management,V.P.Michael* • *Human Resources Management – Dr.P.C.Pardeshi* • *Human Resources Management – Mirza&Zaiyadin* • *Human Resources Management – L.M.Prasad* • *Human Resources Management , Ashwathappa*
Turnaround Management
• *Practical Shutdown & Turnaround Management for k, Engineers & Managers (English, Paperback, IDC Technologies Pvt Ltd.)* • *Managing Corporate Turnaround Text & cases Ram AvtarYadav , Concept Publishing Co.* • *Business Process Reengineering,O.P.Agrawal* • *The Turnaround Experience – FeddrickZimerman*
International Business
• *Economic Survey, Govt. of India. Various issues* • *Export-import Policy and Other Documents, Govt. of India* • *Czinkota, Michael R, 8th Edition,Publisher Wiley, 2010.* • *Hill, Charles W. L., International Business, McGraw Hill, 2011,New York.* • *Aswathappa K ,International Business, Tata McGraw Hill Education,2010.*

Revised Syllabus of Courses of B.Com.(Banking and Insurance) Programme at Semester VI with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Marketing in Banking & Insurance
• *Marketing Management -Philip Kotler, PrenticeHall of India New Delhi.* • *Service Marketing- S.M.Jha,Himalaya Publishing House, Mumbai.* • *Essence of Service Marketing- Adrian Payne, Prentice Hall of India New Delhi.* • *Service Marketing- Hellen Woodruffle,Macmillan Publishers,India, Delhi.* • *E- Marketing - Judy Strauss, Raymond Frost, Pearson Prentice Hall, 2009, 5th Edition* • *Marketing Management – An Asian Perspective Philip Kotler, Gary Armstrong, Prafulla Y. Agnihotri, Ehsan UlHaque – Pearson Education 2010.* • *Rural Marketing – Text and Cases , C.S Krishnamacharayu and Lathiha Ramkrishnan, Pearson Education.* • *Service Marketing – Christopher Loveloca, Pearson Education*
Core Course (CC)
Central Banking
• *Central Banking- IIBF- MacMillan Publishers, 2011* • *Central Banking – ICFAI Press,2008* • *Theory and Practice of Central Banking in India- V.A.Avdhani, Second Edition, Published by Somaiya Publications Pvt. Ltd.* • *Central Banking- M H deKock,Publisher Staples Press.* • *Central Banking in Planned Economy- The Indian Experiment- C.R.Basu, Edition2,Publisher Tata McGraw-Hill Publishing . Co, 1977.*

University of Mumbai

B.Com. (Banking and Insurance) Programme
Guidelines for Project Work
at
Third Year
Semester VI

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Banking and Finance

Introduction

Inclusion of project work in the course curriculum of the B.Com. (Banking and Insurance) programme is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research analyse and scientific temperament challenging the potential of learner as regards to his/ her eager to enquire and ability to interpret particular aspect of the study. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

- There are two modes of preparation of project work
  1. Project work based on research methodology in the study area
  2. Project work based on internship in the study area

Guidelines for preparation of Project Work

1. General guidelines for preparation of project work based on Research Methodology

- The project topic may be undertaken in any area of Elective Courses.
- Each of the learner has to undertake a Project individually under the supervision of a teacher-guide.
- The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.
- University/college shall allot a guiding teacher for guidance to the students based on her / his specialization.
- The project report shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be 80 to 100 pages

Format

1st page (Main Page)

Title of the problem of the Project

A Project Submitted to

University of Mumbai for partial completion of the degree of

Bachelor in Commerce (Banking and Insurance)

Under the Faculty of Commerce

By

Name of the Learner

Under the Guidance of

Name of the Guiding Teacher

Name and address of the College

Month and Year

2nd Page
This page to be repeated on 2nd page (i.e. inside after main page)

On separate page

Index

Chapter No. 1	Title of the Chapter	Page No.

(sub point 1.1, 1.1.1, ... And so on)

Chapter No. 2 Title of the Chapter

Chapter No. 3 Title of the Chapter

Chapter No. 4 Title of the Chapter

Chapter No. 5 Title of the Chapter

List of tables, if any, with page numbers.

List of Graphs, if any, with page numbers.

List of Appendix, if any, with page numbers.

Abbreviations used:

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work

(Model Structure of the Project Work)

- **Chapter No. 1: Introduction**

  In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.

- **Chapter No. 2: Research Methodology**

  This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.

- **Chapter No. 3: Literature Review**

  This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue.

- **Chapter No. 4: Data Analysis, Interpretation and Presentation**

  This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of information's, presentation of graphs etc. can be provided with interpretation by the learner.

- **Chapter No. 5: Conclusions and Suggestions**

  In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

- **Bibliography**
- **Appendix**

On separate page

Name and address of the college

Certificate

This is to certify that Ms/Mr _____has worked and duly completed her/his Project Work for the degree of Bachelor in Commerce (Banking and Insurance) under the Faculty of Commerce in the subject of _____ and her/his project is entitled, "_____*Title of the Project*_____" under my supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University.

It is her/ his own work and facts reported by her/his personal findings and investigations.

Seal of the College

Name and Signature of
Guiding Teacher

Date of submission:

On separate page

Declaration by learner

I the undersigned Miss / Mr. _____*Name of the learner*_____here by, declare that the work embodied in this project work titled "_____ _____*Title of the Project*_____", forms my own contribution to the research work carried out under the guidance of _____*Name of the guiding teacher*_____ is a result of my own research work and has not been previously submitted to any other University for any other Degree/ Diploma to this or any other University.

Wherever reference has been made to previous works of others, it has been clearly indicated as such and included in the bibliography.

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by

Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I take this opportunity to thank the **University of Mumbai** for giving me chance to do this project.

I would like to thank my **Principal, _____**for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our **Coordinator_____**, for her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide _____ whose guidance and care made the project successful.

I would like to thank my **College Library**, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially **myParents and Peers** who supported me throughout my project.

2. Guidelines for Internship based project work

- Minimum 20 days/ 100 hours of Internship with an Organisation/ NGO/ Charitable Organisation/ Private firm.
- The theme of the internship should be based on any study area of the elective courses
- Experience Certificate is Mandatory
- A project report has to be brief in content and must include the following aspects:
  - **Executive Summary:**

    A bird's eye view of your entire presentation has to be precisely offered under this category.
  - **Introduction on the Company:**

    A Concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
  - **Statement and Objectives:**

    The mission and vision of the organization need to be stated enshrining its broad strategies.
  - **Your Role in the Organisation during the internship:**

    The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.
  - **Challenges:**

    The challenges confronted while churning out theoretical knowledge into practical world.
  - **Conclusion:**

    A brief overview of your experience and suggestions to bridge the gap between theory and practice.
- The project report based on internship shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be of minimum 50 pages

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
• **Evaluation of Project Report (Bound Copy)**	**60 Marks**
▪ Introduction and other areas covered	20 Marks
▪ Research Methodology, Presentation, Analysis and interpretation of data	30 Marks
▪ Conclusion& Recommendations	10 Marks
• **Conduct of Viva-voce**	**40 Marks**
▪ In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
▪ Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
▪ Overall Impression (including Communication Skill)	10 Marks

Note:

- ***The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of project shall conduct the viva-voce examination as per the evaluation pattern***

Passing Standard

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V and VI
with effect from the Academic Year 2018-2019

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: 25 %

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.

  (Detail question paper pattern has been given separately)

❖ **Passing Standard**

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

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PAPER II- POLITICAL THEORY

Semester-III

SEMESTER III- PRINCIPLES AND CONCEPTS OF POLITICAL THEORY

Module 1 - Introduction to Political Theory [11 lectures]

1.1 Definition and Scope of Political Theory
1.2Approaches to the Study of Political Theory: Traditional
1.3 Approaches to the Study of Political Theory: Contemporary

Module 2 – State, Civil Society & Market [12 Lectures]

2.1 State: Concept and Perspectives
2.2 Nation - State: Meaning and Changing Perceptions
2.3 State, Civil Society and Market

Module 3 – Power, Authority and Legitimacy [10 Lectures]

3.1 Power
3.2 Authority
3.3 Legitimacy

Module 4 : Concept of Law and Political Obligation [12 Lectures]

4.1 Concept of Law
4.2 Political Obligation
4.3 Right to Resist

SEMESTER IV- POLITICAL VALUES AND IDEOLOGIES

Module1 – Rights **[10 Lectures]**

1.1 Meaning and Nature of Rights
1.2 Theories of Rights
1.3 Classification of Rights

Module 2 – Basic Political Values **[12 Lectures]**

2.1 Liberty
2.2 Equality
2.3 Justice

Module 3 – Democracy **[11 Lectures]**

3.1 Theories of Democracy
3.2 Principles of Liberal Democracy
3.3 Conditions for the Successful Working of Democracy

Module 4 – Political Ideologies **[12 Lectures]**

4.1 Marxism
4.2 Fascism
4.3 Feminism

REFERENCES

Abbas, Hoveyda and Ranjay Kumar, *Political Theory*, Pearson, 2012

Bhargava, Rajeev and Ashok Acharya (eds), *Political Theory: An Introduction,* Pearson Longman, 2008

Bhargava, Rajeev and Helmut Reifeld (eds), *Civil Society, Public Sphere, and Citizenship: Dialogues and Perception,* Sage Publications, New Delhi, 2005

Chandhoke, Neera, *State and Civil Society*: *Explanations in Political Theory,* Sage Publications, New Delhi, 1995

Gauba, O.P., *An Introduction to Political Theory,* Macmillan Publishers India Ltd., 2011

Heywood, Andrew, *Politics,* Palgrave Foundations, New York, 2002

Hoffman, John and Paul Graham, *Introduction to Political Ideology*, Pearson, 2006

Marsh David and Gerry Stoker (ed), *Theory and Methods in Political Science,* Macmillan Press Ltd, 1995

Mckinnon, Catriona (ed), *Issues in Political Theory,* New York Oxford University Press, 2008

Verma, S.P., *Modern Political Theory,* MacMillan, New Delhi, 2003.

Online reference

cornell.edu/cphp

journal.sagepub.com/home/ptx

Reference Books in Marathi

1. Translation of O.P. Gauba's Book, An introduction to Political Theory in Marathi by Jadhav T, *Rajaneetishastra Parichay,* K. Sagar Publications, Pune, 2015.
2. Bhargav Rajeev and Acharya Ashok (eds), Rajakiya Siddhanth Parichay, Pearson, New Delhi, 2008.
3. Tijare, Peshwe, *Adhunik Rajakiya Siddhanth,* Shri Mangesh Prakashan, Nagpur, 1998.
4. Phad, S.B., *Uchhatar Adhunik Rajakiya Siddhanth*, Vidya Books Publishers, Aurangabad, 2014.
5. Deshpande, Shrikant., *Rajakiya Siddhanth*, Shri Mangesh Prakashan, Nagpur, 2003.
6. Chopade, K., *Rajakiya Siddhanthachi Tatve*, Vidya Books Publishers, Aurangabad, 2002.

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PAPER II- POLITICAL THEORY

EXPLANATORY NOTE

Semester III- Principles and Concepts of Political Theory

Module 1 - Introduction to Political Theory	**Explanatory Notes**
1.1 Definition and Scope of Political Theory	What is Politics? Theorising the 'Political' Definitions of Political Theory Nature and Scope of Political Theory Significance of Political Theory
1.2 Approaches to the Study of Political Theory: Traditional	Historical Normative Legal-Institutional
1.3 Approaches to the Study of Political Theory: Contemporary	Empirical Approach Behavioural Approach Post-behavioural Approach
Module 2 – State, Civil Society & Market	
2.1 State: Concept and Perspectives	Theories of Origin of State: Divine Origin theory, Force Theory, Theory of Social Contract, Evolutionary Theory Perspectives of State: Liberal-Individualistic, Welfare
2.2 Nation - State: Meaning and Changing Perceptions	Concept of Nation- State Rise and Growth of Modern Nation-State Challenges to Sovereignty of Nation-States
2.3 State, Civil Society and Market	Concept of Civil Society Emergence of Civil Society Changing Nature of State ,Civil Society and Market
Module 3 – Power, Authority and Legitimacy	
3.1 Power	Concept, Sources and Forms of Power

3.2 Authority	Definitions, Sources and Types of Authority
3.3 Legitimacy	Meaning, Sources and Types of Legitimacy Weberian Classification
Module 4 : Concept of Law and Political Obligation	
4.1 Concept of Law	Meaning, Features and Sources
4.2 Political Obligation	Meaning and Grounds of Political Obligation
4.3 Right to Resist	Liberal and Radical Arguments (with reference to John Locke, T.H. Green and Harold J. Laski) Forms of Resistance Gandhian Techniques of Resistance to Authority

Semester IV- Political Values and Ideologies

Module1 – Rights	**Explanatory Notes**
1.1 Meaning and Nature of Rights	Definition and Meaning of Rights Positive and Negative concept of Rights
1.2 Theories of Rights	Theory of Natural Rights Historical Theory Legal Theory Idealist Theory
1.3 Classification of Rights	Civil, Political, Economic, Social, Cultural and Group Rights
Module 2 – Basic Political Values	
2.1 Liberty	Negative and Positive Concept of Liberty Types of Liberty Safeguards of Liberty
2.2 Equality	Development of the concept of Equality Dimensions of Equality (Civil, Legal,

	Political, Economic) Relation between Liberty and Equality
2.3 Justice	Meaning of Justice, Changing nature of the concept , Procedural and Distributive Justice
Module 3 – Democracy	
3.1 Theories of Democracy	Classical, Elitist, Pluralist, Participatory Democracy
3.2 Principles of Liberal Democracy	Salient features, Merits and Demerits
3.3 Conditions for the Successful Working of Democracy	Challenges to Democracy Safeguards of Democracy
Module 4 – Political Ideologies	
4.1 Marxism	Tenets of Marxism Critical Appraisal of Marxism
4.2 Fascism	Basic Tenets Critical Appraisal
4.3 Feminism	Origin and Types Three Waves of Feminism

AC. 6.6.2012
Item No.4.49

UNIVERSITY OF MUMBAI

Revised Syllabus for the F.Y.B.A/F.Y.B.Sc.

Program: F.Y.B.A/F.Y.B.Sc.

Course: Foundation Course

(Semester I & II)

(As per Credit Based Semester and Grading System
with effect from the academic year 2012–2013)

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B A
Semester 1
Course Code: UA FC 1C1

Lectures 45
Marks 100

Unit 1
Overview of Indian Society:
Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender;
Appreciate the concept of linguistic diversity in relation to the Indian situation;
Understand regional variations according to rural, urban and tribal characteristics;
Understanding the concept of diversity as difference. ***(5 lectures)***

Unit 2
Concept of Disparity- 1:
Understand the concept of disparity as arising out of stratification and inequality;
Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;
Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities. ***(10 lectures)***

Unit 3
Concept of Disparity-2:
Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof;
Understand inter-group conflicts arising out of communalism;
Examine the causes and effects of conflicts arising out of regionalism and linguistic differences. ***(10 lectures)***

Unit 4
The Indian Constitution:
Philosophy of the Constitution as set out in the Preamble;
The structure of the Constitution-the Preamble, Main Body and Schedules;
Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society;
Basic features of the Constitution. ***(10 lectures)***

Unit 5
Significant Aspects of Political Processes:
The party system in Indian politics;
Local self-government in urban and rural areas; the 73^{rd} and 74^{th} Amendments and their implications for inclusive politics;
Role and significance of women in politics. ***(10 lectures)***

Unit 6

Growing Social Problems in India:

a) Substance abuse- impact on youth & challenges for the future
b) HIV/AIDS- awareness, prevention, treatment and services
c) Problems of the elderly- causes, implications and response
d) Issue of child labour- magnitude, causes, effects and response
e) Child abuse- effects and ways to prevent
f) Trafficking of women- causes, effects and response

(15 lectures)

Note:

15 lectures will be allotted for project guidance

Unit Number 6 will not be assessed for the Semester End Exam

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B.A
Semester II
Course Code: UA FC 2C1

Lectures 45
Marks 100

Unit 1
Globalisation and Indian Society:
Understanding the concepts of liberalization, privatization and globalization;
Growth of information technology and communication and its impact manifested in everyday life;
Impact of globalization on industry: changes in employment and increasing migration;
Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides. (7 lectures)

Unit 2
Human Rights
Concept of Human Rights; origin and evolution of the concept;
The Universal Declaration of Human Rights;
Human Rights constituents with special reference to Fundamental Rights stated in the Constitution;
(10lectures)

Unit 3
Ecology
Importance of Environment Studies in the current developmental context;
Understanding concepts of Environment, Ecology and their interconnectedness;
Environment as natural capital and connection to quality of human life;
Environmental Degradation- causes and impact on human life;
Sustainable development- concept and components; poverty and environment
(10 lectures)

Unit 4
Understanding Stress and Conflict:
Causes of stress and conflict in individuals and society;
Agents of socialization and the role played by them in developing the individual;
Significance of values, ethics and prejudices in developing the individual;
Stereotyping and prejudice as significant factors in causing conflicts in society.
Aggression and violence as the public expression of conflict;
(10 lectures)

Unit 5
Managing Stress and Conflict in Contemporary Society:
Types of conflicts and use of coping mechanisms for managing individual stress;
Maslow's theory of self-actualisation;
Different methods of responding to conflicts in society;
Conflict-resolution and efforts towards building peace and harmony in society.
(8 lectures)

Unit 6
Contemporary Societal Challenges:
a) Increasing urbanization, problems of housing, health and sanitation;
b) Changing lifestyles and impact on culture in a globalised world.
c) Farmers' suicides and agrarian distress.
d) Debate regarding Genetically Modified Crops.
e) Development projects and Human Rights violations.
f) Increasing crime/suicides among youth.
(15 lectures)

Note:
15 lectures will be allotted for project guidance
Unit Number 6 will not be assessed for the Semester End Exam

Internal Assessment and Question Paper Pattern for FC- Semester I & II Course At the F Y B A Examinations

The student will be assessed on the basis of Internal Assessment of 40 marks and a Semester End Exam of 60 marks. The student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 16 out of 40 in Internal Assessment and 24 out of 60 in Semester End Exam.

Internal Assessment:
- There will be one mid-semester test of 10 marks on Units 1 and 2.
- The test will, as far as possible, comprise of objective questions and/or short notes.
- The student will have to submit an assignment/project for 20 marks before appearing for the Semester End Exam. This assignment/project will be entirely based on Unit 6 and can take the form of street-plays/exhibition/power-point presentations or similar other modes suitable to the topic selected; students can work in groups of not more than 8 for the purpose of this assignment. Students will have to submit a hard copy of the assignment before appearing for the Semester End Exam. The assignment will be assessed for 20 marks of which 10 marks may be allotted for a viva, to assess the level of engagement of the student with the topic assigned.
- Unit 6 will not be included in the Semester End Exam.
- 10 marks will be assigned to the participation of the student in class discussions and the projects undertaken along with the leadership skills and presentation skills exhibited during the class sessions.

Semester End Exam:

- There will be a Semester End Exam for 60 marks of 2 hours duration.
- This exam will comprise of four compulsory questions covering Units 1-5 of the syllabus.
- Question No. 1, 2 and 3 will be Full-length questions for 15 marks each; there will be an internal choice in each of these questions requiring the students to answer one of two questions asked.
- Full-length questions will be from Units 2, 3, 4 and 5 only.
- Question No. 4 will be of the Short Note type where each Short Note will be for 3 marks each. Students will be required to answer 5 out of 8 Short Notes.
- Short note questions will be from Units 1, 2, 3, 4 and 5.
- Unit 1 will not feature in the Full-length questions but will be asked only in the form of Short Note questions.

NOTE: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Arts passed by the Academic Council from time to time.

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B.Sc
Semester 1
Course Code: US FC 1C1

Lectures 45
Marks 100

Unit 1
Overview of Indian Society:
Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender;
Appreciate the concept of linguistic diversity in relation to the Indian situation;
Understand regional variations according to rural, urban and tribal characteristics;
Understanding the concept of diversity as difference. ***(5 lectures)***

Unit 2
Concept of Disparity- 1:
Understand the concept of disparity as arising out of stratification and inequality;
Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;
Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities. ***(10 lectures)***

Unit 3
Concept of Disparity-2:
Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof;
Understand inter-group conflicts arising out of communalism;
Examine the causes and effects of conflicts arising out of regionalism and linguistic differences. ***(10 lectures)***

Unit 4
The Indian Constitution:
Philosophy of the Constitution as set out in the Preamble;
The structure of the Constitution-the Preamble, Main Body and Schedules;
Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society;
Basic features of the Constitution. ***(10 lectures)***

Unit 5
Significant Aspects of Political Processes:
The party system in Indian politics;
Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics;
Role and significance of women in politics. ***(10 lectures)***

Unit 6

Growing Social Problems in India:

a) Substance abuse- impact on youth & challenges for the future
b) HIV/AIDS- awareness, prevention, treatment and services
c) Problems of the elderly- causes, implications and response
d) Issue of child labour- magnitude, causes, effects and response
e) Child abuse- effects and ways to prevent
f) Trafficking of women- causes, effects and response

(15 lectures)

Note:
15 lectures will be allotted for project guidance
Unit Number 6 will not be assessed for the Semester End Exam

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B.Sc.
Semester II
Course Code: US FC 2C1

Lectures 45
Marks 100

Unit 1
Globalisation and Indian Society:
Understanding the concepts of liberalization, privatization and globalization;
Growth of information technology and communication and its impact manifested in everyday life;
Impact of globalization on industry: changes in employment and increasing migration;
Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides. (7 lectures)

Unit 2
Human Rights
Concept of Human Rights; origin and evolution of the concept;
The Universal Declaration of Human Rights;
Human Rights constituents with special reference to Fundamental Rights stated in the Constitution;
(10lectures)

Unit 3
Ecology
Importance of Environment Studies in the current developmental context;
Understanding concepts of Environment, Ecology and their interconnectedness;
Environment as natural capital and connection to quality of human life;
Environmental Degradation- causes and impact on human life;
Sustainable development- concept and components; poverty and environment
(10 lectures)

Unit 4
Understanding Stress and Conflict:
Causes of stress and conflict in individuals and society;
Agents of socialization and the role played by them in developing the individual;
Significance of values, ethics and prejudices in developing the individual;
Stereotyping and prejudice as significant factors in causing conflicts in society.
Aggression and violence as the public expression of conflict;
(10 lectures)

Unit 5
Managing Stress and Conflict in Contemporary Society:
Types of conflicts and use of coping mechanisms for managing individual stress;
Maslow's theory of self-actualisation;
Different methods of responding to conflicts in society;
Conflict-resolution and efforts towards building peace and harmony in society.
(8 lectures)

Unit 6
Contemporary Societal Challenges:
a) Increasing urbanization, problems of housing, health and sanitation;
b) Changing lifestyles and impact on culture in a globalised world.
c) Farmers' suicides and agrarian distress.
d) Debate regarding Genetically Modified Crops.
e) Development projects and Human Rights violations.
f) Increasing crime/suicides among youth.
(15 lectures)

Note:
15 lectures will be allotted for project guidance
Unit Number 6 will not be assessed for the Semester End Exam

Internal Assessment and Question Paper Pattern for FC- Semester I & II Course At the F Y B Sc Examinations

The student will be assessed on the basis of Internal Assessment of 40 marks and a Semester End Exam of 60 marks. The student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 16 out of 40 in Internal Assessment and 24 out of 60 in Semester End Exam.

Internal Assessment:
- There will be one mid-semester test of 10 marks on Units 1 and 2.
- The test will, as far as possible, comprise of objective questions and/or short notes.
- The student will have to submit an assignment/project for 20 marks before appearing for the Semester End Exam. This assignment/project will be entirely based on Unit 6 and can take the form of street-plays/exhibition/power-point presentations or similar other modes suitable to the topic selected; students can work in groups of not more than 8 for the purpose of this assignment. Students will have to submit a hard copy of the assignment before appearing for the Semester End Exam. The assignment will be assessed for 20 marks of which 10 marks may be allotted for a viva, to assess the level of engagement of the student with the topic assigned.
- Unit 6 will not be included in the Semester End Exam.
- 10 marks will be assigned to the participation of the student in class discussions and the projects undertaken along with the leadership skills and presentation skills exhibited during the class sessions.

Semester End Exam:

- There will be a Semester End Exam for 60 marks of 2 hours duration.
- This exam will comprise of four compulsory questions covering Units 1-5 of the syllabus.
- Question No. 1, 2 and 3 will be Full-length questions for 15 marks each; there will be an internal choice in each of these questions requiring the students to answer one of two questions asked.
- Full-length questions will be from Units 2, 3, 4 and 5 only.
- Question No. 4 will be of the Short Note type where each Short Note will be for 3 marks each. Students will be required to answer 5 out of 8 Short Notes.
- Short note questions will be from Units 1, 2, 3, 4 and 5.
- Unit 1 will not feature in the Full-length questions but will be asked only in the form of Short Note questions.

NOTE: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Science and passed by the Academic Council from time to time.

AC. 6.6.2012
Item No.4.49

UNIVERSITY OF MUMBAI

Revised Syllabus for the F.Y.B.A/F.Y.B.Sc.

Program: F.Y.B.A/F.Y.B.Sc.

Course: Foundation Course

(Semester I & II)

(As per Credit Based Semester and Grading System
with effect from the academic year 2012–2013)

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B A
Semester 1
Course Code: UA FC 1C1

Lectures 45
Marks 100

Unit 1
Overview of Indian Society:
Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender;
Appreciate the concept of linguistic diversity in relation to the Indian situation;
Understand regional variations according to rural, urban and tribal characteristics;
Understanding the concept of diversity as difference. ***(5 lectures)***

Unit 2
Concept of Disparity- 1:
Understand the concept of disparity as arising out of stratification and inequality;
Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;
Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities. ***(10 lectures)***

Unit 3
Concept of Disparity-2:
Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof;
Understand inter-group conflicts arising out of communalism;
Examine the causes and effects of conflicts arising out of regionalism and linguistic differences. ***(10 lectures)***

Unit 4
The Indian Constitution:
Philosophy of the Constitution as set out in the Preamble;
The structure of the Constitution-the Preamble, Main Body and Schedules;
Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society;
Basic features of the Constitution. ***(10 lectures)***

Unit 5
Significant Aspects of Political Processes:
The party system in Indian politics;
Local self-government in urban and rural areas; the 73^{rd} and 74^{th} Amendments and their implications for inclusive politics;
Role and significance of women in politics. ***(10 lectures)***

Unit 6

Growing Social Problems in India:

a) Substance abuse- impact on youth & challenges for the future
b) HIV/AIDS- awareness, prevention, treatment and services
c) Problems of the elderly- causes, implications and response
d) Issue of child labour- magnitude, causes, effects and response
e) Child abuse- effects and ways to prevent
f) Trafficking of women- causes, effects and response

(15 lectures)

Note:

15 lectures will be allotted for project guidance

Unit Number 6 will not be assessed for the Semester End Exam

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B.A
Semester II
Course Code: UA FC 2C1

Lectures 45
Marks 100

Unit 1
Globalisation and Indian Society:
Understanding the concepts of liberalization, privatization and globalization;
Growth of information technology and communication and its impact manifested in everyday life;
Impact of globalization on industry: changes in employment and increasing migration;
Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides. (7 lectures)

Unit 2
Human Rights
Concept of Human Rights; origin and evolution of the concept;
The Universal Declaration of Human Rights;
Human Rights constituents with special reference to Fundamental Rights stated in the Constitution;
(10lectures)

Unit 3
Ecology
Importance of Environment Studies in the current developmental context;
Understanding concepts of Environment, Ecology and their interconnectedness;
Environment as natural capital and connection to quality of human life;
Environmental Degradation- causes and impact on human life;
Sustainable development- concept and components; poverty and environment
(10 lectures)

Unit 4
Understanding Stress and Conflict:
Causes of stress and conflict in individuals and society;
Agents of socialization and the role played by them in developing the individual;
Significance of values, ethics and prejudices in developing the individual;
Stereotyping and prejudice as significant factors in causing conflicts in society.
Aggression and violence as the public expression of conflict;
(10 lectures)

Unit 5
Managing Stress and Conflict in Contemporary Society:
Types of conflicts and use of coping mechanisms for managing individual stress;
Maslow's theory of self-actualisation;
Different methods of responding to conflicts in society;
Conflict-resolution and efforts towards building peace and harmony in society.
(8 lectures)

Unit 6
Contemporary Societal Challenges:
a) Increasing urbanization, problems of housing, health and sanitation;
b) Changing lifestyles and impact on culture in a globalised world.
c) Farmers' suicides and agrarian distress.
d) Debate regarding Genetically Modified Crops.
e) Development projects and Human Rights violations.
f) Increasing crime/suicides among youth.
(15 lectures)

Note:
15 lectures will be allotted for project guidance
Unit Number 6 will not be assessed for the Semester End Exam

Internal Assessment and Question Paper Pattern for FC- Semester I & II Course At the F Y B A Examinations

The student will be assessed on the basis of Internal Assessment of 40 marks and a Semester End Exam of 60 marks. The student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 16 out of 40 in Internal Assessment and 24 out of 60 in Semester End Exam.

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- There will be one mid-semester test of 10 marks on Units 1 and 2.
- The test will, as far as possible, comprise of objective questions and/or short notes.
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- Unit 6 will not be included in the Semester End Exam.
- 10 marks will be assigned to the participation of the student in class discussions and the projects undertaken along with the leadership skills and presentation skills exhibited during the class sessions.

Semester End Exam:

- There will be a Semester End Exam for 60 marks of 2 hours duration.
- This exam will comprise of four compulsory questions covering Units 1-5 of the syllabus.
- Question No. 1, 2 and 3 will be Full-length questions for 15 marks each; there will be an internal choice in each of these questions requiring the students to answer one of two questions asked.
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- Question No. 4 will be of the Short Note type where each Short Note will be for 3 marks each. Students will be required to answer 5 out of 8 Short Notes.
- Short note questions will be from Units 1, 2, 3, 4 and 5.
- Unit 1 will not feature in the Full-length questions but will be asked only in the form of Short Note questions.

NOTE: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Arts passed by the Academic Council from time to time.

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B.Sc
Semester 1
Course Code: US FC 1C1

Lectures 45
Marks 100

Unit 1
Overview of Indian Society:
Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender;
Appreciate the concept of linguistic diversity in relation to the Indian situation;
Understand regional variations according to rural, urban and tribal characteristics;
Understanding the concept of diversity as difference. ***(5 lectures)***

Unit 2
Concept of Disparity- 1:
Understand the concept of disparity as arising out of stratification and inequality;
Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;
Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities. ***(10 lectures)***

Unit 3
Concept of Disparity-2:
Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof;
Understand inter-group conflicts arising out of communalism;
Examine the causes and effects of conflicts arising out of regionalism and linguistic differences. ***(10 lectures)***

Unit 4
The Indian Constitution:
Philosophy of the Constitution as set out in the Preamble;
The structure of the Constitution-the Preamble, Main Body and Schedules;
Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society;
Basic features of the Constitution. ***(10 lectures)***

Unit 5
Significant Aspects of Political Processes:
The party system in Indian politics;
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Role and significance of women in politics. ***(10 lectures)***

Unit 6

Growing Social Problems in India:

a) Substance abuse- impact on youth & challenges for the future
b) HIV/AIDS- awareness, prevention, treatment and services
c) Problems of the elderly- causes, implications and response
d) Issue of child labour- magnitude, causes, effects and response
e) Child abuse- effects and ways to prevent
f) Trafficking of women- causes, effects and response

(15 lectures)

Note:
15 lectures will be allotted for project guidance
Unit Number 6 will not be assessed for the Semester End Exam

Revised Syllabus (From 2012-13)
Foundation Course for F. Y. B.Sc.
Semester II
Course Code: US FC 2C1

Lectures 45
Marks 100

Unit 1
Globalisation and Indian Society:
Understanding the concepts of liberalization, privatization and globalization;
Growth of information technology and communication and its impact manifested in everyday life;
Impact of globalization on industry: changes in employment and increasing migration;
Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides. (7 lectures)

Unit 2
Human Rights
Concept of Human Rights; origin and evolution of the concept;
The Universal Declaration of Human Rights;
Human Rights constituents with special reference to Fundamental Rights stated in the Constitution;
(10lectures)

Unit 3
Ecology
Importance of Environment Studies in the current developmental context;
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Environmental Degradation- causes and impact on human life;
Sustainable development- concept and components; poverty and environment
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Unit 4
Understanding Stress and Conflict:
Causes of stress and conflict in individuals and society;
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Significance of values, ethics and prejudices in developing the individual;
Stereotyping and prejudice as significant factors in causing conflicts in society.
Aggression and violence as the public expression of conflict;
(10 lectures)

Unit 5
Managing Stress and Conflict in Contemporary Society:
Types of conflicts and use of coping mechanisms for managing individual stress;
Maslow's theory of self-actualisation;
Different methods of responding to conflicts in society;
Conflict-resolution and efforts towards building peace and harmony in society.
(8 lectures)

Unit 6
Contemporary Societal Challenges:
a) Increasing urbanization, problems of housing, health and sanitation;
b) Changing lifestyles and impact on culture in a globalised world.
c) Farmers' suicides and agrarian distress.
d) Debate regarding Genetically Modified Crops.
e) Development projects and Human Rights violations.
f) Increasing crime/suicides among youth.
(15 lectures)

Note:
15 lectures will be allotted for project guidance
Unit Number 6 will not be assessed for the Semester End Exam

Internal Assessment and Question Paper Pattern for FC- Semester I & II Course At the F Y B Sc Examinations

The student will be assessed on the basis of Internal Assessment of 40 marks and a Semester End Exam of 60 marks. The student will have to secure a minimum of 40% marks in aggregate and a minimum of 40% in each component of assessment i.e. 16 out of 40 in Internal Assessment and 24 out of 60 in Semester End Exam.

Internal Assessment:
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Semester End Exam:

- There will be a Semester End Exam for 60 marks of 2 hours duration.
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- Question No. 1, 2 and 3 will be Full-length questions for 15 marks each; there will be an internal choice in each of these questions requiring the students to answer one of two questions asked.
- Full-length questions will be from Units 2, 3, 4 and 5 only.
- Question No. 4 will be of the Short Note type where each Short Note will be for 3 marks each. Students will be required to answer 5 out of 8 Short Notes.
- Short note questions will be from Units 1, 2, 3, 4 and 5.
- Unit 1 will not feature in the Full-length questions but will be asked only in the form of Short Note questions.

NOTE: All other rules regarding Standard of Passing, ATKT, etc., will be as per those decided by the Faculty of Science and passed by the Academic Council from time to time.

UNIVERSITY OF MUMBAI
No. UG/38 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Commerce & Management Faculty is invited to this office Circular No. UG/144 of 2011, dated 14th June, 2011 relating to syllabus of Bachelor of Commerce (B.Com.) degree course.

They are hereby informed that the recommendations made by the Board of Studies in Accountancy at its meeting held on 28th February, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.49 and that in accordance therewith, the revised syllabus as per the (CBCS) for the First Year B.Com. (Accounting and Finance) (Sem. II) has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
22nd June, 2018

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Commerce & Management Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.49/05/05/2018

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No. UG/38 -A of 2018 MUMBAI-400 032 22nd June, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Commerce & Management,
2) The Director, Board of Examinations and Evaluation,
3) The Director, Board of Students Development,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Innovative Financial Services
course of
B.Com. (Accounting and Finance)
Programme at
First Year
Semester II

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year 2018-2019)

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com. (Accounting and Finance)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting (Elements of Financial Accounting) - I	**03**	1	Financial Accounting (Special Accounting Areas) - II	**03**
2	Cost Accounting (Introduction and Element of cost) - I	**03**	2	Auditing (Introduction and Planning) - I	**03**
3	Financial Management (Introduction to Financial Management) - I	**03**	3	**Innovative Financial Services** ***(Revised and to be implemented from 2018-2019)***	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Commerce (Business Environment) - I	**03**	6	Business Law (Business Regulatory Framework) - I	**03**
7	Business Economics - I	**03**	7	Business Mathematics	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

Note: Course No. 03 entitled Taxation - I (Indirect Taxes I) Semester II has been substituted to ***Innovative Financial Services*** *and to be implemented from the Academic Year 2018-2019*

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting (Special Accounting Areas) - II	**03**
2	Auditing (Introduction and Planning) - I	**03**
3	**Innovative Financial Services** ***(Revised and to be implemented from 2018-2019)***	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Law (Business Regulatory Framework) - I	**03**
7	Business Mathematics	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - II
2	Foundation Course in NSS - II
3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - II

Note: Course No. 03 entitled Taxation - I (Indirect Taxes I) Semester II has been substituted to ***Innovative Financial Services*** *and to be implemented from the Academic Year 2018-2019*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Innovative Financial Services

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Traditional Financial Services	15
2	Issue Management and Securitization	15
3	Financial Services and its Mechanism	15
4	Consumer Finance and Credit Rating	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Traditional Financial Services**
	a) Financial Services: • Concept, Objectives/Functions, Characteristics, Financial Service Market, Financial Service Market Constituents, Growth of Financial Services in India, Problems in Financial Services Sector, Banking and Non-Banking Companies, Regulatory Framework **b) Factoring and Forfaiting:** • Introduction, Types of Factoring, Theoretical Framework, Factoring Cost, Advantages and Disadvantages of Factoring, Factoring in India, Factoring v/s Forfaiting, Working of Forfaiting, Benefits and Drawbacks of Forfaiting, Practical Problems. **c) Bill Discounting:** • Introduction, Framework, Bill Market Schemes, Factoring V/s Bill Discounting in Receivable Management.
2	**Issue Management and Securitization**
	a) Issue Management and Intermediaries: • Introduction, Merchant Bankers/ Lead Managers, Underwriters, Bankers to an Issue, Brokers to an Issue **b) Stock Broking:** • Introduction, Stock Brokers, SubBrokers, Foreign Brokers, Trading and Clearing/Self Clearing Members, Stock Trading (Cash and Normal) Derivative Trading **c) Securitization:** • Definition, Securitization v/s Factoring, Features of Securitization, Pass Through Certificates, Securitization Mechanism, Special Purpose Vehicle, Securitisable Assets, Benefits of Securitization, New Guidelines on Securitization
3	**Financial Services and its Mechanism**
	a) Lease and Hire-Purchase: • Meaning, Types of Lease - Finance Lease, Operating Lease, Advantages and Disadvantages of Leasing, Leasing in India, Legal Aspects of Leasing. • Definition of Hire Purchase, Hire Purchase and Installment Sale Characteristics, Hire Purchase and Leasing, Advantages of Hire Purchase, Problems of Hire Purchase. **b) Housing Finance:** • Introduction, Housing Finance Industry, Housing Finance Policy Aspect, Sources of Funds, Market of Housing Finance, Housing Finance in India- Major Issues, Housing Finance in India – Growth Factors, Housing Finance Institutions in India, National Housing Bank (NHB), Guidelines for Asset Liability Management System in HFC, Fair Trade Practice Code for HFC's, Housing Finance Agencies

SN	Modules/ Units
	c) Venture Capital: Introduction, Features of Venture Capital, Types of Venture Capital Financing Stages, Disinvestment mechanisms, Venture Capital Investment process, Indian Scenario
4	**Consumer Finance and Credit Rating**
	a) Consumer Finance: • Introduction, Sources, Types of Products, Consumer Finance Practice in India, Mechanics of Consumer Finance, Terms, Pricing, Marketing and Insurance of Consumer Finance, Consumer Credit Scoring, Case for and against Consumer Finance **b) Plastic Money:** • Growth of Plastic Money Services in India, Types of Plastic Cards- Credit card- Debit Card- Smart card- Add-on Cards, Performance of Credit Cards and Debit Cards, Benefits of Credit Cards, Dangers of Debit Cards, Prevention of Frauds and Misuse, Consumer Protection. Indian Scenario. • Smart Cards- Features, Types, Security Features and Financial Applications **c) Credit Rating:** • Meaning, Origin, Features, Advantages of Rating, Regulatory Framework, Credit Rating Agencies, Credit Rating Process, Credit Rating Symbols. Credit Rating Agencies in India, Limitations of Rating

Note: Course No. 03 entitled Taxation - I (Indirect Taxes I) Semester II has been substituted to ***Innovative Financial Services*** *and to be implemented from the Academic Year 2018-2019*

Reference Books

Reference Books
Innovative Financial Services
• *IM Pandey, Financial Management, Vikas Publishing House Ltd.* • *Khan M.Y., Financial Services, Mc Graw Hill Education.* • *Dr.S.Gurusamy, Financial Services, Vijay Nicole Imprints.* • *Financial Market and Services, E, Gordon and K. Natrajan, Himalaya Publishing House*

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

UNIVERSITY OF MUMBAI
No. UG/ 273 of 2017-18

Circular:-

The Principals of the Affiliated Colleges in Faculty of Arts and the Heads, University Departments and the Professor-cum-Director, Institute of Distance and Open Learning,(IDOL) are hereby informed that the recommendations made by the Board of Studies in Politics at its meeting held on 3rd March, 2017 have been accepted by the Academic Council at its meeting held on 11th May, 2017 **vide** item No.4.49 and that in accordance therewith, the revised syllabus as per the (CBCS) for S.Y.B.A. Public Administration (Sem. III & IV), has been brought into force with effect from the academic year 2017-18, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
26th October , 2017

(Dr.Dinesh Kamble)
I/c REGISTRAR

To,

The Principals of the Affiliated Colleges in Faculty of Arts and the Heads, University Departments and the Professor-cum-Director, Institute of Distance and Open Learning, (IDOL).

A.C/4.49/11.05.2017

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No. UG/ 273-A of 2017 MUMBAI-400 032 26th October , 2017

Copy forwarded with Compliments for information to:-

1.The Co-ordinator, Faculty of Arts & Humanities.
2.The Director, Board of Examinations and Evaluation,
3.The Director, Board of Students Development.,
4.The Co-Ordinator, University Computerization Centre,

(Dr.Dinesh Kamble)
I/c REGISTRAR

P.T.O..

SYBA

PAPER III - PUBLIC ADMINISTRATION

Syllabus: Semester-III

Module 1: Introduction to Public Administration [Lectures 12]

1.1. Meaning, Scope and Significance
1.2. Evolution of Public Administration as a Discipline
1.3. Public Administration in the Age of Liberalisation, Privatisation and Globalisation

Module 2.Theories of Administration [Lectures 10]

2.1. Scientific Management Theory- F.W. Taylor
2.2. Bureaucratic Theory- Max Weber
2.3. Human Relations Theory- Elton Mayo

Module3. Basic Principles and Theories of Organisation[Lectures 12]

3.1. Hierarchy, Delegation, Centralisation-Decentralisation
3.2. Motivation Theories- McGregor, McClelland
3.3. Leadership Theories- Trait theory, Contingency theory

Module 4. Contemporary Techniques and Practices in Administration [Lectures 11]

4.1. Good Governance
4.2. E-Governance
4.3. Public-Private Partnership (PPP)

SEMESTER IV- INDIAN ADMINISTRATION

Module 1.Introduction to Indian Administration [Lectures 11]

1.1 Evolution and Constitutional Context
1.2 Salient features
1.3 District Administration since Independence: Changing role of District Collector

Module 2.Personnel Administration[Lectures 11]

2.1. Recruitment: All India Services, Central Services, State Services
2.2. Public Service Commission: Union Public Service Commission and Maharashtra Public Service Commission
2.3. Training: All- India Services, Central Services, State Services (Maharashtra)

Module3.Financial Administration[Lectures 12]

3.1. Budgetary Process
3.2. Parliamentary Committees: Public Accounts Committee, Estimates Committee, Committee on Public Undertakings
3.3. Comptroller and Auditor General

Module 4.Contemporary Issues in Indian Administration[Lectures 11]

4.1. Integrity in Administration: Lokpal, Lokyukta, CVC
4.2. Citizen and Administration
4.3. Citizens' Charter

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Avasthi, Maheshwari, *Public Administration*, Laxmi Narayan Agarwal Publications, Agra, 2006.

Bhattacharya, Mohit,New*Horizons of Public Administration*, Jawahar Publications, New Delhi, 2008.

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Fadia, B. L. &Dr.KuldeepFadia, *Public Administration: Administrative Theories and Concepts*,SahityaBhawan**,** Agra, 2015

K.S. Padhay, **Indian** Political Thought, New Delhi: PHI Learning Pvt. **Ltd**., 2011

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Sahni, Pardeep, and Vayunandan, Etakula, *Administrative Theory*, PHI, New Delhi, 2010

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2. Bora, Shirsat, *Lokaprashasanshastra*,Vidya Books Publishers, Aurangabad, 2013
3. Bang, R.K., *LokPrashasanTatveaniSiddhanth*,Vidya Books Publishers, Aurangabad, 2015.
4. Patil, V. B., *LokPrashasan*, ShriMangeshPrakashan, Nagpur.
5. .Patil, V. B., *SamagraLokPrashasan*, K Sagar, Pune.
6. Bhogale, Shantaram, *LokprashasanacheSiddhantaaniKaaryapadhati*, Kailas Prakashan, Aurangabad

EXPLANATORY NOTE

SYBAPaper III- Public Administration and Paper IV Indian Administration

Syllabus: Semester-III & IV

Semester III- Public Administration	
Module 1: Introduction to Public Administration	**Explanatory Notes**
1.1. Meaning, Scope and Significance	Definitions , Distinction between Public and Private Administration,

	Nature and Scope of Public Administration –Integral view, Managerial view, POSDCoRB view, Subject Matter view Role and importance of Public Administration in Modern State
1.2. Evolution of Public Administration as a Discipline	Stages in the Evolution of Public Administration, New Public Administration
1.3. Public Administration in the Age of Liberalisation, Privatisation and Globalisation	New Public Management: Emergence and Features Public Choice Approach: Features and Critical evaluation
Module 2.Theories of Administration	
2.1. Scientific Management Theory- F.W. Taylor	Taylor's contribution
2.2. Bureaucratic Theory- Max Weber	Characteristics, Views of Max Weber –Authority and Bureaucracy
2.3. Human Relations Theory- Elton Mayo	Hawthorne Studies and Elton Mayo's contribution
Module3. Basic Principles and Theories of Organisation	
3.1. Hierarchy, Delegation, Centralisation-Decentralisation	Hierarchy –Meaning, Advantages and Disadvantages
	Delegation-Concept, Need for Delegation, Principles of Delegation, Limitations and Advantages
	Centralisation-Decentralisation :Concept, Advantages and Disadvantages

3.2. Motivation Theories- McGregor, McClelland	McGregor - Theory X and Theory Y McClelland – Theory of Needs
3.3. Leadership Theories- Trait theory, Contingency theory	Characteristics of Trait Theories – Big Five-Integration of Traits, limitations, importance of Emotional Intelligence Contingency Theory –Fiedler's Contingency model
Module 4. Contemporary Techniques and Practices in Administration	
4.1. Good Governance	Concept, Characteristics, Challenges
4.2. E-Governance	Meaning, SMART governance, benefits , E-governance initiatives in India
4.3. Public-Private Partnership (PPP)	Concept, Modules of PPP, benefits and limitations

Semester IV- Indian Administration	
Module 1.Introduction to Indian Administration	
1.1 Evolution and Constitutional Context	Constitutional provisions relating to Indian Administration British legacy Continuity and change
1.2 Salient features	Features of Indian Administrative System
1.3 District Administration since Independence: Changing role of District Collector	Organisation of District Administration, Powers, functions and role of District Collector
Module 2.Personnel Administration	
2.1. Recruitment: All India Services, Central Services, State Services	Scheme of examination for higher civil services
2.2. Public Service Commission: Union Public Service Commission and Maharashtra Public Service Commission	Composition and functions
2.3. Training: All India Services, Central Services, State Services (Maharashtra)	Institutionalised training for All India Services, Central Services, LalBahadurShashtri National Academy

	of Administration, National Police Academy, Indian Institute of Public Administration, Administrative Staff College of India State Services with respect to Maharashtra – New Training Policy of the Government of Maharashtra, YASHADA
Module 3.Financial Administration	
3.1. Budgetary Process	Concept and significance of Budget, Formulation and Enactment
3.2. Parliamentary Committees: Public Accounts Committee, Estimates Committee, Committee on Public Undertakings	Composition and Functions
3.3. Comptroller and Auditor General	Constitutional position, functions, role as an independent agency
Module 4.Contemporary Issues in Indian Administration	
4.1. Integrity in Administration: Lokpal, Lokyukta, CVC	Meaning of Integrity, Causes of Corruption, Legal and Institutional Remedies Lokpal, Lokayukta (w.r.t. Lok Pal and Lokayukta Act, 2014), CVC – Composition and Powers
4.2. Citizen and Administration	Role of Voluntary Agencies, Right to Information (RTI Act 2005)
4.3. Citizens' Charter	Objectives, Principles and Models

UNIVERSITY OF MUMBAI

No. UG/189 of 2017-18

CIRCULAR:-

A reference is invited to the syllabi relating to the Bachelor of Arts (B.A.) Programme **vide** this office Circular No.UG/50 of 2012-13, dated 28th June, 2012 and the Principals of the affiliated Colleges in Arts are hereby informed that the recommendations made by the Board of Studies in History & Archaeology at its meeting held on 23rd February, 2017 has been accepted by the Academic Council at its meeting held on 11th May, 2017 **vide** item No.4.66 and that in accordance therewith, the revised syllabus as per the (CBCS) of S.Y.B.A. History (History & Archaeology) (Sem III & IV), which is available on the University's website (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2017-18, accordingly.

(Dr.M.A.Khan)
REGISTRAR

MUMBAI – 400 032
9th August, 2017

To

The Principals of the affiliated Colleges in Arts.

A.C/4.66/11/05/2017

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No. UG/189 -A of 2017 MUMBAI-400 032 9th August, 2017

Copy forwarded with Compliments for information to:-

1) The Co-ordinator, Faculty of Arts and Humanités,
2) The Chairman, Board of Studies in History & Archaeology,
3) The Offg. Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
6) The Co-Ordinator, University Computerization Centre,

(Dr.M.A.Khan)
REGISTRAR

....PTO

AC / /2017
Item no.

UNIVERSITYOFMUMBAI

Revised Syllabus for Sem III and Sem IV

Program: B. A.

Course: History and Archaeology

(ChoiceBased Credit System with effect from the Academic year 2017-2018)

SYBA – History Paper-II
Landmarks in World History, 1300 A.D.-1945 A.D.

SEMESTER–III

Objectives**:** To enable the students tocomprehend the transition of Europe from medieval to modern times and its impact on the world. To provide accurate knowledge of the most significant events and personalities of the period under study and encourage understanding of the making of the modern world

Module I: The Modern Age

(a) Renaissance
(b) Geographical Discoveries
(c) Reformation

Module II: Age of Revolutions

(a) American Revolution
(b) French Revolution
(c) Industrial Revolution

Module III: Nationalism and Imperialism

(a) Formation of Nation-States in Europe
(b) Nationalist Movements in Italy and Germany
(c) Imperialist Expansion in Asia

Module IV: World in Transition (1914-1919)

(a) World War I
(b) Russian Revolution
(c) League of Nations

SEMESTER-IV

Module I: Inter War Period

(a) Kemal Pasha and Modernization of Turkey
(b) Reza Shah and Reforms in Iran
(c) Birth of Israel

Module II: Rise of Dictatorships

(a) Fascism
(b) Nazism
(c) Militarism in Japan

Module III: World War II and Efforts for Peace

(a) World War II
(b) The Atlantic Charter
(c) United Nations Organization.

Module IV: Nationalist Movements in Asia

(a) Dr. Sun-Yat-Sen and China
(b) Mahatma Gandhi and India
(c) Dr. Sukarno and Indonesia

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Kadam,Y.N. *VisavyaShatkalinJagachaItihas,*PhadkePrakashan, Kolhapur, 2005.

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SYBA History- Paper- III
Ancient India from Earliest Times to 1000 A.D.

SEMESTER-III

Objectives: To acquaint the students with different sources of Ancient Indian History.To enable the students to understand the political, socio-economic and cultural developments in the period under study and appreciate the rich cultural heritage in India

Module I: Sources of Ancient India and their Importance

(a) Archaeological
(b) Literary
(c) Foreign Travellers

Module II: Indus Valley Civilization

(a) Social and Economic Life
(b) Religious Life
(c) Town Planning and Decline of the Civilization

Module III: Vedic Age

(a) Janapada
(b) Social and Economic Life
(c) Religion

Module IV:India after 6th Century B.C.

(a) Administration of Mahajanapadas
(b) Jainism and Buddhism
(c) Persian and Greek Invasions

SEMESTER-IV

Module I: Mauryan and Post- Mauryan Period (322 B.C. to 320 A.D.)

(a) Chandragupta and Ashoka
(b) Mauryan Administration
(c) Post Mauryan Dynasties- Sungas, Kushanas and Satavahanas

Module II: Gupta Age (320 A.D. to 600 A.D.)

(a) Imperial Expansion: Chandragupta I, Samudragupta and Chandragupta II
(b) Administration
(c) Classical Age

Module III:Post Gupta Period (600A.D. to 1000A.D.)

(a) The Age of Harshavardhan
(b) The Rise of Rajputs
(c) Arab Invasion of Sind

Module IV: Major Dynasties of Deccan and South India

(a) Chalukyas of Badami and Rashtrakutas
(b) Pallavas and Cholas
(c) Spread of Indian Culture in South-East Asia

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Kulkarni,A.R.,*Prachin Bharat*, SnehvardhanPrakashan, Pune.

Morbanchikar,R.S., *Sathvahanakalin Maharashtra*, KailashPrakashan, Aurangabad.

Singre, Anil, *DakshinBharatachaItihas*, KailashPrakashan, Aurangabad.

B.A. HISTORY

Question Paper Pattern for S.Y.B.A. History

Semester III and Semester IV

As per University rules and guidelines

AC 26/2/2015
Item No. 4.70

UNIVERSITY OF MUMBAI

Syllabus for F.Y.B.Sc.
Program BSc
Course: ZOOLOGY

Semester I and II

(Credit Based Semester and Grading System
with effect from the academic year 2015–2016)

Syllabus Committee Members

Dr. Anil S. Singh	-	Convenor
Dr. Manisha Kulkarni	-	Co-convenor
Dr. Jyotsna Mahale	-	Co-convenor
Dr. Meenakshi Sundaresan	-	Co-convenor
Prof. Lata Sardesai	-	Co-convenor
Prof. P.C. Mathew	-	Co-convenor
Dr. Dilip Kakavipure	-	Co-convenor
Dr. V.M. Patole	-	Co-convenor
Dr. Kantilal H. Nagare	-	Co-convenor
Prof. Shanta Janyani	-	Co-convenor
Dr. S. Rangoonwala	-	Co-convenor
Dr. Minakshi Gurav	-	Member (Teacher)
Dr. Shirley B. Agwuocha	-	Member (Teacher)
Dr. Vishakha Shingala	-	Member (Teacher)
Dr. Gayathri N.	-	Member (Teacher)
Dr. Ansariya Rana	-	Member (Teacher)
Dr. Aditya S. Akerkar	-	Member (Teacher)
Dr. Shashikala Prajapati	-	Member (Teacher)
Dr. R.B. Singh	-	Member (Teacher)
Prof. Nitin Wasnik	-	Member (Teacher)
Prof. Nikhil C. Disoria	-	Member (Teacher)
Ms. Purva S. Prabhu	-	Member (Student)
Ms. Sachi R. Mayekar	-	Member (Student)
Ms. NehaVajandar	-	Member (Student)
Ms. Payal A. Shah	-	Member (Student)
Ms. Anuradha Gaikar	-	Member (Student)
Ms. Sonal S. Prabhulkar	-	Member (Student)

Syllabus for
FYBSc
Course – ZOOLOGY

1. Preamble
2. Pedagogy
3. Syllabus Semester I & II
4. References and Additional Reading
5. Scheme of Examination and Paper Pattern
6. Distribution of periods
7. Model Question bank

Aims

- To nurture interest in the students for the subject of Zoology
- To create awareness of the basic and modern concepts of Zoology
- To orient students about the importance of abiotic and biotic factors of environment and their conservation.
- To provide an insight to the basic nutritional and health aspects of human life.
- To inculcate good laboratory practices in students and to train them about scientific handling of important instruments.

Preamble

While presenting this new syllabus to the teachers and students of Semester I and Semester II (F.Y.B.Sc.) Zoology, I am extremely happy to state that for the first time efforts have been made to seek inputs of all the stake holders to make it more relevant.

In the first meeting of the Board of Studies an apex committee was formed to study syllabi worldwide with a view to include modern modules and plan semesters at UG and PG programs in advance to avoid overlapping and duplication of topics in various courses.

Meeting with the industry at the Indian Merchants' Chamber and with the meritorious alumni helped adding need based components. For the first time students were a part of the syllabus committee and the process became participative when the draft was finalized in an open meeting with all the Zoology teachers after having sought democratic criticism on the proposed syllabus placed on the University website for about one month.

While following the guidelines of UGC, use of animals is excluded from the practicals, substituting the same with audiovisual, ICT and simulation aids and that the syllabus is made more interesting with new, innovative topics. Providing the pedagogy as also indicating objectives and desired outcome of every topic for the teachers, and question bank for the students apart from the question paper pattern became an integral part of the syllabus, therefore.

Care is taken to provide the drafts from time to time and declare the final syllabus well in advance enabling the teachers to make preparations before commencement of the academic year and facilitating students to execute their right to know the details before admissions.

The success of this revamped syllabus will depend totally on the enthusiasm of the teachers which is very high all throughout the process and their hands will be strengthened by publishing the University text books for the first time. This curriculum of the Zoologists, for the Zoologists and by the Zoologists developed with the united efforts will take our ever progressive subject to greater heights in the years to come.

- VINAYAK DALVIE, Chairman, BOS in Zoology

Syllabus for
FYBSc.
Course – ZOOLOGY
To be implemented from Academic year 2015-16
SEMESTER - I

COURSE CODE	UNIT	TOPICS	CREDITS	LECTURES/WEEK
USZO101	I	Wonders of animal world	2	1
	II	Biodiversity and its conservation		1
	III	Footsteps to follow		1
USZO102	I	Laboratory safety and Units of Measurement	2	1
	II	Animal Biotechnology		1
	III	Instrumentation		1
USZOP1	Practical based on both courses		2	6

SEMESTER - II

COURSE CODE	UNIT	TOPICS	CREDITS	LECTURES/WEEK
USZO201	I	Population Ecology	2	1
	II	Ecosystem		1
	III	National park and Sanctuaries		1
USZO202	I	Nutrition and Health	2	1
	II	Public health and Hygiene		1
	III	Common human Diseases		1
USZOP2	Practical based on both courses		2	6

SYLLABUS F.Y.B.Sc. ZOOLOGY

UNIT WISE DISTRIBUTION

Semester I		Semester II	
Course 1	**Course 2**	**Course 3**	**Course 4**
Unit 1 Wonders of animal world	Unit 1 Laboratory Safety and Units of Measurement	Unit 1 Population Ecology	Unit 1 Nutrition and Health
Unit 2 Biodiversity and its Conservation	Unit 2 Animal Biotechnology	Unit 2 Ecosystem	Unit 2 Public Health and Hygiene
Unit 3 Footsteps to follow	Unit 3 Instrumentation	Unit 3 National Parks and Sanctuaries	Unit 3 Common Human Diseases
Practical (USZO P1)	Practical (USZO P1)	Practical (USZO P2)	Practical (USZO P2)

PEDAGOGY

F.Y.B.Sc. Syllabus

First year B.Sc. course is the entry point for the students to undergraduate classes which acts like a guiding force for them to make up their mind in selecting a subject they would wish to pursue their studies in future for carving their career in a particular field.

The syllabus committee in the subject of Zoology for F.Y.B.Sc. Class has designed this syllabus with a view that it is most appropriate time when we transform our traditional closed classroom teaching learning practices to more of field and activity based studies, the correct methodology for the study of Natural Sciences. It is recommended to orient the students about ecosystem, bio-diversity, wildlife conservation and management with the help of models, photographs, movies, documentaries, charts and use of ICT and then take learners to field to have realistic experiences. This will enable them to get true insight about endurance of animal life in relation to human activity inducing sentiment of love, care and protection in the young mind and heart leading to understand importance of co-existence and conservation of bio-diversity. An interaction with the officials of wildlife protection force should be allowed to get basic knowledge about the relevant acts through lectures which for creating awareness about these issues and also to make best use of the knowledge in their own interest as well as for the country. Instrumentation and Animal Biotechnology component would initiate academia- industry interface and should be edified in collaboration with expertise from relevant research institutes and industrial establishments and entrepreneurs by inviting them as guest speakers or through industrial visits, excursions for practical experience about the principle, working and application of the instruments for commercial use. Population ecology need to be explained in the context with census to enlighten pupils about the effect of diversity and dynamism of human population on socio economic status of India. Experts from the field of nutrition and health can be invited to enlighten learners on the topics of nutritional value of food, balanced diet, ill-effects of eating junk food and aerated drinks. Medical professionals, relevant NGO's maybe engaged to educate students regarding myth, precautionary measures, immunization drives of common diseases, ill-effects of self-medication and stress, significance of BMI through series of programmes. During medical emergencies it is of immense importance to provide first aid assistance to the diseased within the golden period i.e. of few minutes. This enhances the possibility to save life, thus it is strongly recommended to form a consortium of colleges to conduct training in rotation of first aid techniques for teachers and students both with the help of organizations like Red Cross Society, Health Department of Civic Bodies, Civil Defence Department and Local Self Government etc.

Dr. Anil S. Singh
Convenor

F.Y.B.Sc. ZOOLOGY

(THEORY)

SEMESTER I

USZO101 (Course 1)
Wonders of Animal World, Biodiversity and its Conservation

Unit 1: Wonders of Animal World (15 L)

Objective: *To take learners through a captivating journey of hoarded wealth of marvellous animal world.*

Desired Outcome*: Curiosity will be ignited in the mind of learners, to know more about the fascinating world of animals which would enhance their interest and love for the subject of Zoology.*

1.1**:** Echolocation in Bats and Cetaceans - Dolphins and Whales

1.2**:** Mechanism of Pearl formation in Mollusca

1.3**:** Bioluminescence in Animals: Noctiluca, Glow worm, Firefly, Angler Fish (Mechanism and use for the animal)

1.4**:** Regeneration in Animals - Earthworm (Annelida) and Lizard (Reptile)

1.5**:** Mimicry in Butterflies and its significance: Great Eggfly and Common Crow, Common Palmfly and Plain Tiger.

1.6**:** Mechanism of Coral formation and types of Coral reefs

1.7**:** Bird migration: Definition, types and factors inducing bird migration

1.8**:** Adaptive features of desert animals: Reptiles (Phrynosoma) and Mammals (Camel)

1.9**:** Breeding and Parental care in:

1.9.1**:** Pisces - Ovo-viviparous (Black Molly/Guppy), Mouth brooders (Tilapia), Brood pouches (Sea horse)

1.9.2**:** Amphibia - Mouth brooders (Darwin's Frog), Egg carriers (Midwife Toad)

1.9.3**:** Mammals - Egg-laying (Duck-billed Platypus), Marsupials (Kangaroo)

1.10**:** Aves: Brood Parasitism (Cuckoo)

Unit 2: Biodiversity and its Conservation (15 L)

Objective*: To orient learners about rich heritage of Biodiversity of India and make them understand significance of its conservation.*

Desired Outcome*: Learners would appreciate treasure of Biodiversity, its importance and hence would contribute their best for its conservation*.

2.1: Introduction to Biodiversity - Definition, Concepts, Scope and Significance

2.2: Levels of Biodiversity - Introduction to Genetic, Species and Ecosystem Biodiversity

2.3: Introduction of Biodiversity Hotspots- (Western Ghats and Indo-Burma Border)

2.4: Values of biodiversity - Direct and Indirect use value

2.5: Threats to Biodiversity - Habitat loss and Man-Wildlife conflict

2.6: Biodiversity conservation and management

2.6.1**:** Conservation strategies: *in situ*, ex-situ, National parks, Sanctuaries and Biosphere reserves.

2.6.2**:** Introduction to International efforts : Convention on Biological Diversity (CBD), International Union for Conservation of Nature and Natural Resources (IUCN), United Nations Environment Program - World Conservation Monitoring Centre (UNEP-WCMC)

2.6.3**:** National Biodiversity Action Plan, 2002

2.6.4**:** Introduction to Indian Wildlife (Protection) Act, 1972 and Convention for International Trade of endangered species

Unit 3: Footsteps to follow (15 L)

Objective*: To teach learners about innovative and novel work of scientists/philosopher/entrepreneurs in the field of biological sciences.*

Desired Outcome*: Minds of learners would be impulsed to think differently and would be encouraged ipso facto to their original crude ideas from the field of biological sciences.*

3.1**:** Dr. Hargobind Khorana (Genetic code)

3.2**:** Dr. Varghese Kurien (Amul –White revolution)

3.3**:** Dr. Salim Ali (Ornithologist)

3.4**:** Anna Hazare (Water Conservation-Ralegan Siddhi)

3.5**:** Baba Amte (Anandvan)

3.6**:** Kiran Mazumdar Shaw (Biocon)

3.7**:** Gadre Fisheries (Surimi)

Two cases preferably of local importance to the college be additionally taught.

USZO102 (Course 2)

INSTRUMENTATION and ANIMAL BIOTECHNOLOGY

Unit 1: Laboratory safety, Units and Measurement (15 L)

Objective: *To make learners aware of risks involved in handling of different hazardous chemicals, sensitive (electrical/electronic) instruments and infectious biological specimens especially during practical sessions in the laboratory and to train them to avoid mishap.*

Desired Outcome*: Learners would work safely in the laboratory and avoid occurrence of accidents (mishaps) which will boost their scholastic performance and economy in use of materials/chemicals during practical sessions.*

1.1: Introduction to good laboratory practices

1.2: **Use of safety symbols**: meaning, types of hazards and precautions

1.3: **Units of measurement**:

1.3.1**:** Calculations and related conversions of each: Metric system- length (meter to micrometer); weight (gram to microgram), Volumetric (Cubic measures)

1.3.2**:** Temperature: Celsius, Fahrenheit, Kelvin

1.3.3**:** Concentrations: Percent solutions, ppt, ppm, ppb dilutions, Normality, Molarity and Molality.

1.3.4**:** Biostatistics: Introduction and scope, Sampling and its types, Central Tendencies (mean, median, mode) Tabulation, Graphical representations (Histograms, bar diagrams, pie diagrams).

Unit 2: Animal Biotechnology (15 L)

Objective: *To acquaint learners to the modern developments and concepts of Zoology highlighting their applications aiming for the benefit of human being.*
Desired Outcome*: Learners would understand recent advances in the subject and their applications for the betterment of mankind; and that the young minds would be tuned to think out of the box.*

2.1: **Biotechnology**: Scope and achievements of Biotechnology (Fishery, Animal Husbandry, Medical, Industrial)

2.2: **Transgenesis**: Retro viral method, Nuclear transplantation method, DNA microinjection method and Embryonic stem cell method

2.3: Cloning (Dolly)

2.4: Ethical issues of transgenic and cloned animals

2.5: **Applications of Biotechnology**:

2.5.1**:** DNA fingerprinting: Technique in brief and its application in forensic science (Crime Investigation)

2.5.2**:** Recombinant DNA in medicines (recombinant insulin)

2.5.3**:** Gene therapy: Ex-vivo and *In vivo,* Severe Combined Immunodeficiency (SCID), Cystic Fibrosis

2.5.4**:** Green genes: Green Fluorescent Protein (GFP) from Jelly fish- valuable as reporter genes used to detect food poisoning.

Unit 3: Instrumentation (15 L)

Objective: *To provide all learners a complete insight about the structure and train them with operational skills of different instruments required in Zoology.*
Desired Outcome: *Students will be skilled to select and operate suitable instruments for the studies of different components of Zoology of this course and also of higher classes including research.*

3.1: Microscopy

3.1.1**:** Construction, principle and applications of dissecting and compound microscope.

3.2: Colorimetry and Spectroscopy - Principle and applications.

3.3: pH - Sorenson's pH scale, pH meter - principle and applications.

3.3: Centrifuge - Principle and applications (clinical and ultra centrifuges).

3.4: Chromatography - Principle and applications (Partition and Adsorption)

3.5: Electrophoresis - Principle and applications (AGE and PAGE)

SEMESTER I

Practical USZOP1 (Course I)

1. Mounting of foraminiferan shells from sand (any 3)
2. Study of types of Corals - Brain, Organ pipe, Stag Horn, Mushroom coral Study of

3Study of the following;

a. Symbiosis (Termite and Trychonympha, hermit crab and sea anemone)
b. Camouflage (leaf insect, chameleon)
c. Cannibalistic mate-eating animals (Spider and Praying Mantis)
d. Animal architects: Termites, Harvester ant and Baya weaver bird
e. Study of bioluminescent organisms – Noctiluca, glow worm, fire fly, angler fish.

4. Breeding and parental care in Amphibia- *Rhacophorus*, Midwife toad, Darwin's frog, Caecilian.
5. Mounting of scales of fish (placoid, cycloid and ctenoid)
6 a) Study of Adaptive radiation in Reptiles - Turtle, Tortoise, *Phrynosoma*, *Draco*)
   b) Identification and differentiation of venomous and non-venomous snakes (Scales, Fangs, Bite marks, etc.)
7. Study of Types of feathers(contour, filoplume, down), beaks(Nectar feeding , Insect catching, Fruit eating, Scavenging, Filter feeding), claws (perching, wading, swimming, hopping) in birds
8 a. Identification of birds - Coppersmith Barbet, Bulbul, Rose ringed Parakeet, Magpie Robin, two local birds.
   b. Field Report – To be done in a group of ten students (submission of written / typed report preferably along with photographs/ tables/ graphs.

Other Suggested topics for field observation/survey:

- Butterflies/ Fishes/ Migratory birds of local area.
- Variations in Human like Attached vs. Free Earlobes, Blood Groups, Eye colour, etc. using statistical method.

9. Observations of fauna in the field (with reference to theory syllabus).

***Note - The practicals may be conducted by using specimens authorised by the wild such other regulating authorities though it is strongly recommended that the same sh taught by using photographs/audio-visual aids/ simulations / models, etc. as recomme the UGC and as envisaged in the regulations of the relevant monitoring bodies. specimens, however, shall be procured for the purpose of conducting practicals me here-in-above.**

#There shall be at least one excursion/field trip

SEMESTER I

Practical USZOP1 (Course II)

1. Interpretation of safety symbols (toxic, corrosive, explosive, flammable, skin ritant, oxidizing, compressed gases, aspiration hazards and Biohazardous fectious material.)
   b) Study of Central tendencies and plotting of Bar diagram, histogram and pie diagram.
2. Identification of transgenic fish (Trout and Salmon) / cloned animals (Dolly sheep, cc cat and Snuppy dog) from photograph.
3. Extraction of fruit juice with pectinase from apple/guava/or any other suitable fruit
4. Calculation of pH of three different samples (one each acidic, alkaline and neutral) using pH paper/Universal Indicator and confirming the result with pH meter.
   Application of DNA Fingerprinting in criminology (photograph of electrophoretic pattern to be given for interpretation by the students)
5. a) Study of parts of microscope and their functions.
   b) Technique of focussing a permanent slide under 10x and 45x (objectives).
6. a) Dilution of given sample and estimation of OD by using colorimeter.
   b) Calculation of concentration from the given OD using formula.
7. Calculation of pH of three different samples (one each acidic, alkaline and neutral) using pH paper/universal indicator/pH indicator from red cabbage and confirming the result with pH meter.
8. a) Seperation of amino acids from the mixture by paper chromatography.
   b) Calculation of Rf value of separated pigments/amino acids from given chromatogram and their identification from standard chart.
9. a) Seperation of pigments by adsorption chromatography using chalk.
   b) Seperation of lipids by TLC,

***Note - The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.**

Course I (USZO101)

REFERENCES AND ADDITIONAL READING

1. Wonders of the Animal World - University Text Book of Zoology, F.Y.B.Sc. Semester I Course 1. V.V. Dalvie, G.B. Raje, P. Sardesai, N.S. Prabhu, University Press.
2. Vertebrate Zoology Volume I- Jordan and Verma , S. Chand and Co.
3. Invertebrate Zoology Volume II- Jordan andVerma , S. Chand and Co.
4. Invertebrate Zoology- T. C. Majupuria , S. Nagin and Co.
5. Chordate Zoology- P. S. Dhami and J. K. Dhami , R. Chand and Co.
6. Invertebrate Zoology- P. S. Dhami and J. K. Dhami , R. Chand and Co.
7. Introduction to Vertebrates- Moore Cambridge University- Low Priced Edition
8. Zoology- S. A. Miller and J. B. Harley, Tata McGraw Hill
9. Modern Textbook of Zoology, Invertebrates, R. L. Kotpal
10. Fundamentals of Ecology- E. P. Odum , Sunders Publication
11. Fundamentals of Ecology- M.C.Dash-2nd edition, Tata McGraw Hill
12. Essentials of Ecology and Environmental Science - S.V.S Rana
13. Biodiversity- S.V.S Rana- Prentice Hall Publications
14. Modern Biology- V. B. Rastogi
15. Biology of Mollusca- D. R. Khanna
16. A Textbook of Zoology, Vol. II- T. Jeffery Parker and William. A. Haswell- Low Price Publications
17. Ecology and Environment- P. D. Sharma, R. K. Rastogi Publications
18. Introduction to Ecology- R. Dajoz
19. Wildlife Laws and its Impact on Tribes- Mona Purohit , Deep and Deep Publications
20. Biodiversity- K.C.Agarwal- Agro Botanica Publications
21. Butterflies of India – Isaac Kehimkar- BNHS Publication

Course II (USZO102)

REFERENCES AND ADDITIONAL READINGS

1. Basic Laboratory Techniques, Instrumentation and Biotechnology- University Text Book of Zoology, F.Y.B.Sc. Semester I Course 2. V.V. Dalvie, R. G. Deshmukh, R. D'souza and H.U. Shingadia University Press.

2. Introduction to Practical Biochemistry – David T. Plummer (Tata McGraw Hill Publishing Co. Ltd.)
3. Introductory Practical Biochemistry – S.K. Sawhney and Randhir Singh (Narosa Publishing House)
4. Methods in Biostatistics – B. K. Mahajan, (Jaypee Publications)
5. Microscopy and Cell Biology - V. K. Sharma, (Tata McGraw Hill Publishing Co. Ltd.)
6. Bioinstrumentation – L. Veerakumari, (M.J.P. Publishers)
7. Principles and Techniques of Practical Biochemistry – Keith Wilson and John Walker, (Cambridge University Press)
8. Biotechnology- Thieman and Pallidino, Pearson edu.
9. Biotechnology –Glick and Pasternak
10. Biochemistry –Satyanarayana
11. Understanding biotechnology- Aluizio Borem ,David Bowe-Low price edition –Pearson Publication
12. A Textbook of Biotechnology – R. C. Dubey, S. Chand Publication.
13. A Manual of Medical Laboratory Technology -A. H. Patel, Navneet Prakashan Ltd.
14. Biological instruments and methodology – Dr. P. K. Bajpai, S. Chand company Ltd.
15. Calculations in Molecular biology and Biotechnology - Frank H. Stephenson, Academic Press.

SCHEME OF EXAMINATION (THEORY)

(a) Internal assessment of twenty five (25) marks per course per semester should be conducted according to the guidelines given by University of Mumbai vide circular number UG/04 of 2014 Dated 5th June 2014 to be implemented from academic year 2014-15.

(b) External assessment of seventy five (75) marks per course per semester should be conducted as per the following skeleton question paper pattern.

(c) One practical examination of fifty (50) marks per course each should be conducted at the end of every semester.

SKELETON- EXAMINATION PATTERN FOR THE ABOVE SYLLABUS

All Questions are compulsory

Figures to the right indicate full marks

Time: 2.5 hours **Total marks: 75**

Q.1.	UNIT 1 Answer any four out of eight (5 marks each)	20 marks
Q.2.	UNIT 2 a. Answer any one of the two (10 marks) b. Answer any two out of the four (5 marks each)	20 marks
Q.3.	UNIT 3 Answer any two out of four (10 marks each)	20 marks
Q.4.	a. Unit 1 - (One note of five marks OR objective type questions) b. Unit 2 - (One note of five marks OR objective type questions) c. Unit 3- (One note of five marks OR objective type questions)	15 marks

*For Question 4 it is recommended to have objective questions such as –

(a) Match the column (b) MCQ

(c) Give one word for (d) True and False

(e) Define the term (f) Answer in one sentence etc.

MODEL QUESTION BANK SEMESTER I

USZO101(COURSE I)

Question bank is suggestive and not exhaustive. The paper setters are free to modify the questions or include new questions to the best of their wisdom

UNIT 1 - (05 Marks)

1. Write a note on echolocation in Dolphins/ Whales
2. Write a short note on : Pearl formation in Mollusca
3. Describe : Mechanism of bioluminescence
4. Enumerate the uses of bioluminescence
5. Describe the uses of bioluminescence for…… (Noctiluca, Glow worm, Firefly, Angler fish, etc.)
6. Write a short note on : Luciferin – Luciferase interaction
7. Describe the process of regeneration in Earthworm
8. What is regeneration? Explain the term with an example
9. What is mimicry? Explain with an example.
10. Describe: mimicry in butterfly
11. Describe briefly the formation of Corals
12. Write a short note on types of coral reefs.
13. Describe needs of migration in birds.
14. Describe briefly, the factors inducing migration in birds.
15. How does Camel adapt itself to the desert environment?
16. Describe parental care and breeding in ……. (Examples of Pisces, Amphibia)
17. Describe briefly: Brood parasite
18. Explain parental care in Duck-billed Platypus

UNIT 2 - (05 Marks/10 Marks)

Questions that could be asked for 10 marks:

1. Explain biodiversity and its importance. What is a biodiversity hotspot? Explain Western Ghats as biodiversity hotspot in India.
2. Explain: Direct use value / Indirect use value
3. Explain biodiversity and its types.
4. Enumerate and explain threats to biodiversity.
5. State the factors which amount to habitat loss.
6. Explain the concept of Man-Wildlife conflict with an example.
7. Give a detailed account on *in situ* hybridization and ex-situ hybridization

8. Describe National Park and state its importance in conservation
9. Describe Sanctuary and state its importance in conservation
10. Give a brief account on biosphere reserve.
11. Give a detailed account on: CBD (Convention on Biological Diversity).
12. Give an account of national biodiversity plan 2002.
13. Describe important clauses of Convention for International Trade of endangered species.

Questions that could be asked for 05 marks:

1. Explain biodiversity and mention its types.
2. Explain biodiversity and give two importance
3. Explain biodiversity hotspot
4. Describe *in situ* conservation strategies.
5. Write note on ex-situ conservation strategies.
6. Give an account of genetic / species / ecosystem biodiversity.
7. Enumerate importance threat to biodiversity.
8. State direct and indirect use value of biodiversity.

UNIT 3 - (10 Marks)

1. Give a detailed account on: ……(Name of the eminent personality) For e.g.: Gadre Fisheries, Kiran Mazumdar Shaw, Baba Amte etc.
2. Describe in detail - ……(Name of the case study)
   For e.g.: Amul white revolution, Biocon, Genetic code etc.
3. Give a detailed account on the contribution made by Dr.Salim Ali in the field of Ornithology.
4. What is white revolution? State contribution of Dr. Verghese Kurian for it.
5. Describe the work of water conservation of Anna Hazare.

MODEL QUESTION BANK SEMESTER I USZO102 (COURSE II)

Question bank is suggestive and not exhaustive. The paper setters are free to modify the questions or include new questions to the best of their wisdom

UNIT I: (5 marks)

1. Describe in brief (Minimum five points)
   a. Good laboratory practices
   b. Chemical hazards in a laboratory
   c. Physical hazards in a laboratory
   d. Biological hazards in a laboratory
   e. Personal hygiene in laboratory
   f. Waste disposal
2. Define and give conversions of the three scales of measuring temperature.
3. Define Molarity. How would you prepare
   a. 1 litre of 0.1 M NaOH solution? (Mol.wt. of NaOH=40)
   b. 100 ml of 1M NaOH
   c. 500 ml of 0.2 M NaOH
4. Define Normality. How would you prepare 1 litre of 2 N NaOH solution?
5. Explain briefly the measures of central tendencies?
6. Define mean, median and mode and explain each with an example.
7. The observations of length (in cm) of 10 fishes are 22, 24, 34, 26, 28, 31, 20, 25, 36, 32. Calculate the arithmetic mean of fish length (in cm).
8. Calculate the arithmetic mean for the following data on fish length by Direct method.

Class interval (length in cm)	5-15	15-25	25-35	35-45	45-55
Frequency (no. of fish)	9	21	40	22	8

9. Calculate the arithmetic mean for the above data on fish length by shortcut method.
10. How do you find the median of the data and state the significance of median?
11. What is mode? How do you calculate mode for ungrouped and grouped data?
12. What is random sampling? State the significance.
13. Explain simple, subdivided and multiple bar diagrams.
14. What is a pie diagram? Write the formula for calculating the angles of degrees for different components.
15. The following data shows the areas in million square miles of the oceans of the world. Construct a pie diagram for the data.

16.

Ocean	Pacific	Atlantic	Indian	Antarctic	Arctic	Total
Area (million sq. miles)	70.8	41.2	28.5	7.6	4.8	152.9

t

Plot a histogram/Bar diagram? Explain how it is constructed.

UNIT 2: (5 marks)

1. Give applications of Biotechnology in the field of Medicine / Fishery / Animal Husbandry.
2. Give the Scope of Biotechnology in different areas as a diagrammatic sketch
3. What is SCID? Name the scientist who discovered the gene therapy for it.
4. In SCID which enzyme does not work properly?
5. Which cells are used for SCID gene therapy?
6. Which gene is defective in SCID?
7. Define transgenesis and mention any two transgenic animals.
8. Ethical issues of transgenesis.
9. Enlist five applications of DNA finger printing.
10. What are green genes? State one application of it.

(10 marks)

1. Describe SCID and its treatment with suitable diagram.
2. Explain various methods of transgenesis.
3. What is Cystic fibrosis? Explain its diagnostic biotechnological method.
4. Define transgenesis and explain retro viral method with its application.

UNIT 3: (10 marks)

1. Describe the components of a compound microscope giving function.

2. Explain the principle and the applications of compound microscope.
3. Discuss in detail the principle, construction and applications of dissecting microscope.
4. Write the principle and applications of
    a. Colorimeter
    b. Centrifuge
    c. Spectroscopy
    d. Compound microscope
    e. Dissecting microscope
5. Explain the principle of centrifugation and add a note on its application.
6. What is pH? Give the principle and applications of pH meter.
7. Describe paper chromatography as a separation technique.
8. Describe Agarose gel electrophoresis. Add a note on its applications.
9. Explain the principle and applications of Polyacrylamide gel electrophoresis.
10. With the help of a diagram, explain the parts of a colorimeter. Discuss the principle and uses.
11. Describe principle and uses of colorimeter.
12. Explain the principle and application of adsorption chromatography.

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PRACTICALS

USZOP1 (Course I)

Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Q.1. From the given sample mount foraminiferan shells (Minimum three types) (15 Marks)

OR

Mounting of scales (placoid and cycloid/ctenoid) from fishes.

Q.2. Identify the photograph of the given animals and comment on the type of interaction /speciality. (symbiosis, camouflage, cannibalistic mate eating animals and animal architects,bioluminiscence). Any two (10 Marks)

Q.3. Identify giving reasons - Venomous/Non-venomous snake (from photographs). (5 Marks)

Q.4. Identification (one specimen each) (10 Marks)

a. Types of corals

b. Amphibians-breeding and parental care

c. Adaptive radiation in reptiles

d. Types of feathers/ claws in birds

e. Types of beaks in birds

Q.5. Field study report (Biodiversity) and viva on it. (10 Marks)

Semester I

USZOP1 (Course II)

Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Q. 1 Dilute the given sample and estimate the OD using colorimeter (Three dilutions) (15marks)

OR

Calculate concentration from given OD by formula (3 concentrations)

OR

Find pH of water samples (three) and comment on their chemical nature.

OR

Using red cabbage pH indicator, determine pH of the given samples and comment on their chemical nature

OR

Extract fruit juice using pectinase and compare the result with a set without using pectinase.

Q. 2. Perform experiment for separation of pigments by adsorption chromatography. (10Marks)

OR

Perform experiment for separation of mixture of amino acids by paper chromatography

OR

Calculate R_f value and identify the pigment from chromatogram.

OR

Perform Thin Layer Chromatography (TLC) for separation of lipids

Q. 3. Focus the given slide under 10 X and 45 X and show it to examiner. (5 Marks)

OR

Prepare a frequency distribution table / Plot histogram / Pie diagram / Bar diagram from the given data.

Q. 4. Identification (10 Marks)
(Safety Symbols (two), parts of compound microscope, transgenic animals, DNA fingerprinting)

Q. 5. Journal and Viva voce(on practical component) (10 Marks)

SEMESTER-II

USZO201 (Course: 3)

Ecology and Wildlife Management

Unit 1: Population ecology: (15 L)

Objective: *To facilitate the learning of population ecology, its dynamics and regulatory factors important for its sustenance.*

Desired Outcome: *This unit would allow learners to study about nature of animal population, specific factors affecting its growth and its impact on the population of other life form.*

1.1: Population dynamics

- 1.1.1: Population density
- 1.1.2: Natality
- 1.1.3: Mortality
- 1.1.4: Fecundity
- 1.1.5: Age structure
- 1.1.6: Sex ratio
- 1.1.7: Life tables
- 1.1.8: Survivorship curves
- 1.1.9: Population dispersal and distribution patterns
- 1.1.10 Niche concept

1.2: Population growth regulation

- 1.2.1: Intrinsic mechanism – Density dependent fluctuations and oscillations
- 1.2.2: Extrinsic mechanism- Density independent, environmental and climate factors, population interactions

1.3: Population growth pattern

- 1.3.1: Sigmoid
- 1.3.2: J Shaped

1.4: Human census (India) – Concept, mechanism and significance

Unit 2: Ecosystem: (15 L)

Objective: *To impart knowledge of different components of ecosystem and educate about essentials of coexistence of human beings with all other living organisms.*

Desired Outcome: *Learners will grasp the concept of interdependence and interaction of physical, chemical and biological factors in the environment and will lead to better understanding about implications of loss of fauna specifically on human being, erupting spur of desire for conservation of all flora and fauna.*

2.1: Concept of Ecosystems

2.1.1**:** Ecosystem - Definition and components
2.1.2**:** Impact of temperature on biota
2.1.3**:** Biogeochemical cycles (Water, Oxygen, Nitrogen, Sulphur)
2.1.4**:** Fresh water ecosystem – Lentic and Lotic
2.1.5**:** Food chain and food web in ecosystem (Fresh water and Grass land).
2.1.6**:** Ecological pyramids - energy, biomass and number.
2.1.7**:** Animal interactions (commensalism, mutualism, predation, antibiosis, parasitism)

Unit 3: National parks and Sanctuaries of India (15 L)

Objective: *To enlighten learners about the current status of wild life conservation in India in the light of guidelines from different relevant governing agencies vis-à-vis with adversity of poaching and biopiracy.*
Desired Outcome: *Learners would be inspired to choose career options in the field of wild life conservation, research, photography and ecotourism*.

3.1: Concept of Endangered and Critically Endangered species using examples of Indian Wildlife with respect to National Parks and Wildlife

Sanctuaries of India (Sanjay Gandhi National Park, Tadoba Tiger Reserve, Corbett National Park, Kaziranga National Park, Gir National Park, Silent Valley, Pirotan Island Marine Park, Keoladeo Ghana National Park, Bandipur Sanctuary)

3.2: Management strategies with special reference to Tiger and Rhinoceros in India

3.3: Ecotourism

3.4: Biopiracy

SEMESTER-II

Course: 4 [USZO 202]

NUTRITION, PUBLIC HEALTH AND HYGIENE

Unit 1: Nutrition and Health (15 L)

Objective: *To make learners understand the importance of balanced diet and essential nutrients of food at different stages of life.*

Desired Outcome: *Healthy dietary habits would be inculcated in the life style of learners in order to prevent risk of developing health hazards in younger generation due to faulty eating habits*.

1.1**:** Concept of balanced diet, dietary recommendations to a normal adult, infant, pregnant woman and aged.
1.2**:** Malnutrition disorders – Anemia (B_{12} and Iron deficiency), Rickets, Marasmus, Goiter, Kwashiorkar (cause, symptoms, precaution and remedy).
1.3**:** Constipation, piles, starvation, acidity, flatulence, peptic ulcers (cause, symptoms, precaution and remedy).
1.4**:** Obesity (Definition and consequences).
1.5**:** Importance of fibres in food.
1.6**:** Significance of breast feeding.
1.7**:** Swine flu and Dengue (cause, symptoms, precaution and remedy).
1.8**:** BMI calculation and its significance.

Unit 2: Public Health and Hygiene (15 L)

Objective: *To impart knowledge about source, quantum and need for conservation of fast depleting water resource and essentials of maintaining proper sanitation, hygiene and optimizing use of electronic gadgets.*

Desired Outcome: *Promoting optimum conservation of water, encouragement for maintaining adequate personal hygiene, optimum use of electronic gadgets, avoiding addiction, thus facilitating achievement of the goal of healthy young India in true sense.*

2.1: Health

2.1.1**:** Definition of Health, the need for health education and health goal.

2.1.2**:** Physical, psychological and Social health issues.

2.1.3**:** WHO and its programmes - Polio, Small pox, Malaria and Leprosy (concept, brief accounts and outcome with respect to India).

2.1.4: Ill effects of self-medication.

2.2: Water and water supply

2.2.1**:** Sources and properties of water.

2.2.2**:** Purification of water, small scale, medium scale and large scale (rapid sand filters)

2.2.3 **:** Water footprint (concept, brief accounts and significance).

2.3: Hygiene:

2.3.1**:** Hygiene and health factors at home, personal hygiene, oral hygiene and sex hygiene.

2.4: Radiation risk:

2.4.1**:** Mobile Cell tower and electronic gadgets (data of recommended level, effects and precaution).

2.5: First Aid:

2.5.1**:** Dog bite and its treatment.

2.6: Blood bank – Concept and significance

UNIT 3: Common Human Diseases and Disorders (15 L)

Objective: *To educate learners about causes, symptoms and impact of stress related disorders and infectious diseases.*

Desired Outcome: *Learners will be able to promptly recognize stress related problems at initial stages and would be able to adopt relevant solutions which would lead to psychologically strong mind set promoting positive attitude important for academics and would be able to acquire knowledge of cause, symptoms and precautions of infectious diseases*.

3.1: Stress related disorders

3.1.1**:** Hypertension, Diabetes type II, anxiety, insomnia, migraine, depression (cause, symptoms, precaution and remedy)

3.2: Communicable and non-communicable diseases

3.2.1**:** Tuberculosis and Typhoid

3.2.2**:** Hepatitis (A and B), AIDS, Gonorrhea and Syphilis

3.2.3**:** Diseases of respiratory system- Asthma, Bronchitis.

3.2.4: Oral Cancer

(Discuss cause/causative agents, symptoms, diagnostics, precaution /prevention and remedy)

SEMESTER II

Practical USZOP2 (Course III)

1. Interpretation of the given graphs/ tables and comment on pattern of population nature :
   i. Survivorship curve
   ii. Life tables
   iii. Fecundity tables
   iv. Age structure
   v. Sex ratio

2. a) Calculation of Natality, Mortality, Population density from given data
   b) Estimation of population density by capture recapture method

3. Interpretation of Growth curves (Sigmoid and J shaped)

4. Estimation of hardness from given water sample (tap water v/s well water)
5. Estimation of Free carbon dioxide (Free CO_2) from two different samples- aerated drinks(diluted) v/s tap water
6. Identification and interpretation of aquatic and terrestrial (Grassland) food chains and food webs
7. Construction of food chain/food web using given information/data.
8. a) Identification and interpretation of ecological pyramids of energy, biomass and number
   b) Construction of different types of pyramid from given data.

9. Study of the following:
   a) Endangered (Great Indian Bustard, Asiatic lion, Blackbuck, Olive Ridley sea turtle) and critically endangered species (Slender-billed vulture, Gharial, Malabar civet) of Indian wildlife and state reasons for their decline
   b) Study Biodiversity hotspots using world map (Western Ghats and Indo-Burma)
   Study of sanctuaries, national parks, biosphere reserves in India with respect to its brand fauna (as listed in theory)

***Note - The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.**

#There shall be at least one excursion/field trip

SEMESTER II

Practical USZOP2 (Course IV)

. 1. Qualitative estimation of Vitamin C by Iodometric method.

2. Study of microscopic structure of starch granules of different cereals (wheat, maize and jowar).

3. a) Estimation of maltose from brown/white bread.
   b) Moisture content from biscuits or other suitable food products.

4. Food adulteration Test:
   a) Milk adulterants (starch and glucose), methylene blue reduction Test (MBRT).
   b) Adulterants in Cheese, Butter, Jaggery, Ghee, Honey, Iodised Salt.

5. a) Estimation of protein content of two egg varieties.
   b) Study of efficacy of different antacids (any two antacids).

6. .Study of Human Parasites

   Endoparasites - Protozoans (*Entamoeba, Plasmodium*),
   Helminths (*Ascaris, Wuchereria*),
   Ectoparasites (Head louse, tick) and Exoparasites (Bed bug, Mosquito).

7. Screening of anaemic/non-anaemic persons using $CuSO_4$ method.

8. First Aid – Demonstration Practical Training for teachers and students to be conducted by the experts from Redcorss, Civil defence, Civic authorities by individual institute or cluster colleges in rotation.

9. BMI analysis - Measurement of Height/ Weight and calculation of BMI using formula, preparation and submission of report. (10 students/ group-50 readings/group)

***Note - The practicals may be conducted by using specimens authorised by the wildlife and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/ simulations / models, etc. as recommended by the UGC and as envisaged in the regulations of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in-above.**

Semester II USZOP2 (Course III)

Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Q.1. Estimate Hardness from given water samples and compare the results. (15 Marks)

OR

Estimate Free CO_2 from given samples and compare the results.

Q.2. Solve the given problems (using statistical approach wherever possible) based on (Any two) (10Marks)

Natality
Mortality
Sex Ratio
Fecundity
Population density

Q.3. Identify brand animals (Min. 4) and place them in their respective National parks/ Sanctuaries on the given map quoting reasons for their decline. (5 Marks)

OR

Mark National parks and Sanctuaries on the map of India and mention the name of their brand animals stating reason for their decline. (Min. 4)

(5 Marks)

OR

Identify endangered and critically endangered animals (photographs) one each and state their reason of decline (5 Marks)

Q.4. Study the given information and give answers on the basis of food chain/food web and ecological pyramids. (10 Marks)

OR

Prepare food chain/food web and ecological pyramid from the given data and give its significance. (10 Marks)

OR

Identify and interpret the given graph/growth curve/age structure and comment on the pattern of population dispersal. (10 Marks)

OR

Determine Population density by capture and recapture method. (10 Marks)

Q.5. Journal and Viva voce (Based on practical component) (10 Marks)

Semester II USZOP2 (Course IV)

Skeleton -Practical Examination Question Paper Pattern

Time: 2 hrs **Marks: 50**

Q.1. Estimate Vitamin C from given sample. (15 Marks)

OR

Estimate Maltose content from bread.

OR

Estimate protein content from two different types of eggs.

Q.2. Analyse the given food sample and identify food adulterants (any 2 samples). (10 Marks)

OR

Evaluate milk quality by Methylene Blue Reduction Test (MBRT).

OR

Determine efficacy of different antacids (any two) on acidic solution.

Q.3. Determine moisture content from biscuits/ any other suitable food product. (5 Marks)

OR

On the basis of microscopic structure of starch granules identify different cereals (any two).

OR

Detect adulterants present in th given milk sample (any two).

OR

Determine whether given blood sample is from anaemic/non-anaemic person using $CuSO_4$ Method and suggest the appropriate diet.

Q.4. Identification (10 Marks)

a) One specimen of Protozoan Parasites.

b) One specimen of Helminth Parasites.

c) One specimen from Ectoparasite

d) One specimen from Exoparasite

e) One specimen from Endoparasite

Q.5. Submission of report of Body Mass Index (viva based on it) (10 Marks)

Note: There shall be at least one excursion/field trip.

USZO201 (Course III)

REFERENCES AND ADDITIONAL READING

1. Introduction to Ecology and Wildlife - University Text Book of Zoology, F.Y.B.Sc. Semester II Course 3. University Press.
2. Fundamentals of Ecology - Eugene P. Odum and Grey W. Barrett, Brook Cole/ Cengage learning
3. Fundamentals of Ecology - M. C. Dash , Tata McGraw Hill company Ltd, New Delhi
4. Ecology - Mohan P. Arora , Himalaya Publishing House
5. Field Biology and Ecology -- Alen H. Benton and William E. Werner ,Tata McGraw Hill ltd, New Delhi
6. Ecology and Environment - Sharma P. D , Rastogi Publication, Mumbai
7. Ecology : Principles and Applications - Chapman J.L , Cambridge University trust
8. Ecology - Subramaniam and Others, Narosa Publishing House
9. Wildlife laws and its impact on tribes - Mona Purohit, Deep and deep Publication
10. Biology - Eldra Solomon, Linda R. Berg and Diana W. Martin, Thomson/ Brooks/ Cole
11. Economic Zoology, Biostats and Animal Behaviour - Shukla, Mathur, Upadhyay, Prasad. Rastogi Publications.

USZO202 (Course IV)

REFERENCES AND ADDITIONAL READING

1. Common Diseases, Health and Hygiene - University Text Book of Zoology, F.Y.B.Sc. Semester II Course 4. University Press.
2. Common Medical Symptoms edited - P. J. Mehta National Inblisents and Distributions
3. Parks Textbook of Preventive and Social Medicine K. Park M/S Banarasidas Bhanot Jabalpar.
4. Human Physiology – Volume I – II C. C. Chatterjee, Medical Allied agency, Kolkatta.
5. Parasitology (Protozoology and Helminthoology) - K. D. Chatterjee, Chatterjee Medial Publishers.

6. Nand's handbook of Forensic Medicine and Toxicology - Apurba Nandy, NCBA publication.
7. Essentials of Public Health and Sanitation- Part I and Part II. All India Institute of Local Self Government.
8. Epidemiology and Management for Health Care for all. P.V. Sathe, A. P. Sathe, Popular Prakashan, Mumbai.
9. Textbook of Medical Parasitology- C. K. JayaramPaniker. Jaypee Brothers.
10. A Treatise on Hygiene and Public Health. -B. N. Ghosh. Calcutta Scientific Publishing Company.
11. Prevention of Food Adulteration, Act 1954. Asian Law House.
12. Clinical Dietetics and Nutrition - F. P. Antia and Philip, Oxford University Press.
13. A Complete Handbook of Nature Cure - Dr. H. K. Bakru, Jaico Publishing House.
14. Dietetics - B. Srilakshmi, New Age International (P) Ltd. Publishers.
15. Nutrition: Principles and Application in Health Promotion - J. B. Lippincott Company. Philadelphia.
16. Are You Healing Yourself Mr. Executive - Dr. R. H. Dastur. IBH Publishing Company.
17. Food Nutrition and Health- Dr. Shashi Goyal, Pooja Gupta, S. Chand Publications.
18. Public Health Nutrition. Edited - Michael J. Gidney, Barrie M. Margetts, John M. Kearney and Lenore Arab. Willey Blackwell Publication.
19. Food and Nutrition – Vol. I and II - Dr. Swaminathan , Bappco Publication.
20. Textbook of Human Nutrition - Mahtab Bamji, Prahlad Rao.
21. Total Health by Paramjit Rana.

SCHEME OF EXAMINATION THEORY

(a) Internal assessment of twenty five (25) marks per course per semester should be conducted as class test according to the guidelines given by University of Mumbai vide circular number UG/04 of 2014 Dated 5th June 2014 to be implemented from academic year 2014-15.

(b) External assessment of seventy five (75) marks per course per semester should be conducted as per the following skeleton paper pattern.

(c) One practical examination of fifty (50) marks per course each should be conducted at the end of every semester.

SKELETON- EXAMINATION PATTERN FOR THE ABOVE SYLLABUS

All Questions are compulsory

Figures to the right indicate full marks

Time: 2.5 hours **Total marks: 75**

Q.1.	UNIT 1 Answer any four out of eight (5 marks each)	20 marks
Q.2.	UNIT 2 a. Answer any one of the two (10 marks) b. Answer any two out of the four (5 marks each)	20 marks
Q.3.	UNIT 3 Answer any two out of four (10 marks each)	20 marks
Q.4.	a. Unit 1 - (One note of five marks OR objective type questions) b. Unit 2 - (One note of five marks OR objective type questions) c. Unit 3- (One note of five marks OR objective type questions)	15 marks

*For Question 4 it is recommended to have objective questions such as –

(a) Match the column (b) MCQ

(c) Give one word for (d) True and False

(e) Define the term (f) Answer in one sentence etc.

MODEL QUESTION BANK

SEMESTER II

USZO203 (COURSE III)

Question bank is suggestive and not exhaustive. The paper setters are free to modify the questions or include new questions to the best of their wisdom

UNIT 1: (10 marks)

Describe with suitable Example

1. J-Shaped and Sigmoid growth patterns
2. Population dispersal and distribution patterns
3. Natality and Mortality
4. Natality and Fecundity
5. Fecundity and Mortality
6. Density dependant fluctuation and oscillations
7. Population interactions
8. Age structure and population density
9. Concept of niche and its significance in population ecology.

Write notes on / Give a brief account of: (5 marks)

1. Population density
2. Natality
3. Mortality
4. Fecundity
5. Age structure
6. Sex ratio
7. Survivorship curve
8. Sigmoid growth pattern
9. J-shaped growth curve
10. Intrinsic mechanism
11. Extrinsic mechanism
12. Niche
13. Population dispersal and distribution pattern

UNIT 2: (5 marks)

1. Effect of temperature on metabolism

16. Impact of temperature on reproduction
17. Effect of temperature on animal behaviour
18. Define ecosystem and describe any two abiotic factors
19. Define ecosystem and describe any two biotic factors
20. Explain producers / autotrophs
21. Give a brief account of various levels of consumers in an ecosystem
22. Describe in short the inter-relationship between biotic and abiotic factors
23. Describe the following (any one of the cycles can be asked) water cycle, nitrogen cycle and oxygen cycle, sulphur cycle.
24. Explain any one of the following - lake or river
25. Explain food chain from terrestrial or aquatic ecosystem
26. What is food web and explain the same with a suitable example
27. Give a brief account of: Energy pyramid, Pyramid of biomass, Pyramid of numbers.

Unit 3: (10 marks question)

1. State the differences between National park and Wildlife Sanctuary?
2. Write an account of critically endangered species of Indian wildlife with at least two examples.
3. Explain briefly management strategy of any one tiger project in India.
4. Briefly explain management strategy of Rhinoceros project in India.
5. Write in detail about Indian Wildlife (Protection) Act 1972.
6. What is biopiracy? Explain with suitable examples.
7. Write a note on flora and fauna of Sanjay Gandhi national park.
8. Write an account of Tadoba tiger reserve project.
9. Give an account of biodiversity of Jim Corbett national park.
10. Write a note on Ranthambore Tiger reserve.
11. Write in details about Gir Lion project.
12. Write a note on Keoladeo Ghana National park.
13. Write an account of biodiversity of Silent valley.
14. Describe in detail about Bandipur sanctuary.
15. Write a note on ecotourism in India with few examples.

MODEL QUESTION BANK (COURSE IV) SEMESTERII

Question bank is suggestive and not exhaustive. The paper setters are free to modify the questions or include new questions to the best of their wisdom

Unit I (5 marks)

Explain the following:

1. Concept of balanced diet and dietary recommendations of any one of the following:
   a) Normal adult b)Infant c) Pregnant woman d) Aged
2. Cause and symptoms of the following: a) Anemia b) B_{12} deficiency c) Vitamin D deficiency d) Marasmus e) Kwashiorkar f) Goiter, g) Swine flu, h) Dengue
3. Precautions and remedy for all above mentioned health conditions.
4. Significance of breast feeding.
5. Importance of fibres in food.
6. Food adulterants and toxins with two side effects of each.
7. Causes, symptoms, precautions and treatment of a) Constipation, b) Piles, c) Insomnia, d) Starvation, e) Flatulence, f) Peptic ulcer, g) Obesity
8. BMI and its significance.

Unit II (5/10 marks)

Question of 5 marks:

1. Give a brief account and outcome of WHO Programs:
   a) Polio b) Smallpox c) Malaria d) Leprosy
2. a) Explain the concept of health goal and health knowledge.
   b) Enlist different needs of health education.
   c) State five points of social health issues.

Question of 10 marks:

1. Describe sources and properties of water in relation to human consumption.

2. Describe methods of purification of water – small scale, medium scale and large scale.
3. Explain the concept of water footprint and give its significance.
4. Describe disposal of human and animal waste – STP and ETP, its functioning and significance.
5. Give a brief of risk of radiation from mobile cell towers and electronic gadgets.
6. Explain the concepts of physical health, psychological health and myth related to it.
7. Describe the term hygiene and explain in brief health factors related to it at home.
8. Explain personal hygiene, oral hygiene and sex hygiene with significance of each.
9. Describe ill effects of self medication with respect to antibiotics and steroids.
10. Give brief account of first aid symbols.

Unit III (10 marks)

1. Explain causes, symptoms, precautions and remedy
   a) Hypertension b) Diabetes Type II c) Anxiety and Insomnia d) Migraine and depression
2. Explain causes, symptoms, precautions and remedy
   a) Tuberculosis b) Common flu c) Dengue d) Malaria e) Typhoid f) Hepatitis A g) Hepatitis B h) AIDS

UNIVERSITY OF MUMBAI

No. UG/ 9 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities, Sci. & Tech. Faculties is invited to this office Circular No.UG/122 of 2017-18 dated 28th July, 2017 relating to syllabus of the B.A./B.Sc. degree course.

They are hereby informed that the recommendations made by the Board of Studies in Mathematics at its meeting held on 3rd May, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.71 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.A./T.Y.B.Sc. in Mathematics (Sem. –V) Paper-I Integral Calculas, Paper-III Topology of Metric Spaces and (Sem.VI) Paper-I Basic Complex Analysis, Paper-III Topology of Metric Spaces and Real Analysis, has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
12th June, 2018

To

The Principals of the affiliated Colleges & Directors of the recognized Institutions in Humanities, Sci. & Tech. Faculties. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.71/05/05/2018

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No. UG/ 9 -A of 2018 MUMBAI-400 032 12th June, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculties of Humanities, Science & Technology,
2) The Chairman, Board of Studies in Mathematics,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,
6) The Professor-cum-Director, Institute of Distance & Open Learning.

(Dr. Dinesh Kamble)
I/c REGISTRAR

(UNIVERSITY OF MUMBAI)

Syllabus for: T.Y.B.Sc./T.Y.B.A.

Program: B.Sc./B.A.
Course: Mathematics
Choice based Credit System (CBCS)
with effect from the
academic year 2018-19

SEMESTER V

Multivariable Calculus II				
Course Code	UNIT	TOPICS	Credits	L/Week
USMT 501, UAMT 501	I	Multiple Integrals	2.5	3
	II	Line Integrals		
	III	Surface Integrals		
Linear Algebra				
USMT 502 ,UAMT 502	I	Quotien spaces and Orthogonal Linear Transformations	2.5	3
	II	Eigen values and Eigen vectors		
	III	Diagonalisation		
Topology of Metric Spaces				
USMT 503/UAMT503	I	Metric spaces	2.5	3
	II	Sequences and Complete metric spaces		
	III	Compact Sets		
Numerical Analysis I(Elective A)				
USMT5A4 ,UAMT 5A4	I	Errors Analysis	2.5	3
	II	Transcendental and Polynomial & Equations		
	III	Linear System of Equations		
Number Theory and Its applications I (Elective B)				
USMT5B4 ,UAMT 5B4	I	Congruences and Factorization	2.5	3
	II	Diophantine equations and their & solutions		
	III	Primitive Roots and Cryptography		
Graph Theory (Elective C)				
USMT5C4 ,UAMT 5C4	I	Basics of Graphs	2.5	3
	II	Trees		
	III	Eulerian and Hamiltonian graphs		
Basic Concepts of Probability and Random Variables (Elective D)				
USMT5D4 ,UAMT 5D4	I	Basic Concepts of Probability and Random Variables	2.5	3
	II	Properties of Distribution function, Joint Density function		
	III	Weak Law of Large Numbers		
PRACTICALS				
USMTP05/UAMTP05		Practicals based on USMT501/UAMT 501 and USMT 502/UAMT 502	3	6
USMTP06/UAMTP06		Practicals based on USMT503/ UAMT 503 and USMT5A4/ UAMT 5A4 OR USMT5B4/ UAMT 5B4 OR USMT5C4/ UAMT 5C4 OR USMT5D4/ UAMT 5D4	3	6

SEMESTER VI

BASIC COMPLEX ANALYSIS				
Course Code	UNIT	TOPICS	Credits	L/Week
USMT 601, UAMT 601	I	Introduction to Complex Analysis	2.5	3
	II	Cauchy Integral Formula		
	III	Complex power series, Laurent series and isolated singularities		
ALGEBRA				
USMT 602 ,UAMT 602	I	Group Theory	2.5	3
	II	Ring Theory		
	III	Polynomial Rings and Field theory Homomorphism		
Topology of Metric Spaces and Real Analysis				
USMT 603 / UAMT 603	I	Continuous functions on Metric spaces	2.5	3
	II	Connected sets		
		Sequences and series of functions		
Numerical Analysis II(Elective A)				
USMT6A4 ,UAMT 6A4	I	Interpolation	2.5	3
	II	Polynomial Approximations and Numerical Differentiation		
	III	Numerical Integration		
Number Theory and Its applications II (Elective B)				
USMT6B4 ,UAMT 6B4	I	Quadratic Reciprocity	2.5	3
	II	Continued Fractions		
	III	Pell's equation, Arithmetic function & and Special numbers		
Graph Theory and Combinatorics (Elective C)				
USMT6C4 ,UAMT 6C4	I	Colorings of Graphs	2.5	3
	II	Planar graph		
	III	Combinatorics		
Operations Research (Elective D)				
USMT6D4 ,UAMT 6D4	I	Basic Concepts of Probability and Linear Programming I	2.5	3
	II	Linear Programming II		
	III	Queuing Systems		
PRACTICALS				
USMTP07/ UAMTP07		Practicals based on USMT601/UAMT 601 and USMT 602/UAMT 602	3	6
USMTP08/UAMTP08		Practicals based on USMT603/ UAMT 603 and USMT6A4/ UAMT 6A4 OR USMT6B4/ UAMT 6B4 OR USMT6C4/ UAMT 6C4 OR USMT6D4/ UAMT 6D4	3	6

Note: 1 . USMT501/UAMT501, USMT502/UAMT502, USMT503/UAMT503 are compulsory courses for Semester V.

2 . Candidate has to opt one Elective Course from USMT5A4/UAMT5A4, USMT5B4/UAMT5B4, USMT5C4/UAMT5C4 and USMT5D4/UAMT5D4 for Semester V.

3 . USMT601/UAMT601, USMT602/UAMT602, USMT603/UAMT603 are compulsory courses for Semester VI.

4 . Candidate has to opt one Elective Course from USMT6A4/UAMT6A4, USMT6B4/UAMT6B4, USMT6C4/UAMT6C4 and USMT6D4/UAMT6D4 for Semester VI.

5 . Passing in theory and practical shall be separate.

Teaching Pattern for T.Y.B.Sc/B.A.

1. Three lectures per week per course (1 lecture/period is of 48 minutes duration).
2. One practical of three periods per week per course (1 lecture/period is of 48 minutes duration).

Scheme of Examination

I. **Semester End Theory Examinations:** There will be a Semester-end external Theory examination of 100 marks for each of the courses USMT501/UAMT501, USMT502/UAMT502, USMT503 and USMT5A4 OR USMT5B4 OR USMT5C4 OR USMT 5D4 of Semester V and USMT601/UAMT601, USMT602/UAMT602, USMT603 and USMT6A4 OR USMT6B4 OR USMT 6C4 OR USMT 6D4 of semester VI to be conducted by the University.

1. Duration: The examinations shall be of 3 Hours duration.
2. Theory Question Paper Pattern:
   a) There shall be FIVE questions. The first question Q1 shall be of objective type for 20 marks based on the entire syllabus. The next three questions Q2, Q2, Q3 shall be of 20 marks, each based on the units I, II, III respectively. The fifth question Q5 shall be of 20 marks based on the entire syllabus.
   b) All the questions shall be compulsory. The questions Q2, Q3, Q4, Q5 shall have internal choices within the questions. Including the choices, the marks for each question shall be 30-32.
   c) The questions Q2, Q3, Q4, Q5 may be subdivided into sub-questions as a, b, c, d & e, etc and the allocation of marks depends on the weightage of the topic.
   d) The question Q1 may be subdivided into 10 sub-questions of 2 marks each.

II. **Semester End Examinations Practicals:**
There shall be a Semester-end practical examinations of three hours duration and 100 marks for each of the courses USMTP05/UAMTP05 of Semester V and USMTP06/UAMTP06 of semester VI.

In semester V, the Practical examinations for USMTP05/UAPTP05 and USMTP06/UAMTP06 are conducted by the college.

In semester VI, the Practical examinations for USMTP07/UAMTP07 and USMTP08/UAMTP08 are conducted by the University.

Question Paper pattern:

Paper pattern: The question paper shall have two parts A, B.
Each part shall have two Sections.

Section I Objective in nature: Attempt any Eight out of Twelve multiple choice questions. ($8 \times 3 = 24$ Marks)

Section II Problems: Attempt any Two out of Three. ($8 \times 2 = 16$ Marks)

Practical Course	Part A	Part B	Marks out of	duration
USMTP05/UAMTP05	Questions from USMT501/UAMT501	Questions from USMT502/UAMT502	80	3 hours
USMTP06/UAMTP06	Questions from USMT503/UAMT503	Questions from USMT504/UAMT504	80	2 hours
USMTP07/UAMTP07	Questions from USMT601/UAMT601	Questions from USMT602/UAMT602	80	3 hours
USMTP06/UAMTP08	Questions from USMT603/UAMT603	Questions from USMT604/UAMT604	80	2 hours

Marks for Journals and Viva:
For each course USMT501/UAMT501, USMT502/UAMT502, USMT503/UAMT503, USMT504/UAMT504, USMT601/UAMT601, USMT602/UAMT602 USMT603/UAMT603, and USMT604/UAMT604:

1. Journals: 5 marks.

2. Viva: 5 marks.

Each Practical of every course of Semester V and VI shall contain 10 (ten) problems out of which minimum 05 (five) have to be written in the journal. A student must have a certified journal before appearing for the practical examination.

SEMESTER V
MULTIVARIABLE CALCULUS II
Course Code: USMT501/UAMT501

ALL Results have to be done with proof unless otherwise stated.

Unit I-Multiple Integrals (15L)
Definition of double (resp: triple) integral of a function and bounded on a rectangle (resp:box). Geometric interpretation as area and volume. Fubini's Theorem over rectangles and any closed bounded sets, Iterated Integrals. Basic properties of double and triple integrals proved using the Fubini's theorem such as

(i) Integrability of the sums, scalar multiples, products, and (under suitable conditions) quotients of integrable functions. Formulae for the integrals of sums and scalar multiples of integrable functions.

(ii) Integrability of continuous functions. More generally, Integrability of functions with a "small set of (Here, the notion of "small sets should include finite unions of graphs of continuous functions.)

(iii) Domain additivity of the integral. Integrability and the integral over arbitrary bounded domains. Change of variables formula (Statement only).Polar, cylindrical and spherical coordinates, and integration using these coordinates. Differentiation under the integral sign. Applications to finding the center of gravity and moments of inertia.

References for Unit I:

1. Apostol, Calculus, Vol. 2, Second Ed., John Wiley, New York, 1969 Section 1.1 to 11.8
2. James Stewart , Calculus with early transcendental Functions - Section 15
3. J.E.Marsden and A.J. Tromba, Vector Calculus, Fourth Ed., W.H. Freeman and Co., New York, 1996.Section 5.2 to 5.6.

Unit 2: Line Integrals (15L)

Review of Scalar and Vector fields on $\mathbb{R}^n$, Vector Differential Operators, Gradient, Curl, Divergence.
Paths (parametrized curves) in $\mathbb{R}^n$ (emphasis on $\mathbb{R}^2$ and $\mathbb{R}^3$), Smooth and piecewise smooth paths. Closed paths. Equivalence and orientation preserving equivalence of paths. Definition of the line integral of a vector field over a piecewise smooth path. Basic properties of line integrals including linearity, path-additivity and behavior under a change of parameters. Examples.

Line integrals of the gradient vector field, Fundamental Theorem of Calculus for Line Integrals, Necessary and sufficient conditions for a vector field to be conservative. Greens Theorem (proof in the case of rectangular domains). Applications to evaluation of line integrals.

References for Unit II:

1. Lawrence Corwin and Robert Szczarba ,Multivariable Calculus, Chapter 12.
2. Apostol, Calculus, Vol. 2, Second Ed., John Wiley, New York, 1969 Section 10.1 to 10.5,10.10 to 10.18
3. James Stewart , Calculus with early transcendental Functions - Section 16.1 to 16.4.
4. J.E.Marsden and A.J. Tromba, Vector Calculus, Fourth Ed., W.H. Freeman and Co., New York, 1996. Section 6.1,7.1.7.4.

Unit III: Surface Integrals (15 L)

Parameterized surfaces. Smoothly equivalent parameterizations. Area of such surfaces.
Definition of surface integrals of scalar-valued functions as well as of vector fields defined on a surface.
Curl and divergence of a vector field. Elementary identities involving gradient, curl and divergence.
Stokes Theorem (proof assuming the general from of Greens Theorem). Examples.
Gauss Divergence Theorem (proof only in the case of cubical domains). Examples.

References for Unit III:

1. Apostol, Calculus, Vol. 2, Second Ed., John Wiley, New York, 1969 Section 1.1 to 11.8

2. James Stewart , Calculus with early transcendental Functions - Section 16.5 to 16.9

3. J.E.Marsden and A.J. Tromba, Vector Calculus, Fourth Ed., W.H. Freeman and Co., New York, 1996 Section 6.2 to 6.4.

Other References :

1. T Apostol, Mathematical Analysis, Second Ed., Narosa, New Delhi. 1947.

2. R. Courant and F.John, Introduction to Calculus and Analysis, Vol.2, Springer Verlag, New York, 1989.

3. W. Fleming, Functions of Several Variables, Second Ed., Springer-Verlag, New York, 1977.

4. M.H. Protter and C.B.Morrey Jr., Intermediate Calculus, Second Ed., Springer-Verlag, New York, 1995.

5. G.B. Thomas and R.L Finney, Calculus and Analytic Geometry, Ninth Ed. (ISE Reprint), Addison- Wesley, Reading Mass, 1998.

6. D.V.Widder, Advanced Calculus, Second Ed., Dover Pub., New York. 1989.

7. A course in Multivariable Calculus and Analysis., Sudhir R.Ghorpade and Balmohan Limaye, Springer International Edition.

Linear Algebra
Course Code: USMT502/UAMT502

Unit I. Quotient Spaces and Orthogonal Linear Transformations (15L)

Review of vector spaces over $\mathbb{R}$, sub spaces and linear transformation.
Quotient Spaces: For a real vector space V and a subspace W, the cosets $v + W$
and the quotient space V/W , First Isomorphism theorem of real vector spaces (fundamental theorem of homomorphism of vector spaces), Dimension and basis of the quotient space V/W , when V is finite dimensional.

Orthogonal transformations: Isometries of a real finite dimensional inner product space, Translations and Reflections with respect to a hyperplane, Orthogonal matrices over $\mathbb{R}$, Equivalence of orthogonal transformations and isometries fixing origin on a finite dimensional inner product space, Orthogonal transformation of $\mathbb{R}^2$, Any orthogonal transformation in $\mathbb{R}^2$ is a reflection or a rotation, Characterization of isometries as composites of orthogonal transformations and translation. Characteristic polynomial of an $n \times n$ real matrix. Cayley Hamilton Theorem and its Applications (Proof assuming the result $A(\text{adj}A) = I_n$ for an $n \times n$ matrix over the polynomial ring $\mathbb{R}[t]$.

Unit II. Eigenvalues and eigen vectors (15L)

Eigen values and eigen vectors of a linear transformation $T : V \longrightarrow V$, where V is a finite dimensional real vector space and examples, Eigen values and Eigen vectors of n n real matrices, The linear independence of eigenvectors corresponding to distinct eigenvalues of a linear transformation and a Matrix. The characteristic polynomial of an n real matrix and a linear transformation of a finite dimensional real vector space to itself, characteristic roots, Similar

matrices, Relation with change of basis, Invariance of the characteristic polynomial and (hence of the) eigen values of similar matrices, Every square matrix is similar to an upper triangular matrix. Minimal Polynomial of a matrix, Examples like minimal polynomial of scalar matrix, diagonal matrix, similar matrix, Invariant subspaces.

Unit III: Diagonalisation (15L)

Geometric multiplicity and Algebraic multiplicity of eigen values of an $n \times n$ real matrix, An $n \times n$ matrix A is diagonalizable if and only if has a basis of eigenvectors of A if and only if the sum of dimension of eigen spaces of A is n if and only if the algebraic and geometric multiplicities of eigen values of A coincide, Examples of non diagonalizable matrices, Diagonalisation of a linear transformation $T : V \longrightarrow V$, where V is a finite dimensional real vector space and examples. Orthogonal diagonalisation and Quadratic Forms. Diagonalisation of real Symmetric matrices, Examples, Applications to real Quadratic forms, Rank and Signature of a Real Quadratic form, Classification of conics in $\mathbb{R}^2$ and quadric surfaces in $\mathbb{R}^3$. Positive definite and semi definite matrices, Characterization of positive definite matrices in terms of principal minors.

Recommended Books.

1. S. Kumaresan, Linear Algebra: A Geometric Approach.
2. Ramachandra Rao and P. Bhimasankaram, Tata McGrawHillll Publishing Company.

Additional Reference Books

1. T. Banchoff and J. Wermer, Linear Algebra through Geometry, Springer.
2. L. Smith, Linear Algebra, Springer.
3. M. R. Adhikari and Avishek Adhikari, Introduction to linear Algebra, Asian Books Private Ltd.
4. K Hoffman and Kunze, Linear Algebra, Prentice Hall of India, New Delhi.
5. Inder K Rana, Introduction to Linear Algebra, Ane Books Pvt. Ltd.

Course: Topology of Metric Spaces
Course Code: USMT503/UAMT503

Unit I: Metric spaces (15 L)

Definition, examples of metric spaces $\mathbb{R}, \mathbb{R}^2$,Euclidean space $\mathbb{R}^n$ with its Euclidean, sup and sum metric, $\mathbb{C}$ (complex numbers), the spaces l^1 and l^2 of sequences and the space $C[a, b]$, of real valued continuous functions on $[a, b]$. Discrete metric space.
Distance metric induced by the norm, translation invariance of the metric induced by the norm. Metric subspaces, Product of two metric spaces. Open balls and open set in a metric space, examples of open sets in various metric spaces. Hausdorff property. Interior of a set. Properties of open sets. Structure of an open set in IR. Equivalent metrics.
Distance of a point from a set, between sets ,diameter of a set in a metric space and bounded sets. Closed ball in a metric space, Closed sets- definition, examples. Limit point of a set, isolated point, a closed set contains all its limit points, Closure of a set and boundary of a set.

Unit II: Sequences and Complete metric spaces (15L)

Sequences in a metric space, Convergent sequence in metric space, Cauchy sequence in a metric space, subsequences, examples of convergent and Cauchy sequence in finite metric spaces, $\mathbb{R}^n$ with different metrics and other metric spaces.
Characterization of limit points and closure points in terms of sequences, Definition and examples of relative openness/closeness in subspaces. Dense subsets in a metric space and Separability Definition of complete metric spaces, Examples of complete metric spaces, Completeness property in subspaces, Nested Interval theorem in $\mathbb{R}$, Cantor's Intersection Theorem, Applications of Cantors Intersection Theorem:

(i) The set of real Numbers is uncountable.

(ii) Density of rational Numbers(Between any two real numbers there exists a rational number)

(iii) Intermediate Value theorem: Let $: [a, b]\mathbb{R}$ be continuous, and assume that $f(a)$ and $f(b)$ are of different signs say, $f(a) < 0$ and $f(b) > 0$. Then there exists $c \in (a, b)$ such that $f(c) = 0$.

Unit III: Compact sets 15 lectures

Definition of compact metric space using open cover, examples of compact sets in different metric spaces $\mathbb{R}, \mathbb{R}^2, \mathbb{R}^n$, Properties of compact sets: A compact set is closed and bounded, (Converse is not true). Every infinite bounded subset of compact metric space has a limit point. A closed subset of a compact set is compact. Union and Intersection of Compact sets. Equivalent statements for compact sets in $\mathbb{R}$:

(i) Sequentially compactness property.

(ii) Heine-Borel property: Let be a closed and bounded interval. Let be a family of open intervals such that Then there exists a finite subset such that that is, is contained in the union of a finite number of open intervals of the given family.

(iii) Closed and boundedness property.

(iv) Bolzano-Weierstrass property: Every bounded sequence of real numbers has a convergent subsequence.

Reference books:

1. S. Kumaresan, Topology of Metric spaces.
2. E. T. Copson. Metric Spaces. Universal Book Stall, New Delhi, 1996.
3. Expository articles of MTTS programme

Other references :

1. W. Rudin, Principles of Mathematical Analysis.
2. T. Apostol. Mathematical Analysis, Second edition, Narosa, New Delhi, 1974
3. E. T. Copson. Metric Spaces. Universal Book Stall, New Delhi, 1996.
4. R. R. Goldberg Methods of Real Analysis, Oxford and IBH Pub. Co., New Delhi 1970.
5. P.K.Jain. K. Ahmed. Metric Spaces. Narosa, New Delhi, 1996.
6. W. Rudin. Principles of Mathematical Analysis, Third Ed, McGraw-Hill, Auckland, 1976.
7. D. Somasundaram, B. Choudhary. A first Course in Mathematical Analysis. Narosa, New Delhi
8. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hi, New York, 1963.
9. Sutherland. Topology.

Course: Numerical Analysis I (Elective A)
Course Code: USMT5A4/UAMT5A4

N.B. Derivations and geometrical interpretation of all numerical methods have to be covered.

Unit I. Errors Analysis and Transcendental & Polynomial Equations (15L)
Measures of Errors: Relative, absolute and percentage errors. Types of errors: Inherent error, Round-off error and Truncation error. Taylors series example. Significant digits and numerical stability. Concept of simple and multiple roots. Iterative methods, error tolerance, use of intermediate value theorem. Iteration methods based on first degree equation: Newton-Raphson method, Secant method, Regula-Falsi method, Iteration Method. Condition of convergence and Rate of convergence of all above methods.

Unit II. Transcendental and Polynomial Equations (15L)
Iteration methods based on second degree equation: Muller method, Chebyshev method, Multipoint iteration method. Iterative methods for polynomial equations; Descarts rule of signs, Birge-Vieta method, Bairstrow method. Methods for multiple roots. Newton-Raphson method. System of non-linear equations by Newton- Raphson method. Methods for complex roots. Condition of convergence and Rate of convergence of all above methods.

Unit III. Linear System of Equations (15L)
Matrix representation of linear system of equations. Direct methods: Gauss elimination method.

Pivot element, Partial and complete pivoting, Forward and backward substitution method, Triangularization methods-Doolittle and Crouts method, Choleskys method. Error analysis of direct methods. Iteration methods: Jacobi iteration method, Gauss-Siedal method. Convergence analysis of iterative method. Eigen value problem, Jacobis method for symmetric matrices Power method to determine largest eigenvalue and eigenvector.

Recommended Books

1. Kendall E. and Atkinson, An Introduction to Numerical Analysis, Wiley.
2. M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
3. S.D. Comte and Carl de Boor, Elementary Numerical Analysis, An algorithmic approach, McGrawHillll International Book Company.
4. S. Sastry, Introductory methods of Numerical Analysis, PHI Learning.
5. Hildebrand F.B., Introduction to Numerical Analysis, Dover Publication, NY.
6. Scarborough James B., Numerical Mathematical Analysis, Oxford University Press, New Delhi.

Course: Number Theory and its applications I (Elective B)
Course Code: USMT5B4 / UAMT5B4

Unit I. Congruences and Factorization (15L)

Review of Divisibility, Primes and The fundamental theorem of Arithmetic.
Congruences : Definition and elementary properties, Complete residue system modulo m, Reduced residue system modulo m , Euler's function and its properties, Fermat's little Theorem, Euler's generalization of Fermat's little Theorem, Wilson's theorem, Linear congruence, The Chinese remainder Theorem, Congruences ofHillgher degree, The Fermat-Kraitchik Factorization Method.

Unit II. Diophantine equations and their solutions (15L)

The linear equations $ax + by = c$. The equations $x^2 + y^2 = p$, where p is a prime. The equation $x^2 + y^2 = z^2$, Pythagorean triples, primitive solutions, The equations $x^4 + y^4 = z^2$ and $x^4 + y^4 = z^4$ have no solutions $(x; y; z)$ with $xyz \neq 0$. Every positive integer n can be expressed as sum of squares of four integers, Universal quadratic forms $x^2+y^2+z^2+t^2$. Assorted examples :section 5.4 of Number theory by Niven- Zuckermann-Montgomery.

Unit III. Primitive Roots and Cryptography (15L)

Order of an integer and Primitive Roots. Basic notions such as encryption (enciphering) and decryption (deciphering), Cryptosystems, symmetric key cryptography, Simple examples such as shift cipher, Affine cipher,Hillll's cipher, Vigenere cipher. Concept of Public Key Cryptosystem; RSA Algorithm. An application of Primitive Roots to Cryptography.

Reference for Unit III:

Elementary number theory, David M. Burton, Chapter 8 sections 8.1, 8.2 and 8.3, Chapter 10, sections 10.1, 10.2 and 10.3

Recommended Books

1. Niven, H. Zuckerman and H. Montogomery, An Introduction to the Theory of Numbers, John Wiley & Sons. Inc.
2. David M. Burton, An Introduction to the Theory of Numbers. Tata McGrawHillll Edition.
3. G. H. Hardy and E.M. Wright. An Introduction to the Theory of Numbers. Low priced edition. The English Language Book Society and Oxford University Press, 1981.
4. Neville Robins. Beginning Number Theory. Narosa Publications.
5. S.D. Adhikari. An introduction to Commutative Algebra and Number Theory. Narosa Publishing House.
6. N. Koblitz. A course in Number theory and Cryptography, Springer.
7. M. Artin, Algebra. Prentice Hall.
8. K. Ireland, M. Rosen. A classical introduction to Modern Number Theory. Second edition, Springer Verlag.
9. William Stalling. Cryptology and network security.

Course: Graph Theory (Elective C)
Course Code: USMT5C4 / UAMT5C4

Unit I. Basics of Graphs (15L)

Definition of general graph, Directed and undirected graph, Simple and multiple graph, Types of graphs- Complete graph, Null graph, Complementary graphs, Regular graphs Sub graph of a graph, Vertex and Edge induced sub graphs, Spanning sub graphs. Basic terminology- degree of a vertex, Minimum and maximum degree, Walk, Trail, Circuit, Path, Cycle. Handshaking theorem and its applications, Isomorphism between the graphs and consequences of isomorphism between the graphs, Self complementary graphs, Connected graphs, Connected components. Matrices associated with the graphs Adjacency and Incidence matrix of a graph- properties, Bipartite graphs and characterization in terms of cycle lengths. Degree sequence and Havel-Hakimi theorem, Distance in a graph- shortest path problems, Dijkstra's algorithm.

Unit II. Trees (15L)

Cut edges and cut vertices and relevant results, Characterization of cut edge, Definition of a tree and its characterizations, Spanning tree, Recurrence relation of spanning trees and Cayley formula for spanning trees of Kn , Algorithms for spanning tree-BFS and DFS, Binary and m-ary tree, Prefix codes and Huffman coding, Weighted graphs and minimal spanning trees - Kruskal's algorithm for minimal spanning trees.

Unit III. Eulerian and Hamiltonian graphs (15L)

Eulerian graph and its characterization- Fleury's Algorithm-(Chinese postman problem), Hamiltonian graph, Necessary condition for Hamiltonian graphs using G- S where S is a proper subset of V(G), Sufficient condition for Hamiltonian graphs- Ore's theorem and Dirac's theorem, Hamiltonian closure of a graph, Cube graphs and properties like regular, bipartite, Connected and Hamiltonian nature of cube graph, Line graph of graph and simple results.

Recommended Books.

1. Bondy and Murty Grapgh, Theory with Applications.
2. Balkrishnan and Ranganathan, Graph theory and applications.
3. West D G. , Graph theory.

Additional Reference Book.

1. Behzad and Chartrand Graph theory.
2. Choudam S. A., Introductory Graph theory.

Course: Basic Concepts of Probability and Random Variables (Elective D)
Course Code: USMT5D4 / UAMT5D4

Unit I. Basic Concepts of Probability and Random Variables.(15 L)
Basic Concepts: Algebra of events including countable unions and intersections, Sigma field $\mathcal{F}$, Probability measure$P$ on $\mathcal{F}$, Probability Space as a triple $(\Omega, \mathcal{F}, P)$, Properties of P including Subadditivity. Discrete Probability Space, Independence and Conditional Probability, Theorem of Total Probability. Random Variable on $(\Omega, \mathcal{F}, P)$ Definition as a measurable function, Classification of random variables - Discrete Random variable, Probability function, Distribution function, Density function and Probability measure on Borel subsets of $\mathbb{R}$, Absolutely continuous random variable. Function of a random variable; Result on a random variable R with distribution function F to be absolutely continuous, Assume F is continuous everywhere and has a continuous derivative at all points except possibly at finite number of points, Result on density function f_2 of R_2 where $R_2 = g(R_1), h_j$ is inverse of g over a suitable subinterval $f_2(y) + \sum_{i=1}^{n} f_1(h_j(y))|h_j'(y)|$ under suitable conditions.

Reference for Unit 1, Sections 1.1-1.6, 2.1-2.5 of Basic Probability theory by Robert Ash, Dover Publication, 2008.

Unit II. Properties of Distribution function, Joint Density function (15L) Properties of distribution function F, F is non-decreasing, $\lim_{x \longrightarrow \infty} F(x) = 1$, $\lim_{x \longrightarrow \infty} F(x) = 0$, Right continuity of F, $\lim_{x \longrightarrow x_0} F(x) = P(\{R < x_o\}, P(\{R = x_o\}) = F(x_o)F(\overline{x_0})$. Joint distribution, Joint Density, Results on Relationship between Joint and Individual densities, Related result for Independent random variables. Examples of distributions like Binomial, Poisson and Normal distribution. Expectation and $k-$th moments of a random variable with properties.

Reference for Unit II:
Sections 2.5-2.7, 2.9, 3.2-3.3,3.6 of Basic Probability theory by Robert Ash, Dover Publication, 2008.

Unit III. Weak Law of Large Numbers
Joint Moments, Joint Central Moments, Schwarz Inequality, Bounds on Correlation Coefficient ρ ,Result on ρ as a measure of linear dependence, $\text{Var}\Big(\sum_{i=1}^{n} R_i\Big) = \sum_{i=1}^{n} Var(R_i) + 2 \sum_{i=1 \le i < j \le n}^{n} \text{Cov}(R_i, R_j)$, Method of Indicators to find expectation of a random variable, Chebyshevs Inequality, Weak

law of Large numbers.

Reference for Unit III
Sections 3.4, 3.5, 3.7, 4.1-4.4 of Basic Probability theory by Robert Ash, Dover Publication, 2008.

Additional Reference Books. Marek Capinski, Probability through Problems, Springer.

Course: Practicals (Based on USMT501 / UAMT501 and USMT502 / UAMT502)
Course Code: USMTP05 / UAMTP05

Suggested Practicals (Based on USMT501 / UAMT501)

1. Evaluation of double and triple integrals.
2. Change of variables in double and triple integrals and applications
3. Line integrals of scalar and vector fields
4. Greens theorem, conservative field and applications
5. Evaluation of surface integrals
6. Stokes and Gauss divergence theorem
7. Miscellaneous theory questions on units 1, 2 and 3.

Suggested Practicals (Based on USMT502 / UAMT502)

1. Quotient Spaces, Orthogonal Transformations.
2. Cayley Hamilton Theorem and Applications
3. Eigen Values & Eigen Vectors of a linear Transformation/ Square Matrices
4. Similar Matrices, Minimal Polynomial, Invariant Subspaces
5. Diagonalisation of a matrix
6. Orthogonal Diagonalisation and Quadratic Forms.
7. Miscellaneous Theory Questions

Course: Practicals (Based on USMT503 / UAMT503 and USMT5A4 / UAMT5A4 OR USMT5B4 / UAMT5B4 OR USMT5C4 / UAMT5C4 OR USMT5D4 / UAMT5D4)
Course Code: USMTP06 / UAMTP06

Suggested Practicals USMT503 / UAMT503:

1. Examples of Metric Spaces, Normed Linear Spaces,
2. Sketching of Open Balls in IR2, Open and Closed sets, Equivalent Metrics
3. Subspaces, Interior points, Limit Points, Dense Sets and Separability, Diameter of a set, Closure.

4. Limit Points ,Sequences , Bounded , Convergent and Cauchy Sequences in a Metric Space
5. Complete Metric Spaces and Applications
6. Examples of Compact Sets
7. Miscellaneous Theory Questions

Suggested Practicals on USMT5A4 / UAMT5A4
The Practicals should be performed using non-programmable scientific calculator. (The use of programming language like C or Mathematical Software like Mathematica, Matlab, MuPad, and Maple may be encouraged).

1. Newton-Raphson method, Secant method, Regula-Falsi method, Iteration Method
2. Muller method, Chebyshev method, Multipoint iteration method
3. Descarts rule of signs, Birge-Vieta method, Bairstrow method
4. Gauss elimination method, Forward and backward substitution method,
5. Triangularization methods-Doolittles and Crouts method, Choleskys method
6. Jacobi iteration method, Gauss-Siedal method
7. Eigen value problem: Jacobis method for symmetric matrices and Power method to determine largest eigenvalue and eigenvector

Suggested Practicals based on USMT5B4 / UAMT5B4

1. Congruences.
2. Linear congruences and congruences of Hilgher degree.
3. Linear diophantine equation.
4. Pythagorean triples and sum of squares.
5. Cryptosystems (Private Key).
6. Cryptosystems (Public Key) and primitive roots.
7. Miscellaneous theoretical questions based on full USMT5B4 / UAMT5B4.

Suggested Practicals based on USMT5C4 / UAMT5C4

1. Handshaking Lemma and Isomorphism.
2. Degree sequence and Dijkstra's algorithm
3. Trees, Cayley Formula
4. Applications of Trees
5. Eulerian Graphs.
6. Hamiltonian Graphs.

7. Miscellaneous Problems.

Suggested Practicals based on USMT5D4 / UAMT5D4

1. Basic concepts of Probability (Algebra of events, Probability space, Probability measure, combinatorial problems)
2. Conditional Probability, Random variable (Independence of events. Definition, Classification and function of a random variable)
3. Distribution function, Joint Density function
4. Expectation of a random variable, Normal distribution
5. Method of Indicators, Weak law of large numbers
6. Conditional density, Conditional expectation
7. Miscellaneous Theoretical questions based on full paper

SEMESTER VI
BASIC COMPLEX ANALYSIS
Course Code: USMT501/UAMT501

Unit I: Introduction to Complex Analysis (15 Lectures)

Review of complex numbers: Complex plane, polar coordinates, exponential map, powers and roots of complex numbers, De Moivres formula, $\mathbb{C}$ as a metric space, bounded and unbounded sets, point at infinity-extended complex plane, sketching of set in complex plane (No questions to be asked).

Limit at a point, theorems on limits, convergence of sequences of complex numbers and results using properties of real sequences. Functions $f : \mathbb{C} \longrightarrow \mathbb{C}$, real and imaginary part of functions, continuity at a point and algebra of continuous functions. Derivative of $f : \mathbb{C} \longrightarrow \mathbb{C}$, comparison between differentiability in real and complex sense, Cauchy-Riemann equations, sufficient conditions for differentiability, analytic function, f, g analytic then $f + g, f - g, fg$ and f/g are analytic, chain rule.

Theorem: If $f(z) = 0$ everywhere in a domain D, then $f(z)$ must be constant throughout D
Harmonic functions and harmonic conjugate.

Unit II: Cauchy Integral Formula (15 Lectures)

Explain how to evaluate the line integral $\int f(z)\, dz$ over $|z-z_0| = r$ and prove the Cauchy integral formula : If f is analytic in $B(z_0, r)$ then for any w in $B(z_0, r)$ we have $f(w) = \dfrac{1}{2\pi i} \int \dfrac{f(z)}{z - w}\, dz$, over $|z - z_0| = r$.

Taylors theorem for analytic function , Mobius transformations: definition and examples
Exponential function, its properties, trigonometric function, hyperbolic functions.

Unit III: Complex power series, Laurent series and isolated singularities. (15 Lectures)

Power series of complex numbers and related results following from Unit I, radius of convergences, disc of convergence, uniqueness of series representation, examples.

Definition of Laurent series , Definition of isolated singularity, statement (without proof) of existence of Laurent series expansion in neighbourhood of an isolated singularity, type of isolated singularities viz. removable, pole and essential defined using Laurent series expansion, examples Statement of Residue theorem and calculation of residue.

Reference:

1. J.W. Brown and R.V. Churchill, Complex analysis and Applications : Sections 18, 19, 20, 21, 23, 24, 25, 28, 33, 34, 47, 48, 53, 54, 55 , Chapter 5, page 231 section 65, define residue of a function at a pole using Theorem in section 66 page 234, Statement of Cauchys residue theorem on page 225, section 71 and 72 from chapter 7.

Other References:

1. Robert E. Greene and Steven G. Krantz, Function theory of one complex variable
2. T.W. Gamelin, Complex analysis

Course: Algebra
Course Code: USMT602 / UAMT602

Unit I. Group Theory (15L)
Review of Groups, Subgroups, Abelian groups, Order of a group, Finite and infinite groups, Cyclic groups, The Center Z(G) of a group G, Cosets, Lagranges theorem, Group homomorphisms, isomorphisms, automorphisms, inner automorphisms (No questions to be asked)

Normal subgroups: Normal subgroups of a group, definition and examples including center of a group, Quotient group, Alternating group A_n, Cycles. Listing normal subgroups of A_4, S_3. First Isomorphism theorem (or Fundamental Theorem of homomorphisms of groups), Second Isomorphism theorem, third Isomorphism theorem, Cayleys theorem, External direct product of a group, Properties of external direct products, Order of an element in a direct product, criterion for direct product to be cyclic, Classification of groups of order ≤ 7.

Unit II. Ring Theory (15L)
Motivation: Integers & Polynomials.
Definitions of a ring (The definition should include the existence of a unity element), zero divisor, unit, the multiplicative group of units of a ring. Basic Properties & examples of rings, including $\mathbb{Z}, \mathbb{Q}, \mathbb{R}, \mathbb{C}, Mn(\mathbb{R}), \mathbb{Q}[X], \mathbb{R}[X], \mathbb{C}[X], \mathbb{Z}[i], \mathbb{Z}[\sqrt{2}], \mathbb{Z}[\sqrt{-5}], \mathbb{Z}_n$.
Definitions of Commutative ring, integral domain (ID), Division ring, examples. Theorem such as: A commutative ring R is an integral domain if and only if for $a, b, c \in R$ with $a \neq 0$ the relation $ab = ac$ implies that $b = c$. Definitions of Subring, examples. Ring homomorphisms, Properties of ring homomorphisms, Kernel of ring homomorphism, Ideals, Operations on ideals and Quotient rings, examples. Factor theorem and First and second Isomorphism theorems for rings, Correspondence Theorem for rings: (If $f : R \longrightarrow R'$ is a surjective ring homomorphism, then there is a $1-1$ correspondence between the ideals of R containing the ker f and the ideals of R. Definitions of characteristic of a ring, Characteristic of an ID.

Unit III. Polynomial Rings and Field theory (15L)
Principal ideal, maximal ideal, prime ideal, the characterization of the prime and maximal ideals

in terms of quotient rings. Polynomial rings, R[X] when R is an integral domain/ Field. Divisibility in Integral Domain, Definitions of associates, irreducible and primes. Prime (irreducible) elements in $\mathbb{R}[X], \mathbb{Q}[X], \mathbb{Z}_p[X]$. Eisensteins criterion for irreducibility of a polynomial over $\mathbb{Z}$. Prime and maximal ideals in polynomial rings. Definition of field, subfield and examples, characteristic of fields. Any field is an ID and a finite ID is a field. Characterization of fields in terms of maximal ideals, irreducible polynomials. Construction of quotient field of an integral domain (Emphasis on $\mathbb{Z}, \mathbb{Q}$). A field contains a subfield isomorphic to $\mathbb{Z}_p$ or $\mathbb{Q}$.

Recommended Books

1. P. B. Bhattacharya, S. K. Jain, and S. R. Nagpaul, Abstract Algebra, Second edition, Foundation Books, New Delhi, 1995.
2. N. S. Gopalakrishnan, University Algebra, Wiley Eastern Limited.
3. N. Herstein. Topics in Algebra, Wiley Eastern Limited, Second edition.
4. M. Artin, Algebra, Prentice Hall of India, New Delhi.
5. J. B. Fraleigh, A First course in Abstract Algebra, Third edition, Narosa, New Delhi.
6. J. Gallian, Contemporary Abstract Algebra, Narosa, New Delhi.

Additional Reference Books:

1. S. Adhikari, An Introduction to Commutative Algebra and Number theory, Narosa Publishing House.
2. T.W. Hungerford. Algebra, Springer.
3. D. Dummit, R. Foote. Abstract Algebra, John Wiley & Sons, Inc.
4. I.S. Luthar, I.B.S. Passi. Algebra, Vol. I and II.
5. U. M. Swamy, A. V. S. N. Murthy Algebra Abstract and Modern, Pearson.
6. Charles Lanski, Concepts Abstract Algebra, American Mathematical Society
7. Sen, Ghosh and Mukhopadhyay, Topics in Abstract Algebra, Universities press

Course: Topology of Metric Spaces and Real Analysis
Course Code: USMT603/ UAMT603

Unit I: Continuous functions on metric spaces (15 L) Epsilon-delta definition of continuity at a point of a function from one metric space to another. Characterization of continuity at a point in terms of sequences, open sets and closed sets and examples, Algebra of continuous real valued functions on a metric space. Continuity of composite continuous function. Continuous image of compact set is compact, Uniform continuity in a metric space, definition and examples (emphasis on $\mathbb{R}$). Let (X, d) and (Y, d) be metric spaces and $f : X \longrightarrow Y$ be continuous. If (X, d) is compact metric, then $f : X \longrightarrow Y$ is uniformly continuous.
Contraction mapping and fixed point theorem, Applications.

Unit II: Connected sets: (15L)
Separated sets- Definition and examples, disconnected sets, disconnected and connected metric spaces, Connected subsets of a metric space, Connected subsets of $\mathbb{R}$. A subset of $\mathbb{R}$ is connected if and only if it is an interval. A continuous image of a connected set is connected. Characterization of a connected space, viz. a metric space is connected if and only if every continuous function from X to $\{1, -1\}$ is a constant function. Path connectedness in Rn, definition and examples. A path connected subset of Rn is connected, convex sets are path connected. Connected components. An example of a connected subset of Rn which is not path connected.

Unit III : Sequence and series of functions:(15 lectures)
Sequence of functions - pointwise and uniform convergence of sequences of real- valued functions, examples. Uniform convergence implies pointwise convergence, example to show converse not true, series of functions, convergence of series of functions, Weierstrass M-test. Examples. Properties of uniform convergence: Continuity of the uniform limit of a sequence of continuous function, conditions under which integral and the derivative of sequence of functions converge to the integral and derivative of uniform limit on a closed and bounded interval. Examples. Consequences of these properties for series of functions, term by term differentiation and integration. Power series in $\mathbb{R}$ centered at origin and at some point in $\mathbb{R}$, radius of convergence, region (interval) of convergence, uniform convergence, term by-term differentiation and integration of power series, Examples. Uniqueness of series representation, functions represented by power series, classical functions defined by power series such as exponential, cosine and sine functions, the basic properties of these functions.

References for Units I, II, III:

1. S. Kumaresan, Topology of Metric spaces.
2. E. T. Copson. Metric Spaces. Universal Book Stall, New Delhi, 1996.
3. Robert Bartle and Donald R. Sherbert, Introduction to Real Analysis, Second Edition, John Wiley and Sons.
4. Ajit Kumar, S. Kumaresan, Introduction to Real Analysis
5. R.R. Goldberg, Methods of Real Analysis, Oxford and International Book House (IBH) Publishers, New Delhi.

Other references :

1. W. Rudin, Principles of Mathematical Analysis.
2. T. Apostol. Mathematical Analysis, Second edition, Narosa, New Delhi, 1974
3. E. T. Copson. Metric Spaces. Universal Book Stall, New Delhi, 1996.
4. R. R. Goldberg Methods of Real Analysis, Oxford and IBH Pub. Co., New Delhi 1970.
5. P.K.Jain. K. Ahmed. Metric Spaces. Narosa, New Delhi, 1996.
6. W. Rudin. Principles of Mathematical Analysis, Third Ed, McGraw-Hill, Auckland, 1976.
7. D. Somasundaram, B. Choudhary. A first Course in Mathematical Analysis. Narosa, New Delhi

8. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hi, New York, 1963.

9. Sutherland. Topology.

Course: Numerical Analysis II (Elective A)
Course Code: USMT6A4 / UAMT6A4

N.B. Derivations and geometrical interpretation of all numerical methods with theorem mentioned have to be covered.

Unit I. Interpolation (15L)
Interpolating polynomials, Uniqueness of interpolating polynomials. Linear, Quadratic andHillgher order interpolation. Lagranges Interpolation. Finite difference operators: Shift operator, forward, backward and central difference operator, Average operator and relation between them. Difference table, Relation between difference and derivatives. Interpolating polynomials using finite differences Gregory-Newton forward difference interpolation, Gregory-Newton backward difference interpolation, Stirlings Interpolation. Results on interpolation error.

Unit II. Polynomial Approximations and Numerical Differentiation (15L)
Piecewise Interpolation: Linear, Quadratic and Cubic. Bivariate Interpolation: Lagranges Bivariate Interpolation, Newtons Bivariate Interpolation. Numerical differentiation: Numerical differentiation based on Interpolation, Numerical differentiation based on finite differences (forward, backward and central), Numerical Partial differentiation.

Unit III. Numerical Integration (15L)
Numerical Integration based on Interpolation. Newton-Cotes Methods, Trapezoidal rule, Simpson's 1/3rd rule, Simpson's 3/8th rule. Determination of error term for all above methods. Convergence of numerical integration: Necessary and sufficient condition (with proof). Composite integration methods; Trapezoidal rule, Simpson's rule.

Reference Books

1. Kendall E, Atkinson, An Introduction to Numerical Analysis, Wiley.

2. M. K. Jain, S. R. K. Iyengar and R. K. Jain,, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.

3. S.D. Comte and Carl de Boor, Elementary Numerical Analysis, An algorithmic approach, McGrawHillll International Book Company.

4. S. Sastry, Introductory methods of Numerical Analysis, PHI Learning.

5. Hildebrand F.B, .Introduction to Numerical Analysis, Dover Publication, NY.

6. Scarborough James B., Numerical Mathematical Analysis, Oxford University Press, New Delhi.

Course: Number Theory and its applications II (Elective B)
Course Code: USMT6B4 / UAMT6B4

Unit I. Quadratic Reciprocity (15 L)

Quadratic residues and Legendre Symbol, Gausss Lemma, Theorem on Legendre Symbol $\left(\frac{2}{p}\right)$, the result: If p is an odd prime and a is an odd integer with $(a,p)=1$ then $\left(\frac{a}{p}\right)=(-1)^t$ where $t=\sum_{k=1}^{\frac{p-1}{2}}\left[\frac{ka}{p}\right]$, Quadratic Reciprocity law. Theorem on Legendre Symbol $\left(\frac{3}{p}\right)$. The Jacobi Symbol and law of reciprocity for Jacobi Symbol. Quadratic Congruences with Composite moduli.

Unit II. Continued Fractions (15 L)

Finite continued fractions. Infinite continued fractions and representation of an irrational number by an infinite simple continued fraction, Rational approximations to irrational numbers and order of convergence, Best possible approximations. Periodic continued fractions.

Unit III. Pells equation, Arithmetic function and Special numbers (15 L)

Pell's equation $x^2dy^2=n$, where d is not a square of an integer. Solutions of Pell's equation (The proofs of convergence theorems to be omitted). Arithmetic functions of number theory: $d(n)(or\tau(n)), \sigma(n), \sigma_k(n), \omega(n)$ and their properties, $\mu(n)$ and the Mbius inversion formula. Special numbers: Fermat numbers, Mersenne numbers, Perfect numbers, Amicable numbers, Pseudo primes, Carmichael numbers.

Recommended Books

1. Niven, H. Zuckerman and H. Montogomery. An Introduction to the Theory of Numbers. John Wiley & Sons. Inc.
2. David M. Burton. An Introduction to the Theory of Numbers. Tata McGraw-Hill Edition.
3. G. H. Hardy and E.M. Wright. An Introduction to the Theory of Numbers. Low priced edition. The English Language Book Society and Oxford University Press, 1981.
4. Neville Robins. Beginning Number Theory. Narosa Publications.
5. S. D. Adhikari. An introduction to Commutative Algebra and Number Theory. Narosa Publishing House
6. .N. Koblitz. A course in Number theory and Crytopgraphy. Springer.
7. M. Artin. Algebra. Prentice Hall.
8. K. Ireland, M. Rosen. A classical introduction to Modern Number Theory. Second edition, Springer Verlag.
9. William Stalling. Cryptology and network security.

Course: Graph Theory and Combinatorics (Elective C)
Course Code: USMT6C4 /UAMT6C4

Unit I. Colorings of graph (15L)

Vertex coloring- evaluation of vertex chromatic number of some standard graphs, critical graph. Upper and lower bounds of Vertex chromatic Number- Statement of Brooks theorem. Edge coloring- Evaluation of edge chromatic number of standard graphs such as complete graph, complete bipartite graph, cycle. Statement of Vizing Theorem. Chromatic polynomial of graphs- Recurrence Relation and properties of Chromatic polynomials. Vertex and Edge cuts vertex and edge connectivity and the relation between vertex and edge connectivity. Equality of vertex and edge connectivity of cubic graphs. Whitney's theorem on 2-vertex connected graphs.

Unit II. Planar graph (15L)

Definition of planar graph. Euler formula and its consequences. Non planarity of $K5; K(3; 3)$. Dual of a graph. Polyhedran in $\mathbb{R}^3$ and existence of exactly five regular polyhedra- (Platonic solids) Colorabilty of planar graphs- 5 color theorem for planar graphs, statement of 4 color theorem. Networks and flow and cut in a network- value of a flow and the capacity of cut in a network, relation between flow and cut. Maximal flow and minimal cut in a network and Ford-Fulkerson theorem.

Unit III. Combinatorics (15L)

Applications of Inclusion Exclusion Principle- Rook polynomial, Forbidden position problems Introduction to partial fractions and using Newtons binomial theorem for real power find series, expansion of some standard functions. Forming recurrence relation and getting a generating function. Solving a recurrence relation using ordinary generating functions. System of Distinct Representatives and Hall's theorem of SDR. Introduction to matching, M alternating and M augmenting path, Berge theorem. Bipartite graphs.

Recommended Books.

1. Bondy and Murty Grapgh, Theory with Applications.
2. Balkrishnan and Ranganathan, Graph theory and applications. 3 West D G. , Graph theory.
3. Richard Brualdi, Introduction to Combinatorics.

Additional Reference Book.

1. Behzad and Chartrand Graph theory.
2. Choudam S. A., Introductory Graph theory. 3 Cohen, Combinatorics.

Course: Operations Research Elective D)
Course Code: USMT6D4 / UAMT6D4

Unit I. Linear Programming-I (15L)

Prerequisites: Vector Space, Linear independence and dependence, Basis, Convex sets, Dimension of polyhedron, Faces.

Formation of LPP, Graphical Method. Theory of the Simplex Method- Standard form of LPP, Feasible solution to basic feasible solution, Improving BFS, Optimality Condition, Unbounded solution, Alternative optima, Correspondence between BFS and extreme points. Simplex Method Simplex Algorithm, Simplex Tableau.

Reference for unit I

1. G. Hadley, Linear Programming, Narosa Publishing, (Chapter 3).

Unit II. Linear programming-II (15L)

Simplex Method Case of Degeneracy, Big-M Method, Infeasible solution, Alternate solution, Solution of LPP for unrestricted variable. Transportation Problem: Formation of TP, Concepts of solution, feasible solution, Finding Initial Basic Feasible Solution by North West Corner Method, Matrix Minima Method, Vogels Approximation Method. Optimal Solution by MODI method, Unbalanced and maximization type of TP.

Reference for Unit II

1. G. Hadley, Linear Programming, Narosa Publishing, (Chapter 4 and 9).

2. J. K. Sharma, Operations Research, Theory and Applications, (Chapter 4, 9).

Unit III. Queuing Systems (15L)

Elements of Queuing Model, Role of Exponential Distribution. Pure Birth and Death Models; Generalized Poisson Queuing Mode. Specialized Poisson Queues: Steady- state Measures of Performance, Single Server Models, Multiple Server Models, Self- service Model, Machine-servicing Model.

Reference for Unit III:

1. J. K. Sharma, Operations Research, Theory and Applications.

2. H. A. Taha, Operations Research, Prentice Hall of India.

Additional Reference Books:

1. Hillier and Lieberman, Introduction to Operations Research.

2. Richard Broson, Schaum Series Book in Operations Research, Tata McGrawHill Publishing Company Ltd.

Course: Practicals (Based on USMT601 / UAMT601 and USMT602 / UAMT602)
Course Code: USMTP07 / UAMTP07

Suggested Practicals (Based on USMT601 / UAMT601):

1. Limit continuity and derivatives of functions of complex variables,

2. Steriographic Projection , Analytic function, finding harmonic conjugate,

3. Contour Integral, Cauchy Integral Formula ,Mobius transformations

4. Taylors Theorem , Exponential , Trigonometric, Hyperbolic functions

5. Power Series , Radius of Convergence, Laurents Series

6. Finding isolated singularities- removable, pole and essential, Cauchy Residue theorem.
7. Miscellaneous theory questions.

Suggested Practicals (Based on USMT602 / UAMT602)

1. Normal Subgroups and quotient groups.
2. Cayleys Theorem and external direct product of groups.
3. Rings, Subrings, Ideals, Ring Homomorphism and Isomorphism
4. Prime Ideals and Maximal Ideals
5. Polynomial Rings
6. Fields.
7. Miscellaneous Theoretical questions on Unit 1, 2 and 3.

Course: Practicals (Based on USMT603 / UAMT603 and USMT6A4 / UAMT6A4 OR USMT6B4 / UAMT6B4 OR USMT6C4 / UAMT6C4 OR USMT6D4 / UAMT6D4)
Course Code: USMTP08 / UAMTP08

Suggested practicals Based on USMT603 / UAMT603:

1 Continuity in a Metric Spaces

2 Uniform Continuity, Contraction maps, Fixed point theorem

3 Connected Sets , Connected Metric Spaces

4 Path Connectedness, Convex sets, Continuity and Connectedness

5 Pointwise and uniform convergence of sequence functions, properties

6 Point wise and uniform convergence of series of functions and properties

7 Miscellaneous Theory Questions

Suggested Practicals based on USMT6A4 / UAMT6A4

The Practicals should be performed using non-programmable scientific calculator. (The use of programming language like C or Mathematical Software like Mathematica, Matlab, MuPad, and Maple may be encouraged).

1 Linear, Quadratic andHillgher order interpolation, Interpolating polynomial by Lagranges Interpolation

2 Interpolating polynomial by Gregory-Newton forward and backward difference Interpolation and Stirling Interpolation.

3 Bivariate Interpolation: Lagranges Interpolation and Newtons Interpolation

4 Numerical differentiation: Finite differences (forward, backward and central), Numerical Partial differentiation

5 Numerical differentiation and Integration based on Interpolation

6 Numerical Integration: Trapezoidal rule, Simpsons 1/3rd rule, Simpsons 3/8th rule

7 Composite integration methods: Trapezoidal rule, Simpsons rule.

Suggested Practicals based on USMT6B4 / UAMT6B4

1. Legendre Symbol.
2. Jacobi Symbol and Quadratic congruences with composite moduli.
3. Finite continued fractions.
4. Infinite continued fractions.
5. Pells equations and Arithmetic functions of number theory.
6. Special Numbers.
7. Miscellaneous Theoretical questions based on full USMT6B4 / UAMT6B4.

Suggested Practicals based on USMT6C4 / UAMT6C4

1. Coloring of Graphs
2. Chromatic polynomials and connectivity.
3. Planar graphs
4. Flow theory.
5. Inclusion Exclusion Principle and Recurrence relation.
6. SDR and Mathching.
7. Miscellaneous theoretical questions.

Suggested Practicals based on USMT6D4 / UAMT6D4
All practicals to be done manually as well as using software TORA / EXCEL solver.

1. LPP formation, graphical method and simple problems on theory of simplex method
2. LPP Simplex Method
3. Big-M method, special cases of solutions.
4. Transportation Problem
5. Queuing Theory; single server models
6. Queuing Theory; multiple server models
7. Miscellaneous Theory Questions.

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UNIVERSITY OF MUMBAI
No. UG/104 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Com. (Financial Management) degree programme **vide** this office Circular No. UG/10 of 2014 dated 1st July, 2014 the Principals of affiliated Colleges in Commerce are hereby informed that the hereby informed that the approved by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.73 and that in accordance therewith, the revised syllabus as per Choice Based Credit System for B.Com (Financial Management) for (Sem. I to VI)-Course Structure (Sem. I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

24/10/16

(Dr.M.A. Khan)
REGISTRAR

MUMBAI – 400 032
October, 2016

To,

The Principals of affiliated Colleges in Commerce and the Heads of recognized Institutions concerned.

A.C/4.73 /24/06/2016

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No. UG/104-A of 2016-17 MUMBAI-400 032 25 October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Commerce,
2) The Director, Board of College and University Development,
3) The Controller of Examinations,
4) The Professor-cum- Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre.

24/10/16

(Dr.M.A. Khan)
REGISTRAR

PTO..

AC 24-06-2016
Item No. 4.73

University of Mumbai

B.Com. (Financial Management) Programme
Three Year Integrated Programme- Six Semesters
Course Structure

Under Choice Based Credit System

To be implemented from Academic Year- 2016-2017 Progressively

Board of Studies-in-Accountancy, University of Mumbai

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Financial Management)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting- I	**03**	1	Financial Accounting- II	**03**
2	Business Mathematics	**03**	2	Business Statistics	**03**
3	Indian Financial System	**03**	3	Principles of Finance	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Environment	**03**	6	Environmental Science	**03**
7	Business Economics - I	**03**	7	Computer Skills - I	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

S.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1, 2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	*Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
4	Entrepreneurial Development	**02**	4	IT in Management	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
5	Management Accounting	**03**	5	Corporate Finance	**03**
6	Business Law	**03**	6	Corporate Law	**03**
7	Business Regulatory Framework	**03**	7	Office Management	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)***		****List of DisciplineRelated Elective(DRE) Courses for Semester IV (Any Three)***	
1	Corporate Accounts -1	1	Corporate Accounts-2
2	Direct Tax – 1	2	Direct Tax-2
3	Indirect Tax- 1	3	IndirectTax-2
4	Investment Banking	4	Merchant Banking
5	Cost Accounting-1	5	Cost Accounting-2
Note: Course/ Subject selected in Semester III will continue in Semester IV			

T.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Financial Management-1	**04**	5	Financial Management-2	**04**
3	****Project Work***		***3***	****Project Work***	
6	Project Work I	**04**	6	Project Work II	**04**
	Total Credits	**20**		**Total Credits**	**20**

Note: *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 043 credits. A project work may be undertaken in any area of Elective Courses/ study area*

****List of Elective Courses for Semester V (Any Four)***		****List of Elective Courses for Semester VI (Any Four)***	
1	Corporate Accounting	1	Corporate Restructuring
2	Auditing-1	2	Auditing-2
3	Management Information systems	3	Financial Reporting
4	Business Ethics	4	OrganisationalBehaviour
5	Personal Financial Planning	5	Econometrics for Finance
6	Financial Analysis and Business Valuation	6	Security Analysis & Portfolio Management
Note: Course/ Subject selected in Semester V will continue in Semester VI			

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses
of
B.Com. (Financial Management)
Programme
First Year

Semester I and II

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year- 2016-2017)

Board of Studies-in-Accountancy, University of Mumbai

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Financial Management)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting-I	**03**	1	Financial Accounting-II	**03**
2	Business Mathematics	**03**	2	Business Statistics	**03**
3	Indian Financial system	**03**	3	Principles of Finance	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication -II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Environment	**03**	6	Environmental Science	**03**
7	Business Economics - I	**03**	7	Computer Skills - I	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Coursein NSS - I	2	Foundation Coursein NSS - II
3	Foundation Coursein NCC - I	3	Foundation Coursein NCC - II
4	Foundation CourseinPhysical Education - I	4	Foundation Coursein Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting - I	**03**
2	Business Mathematics	**03**
3	Indian Financial system	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication -I	**03**
2B	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Environment	**03**
7	Business Economics - I	**03**
	Total Credits	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***	
1	Foundation Course - I
2	Foundation Course - NSS – I
3	Foundation Course - NCC – I
4	Foundation Course - Physical Education – I

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1.Financial Accounting–I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Meaning and scope of Accounting	15
2	Depreciation	15
3	Single Entry	15
4	Final Accounts of a sole trader	15
	Total	**60**

Sr. No.	Modules / Units
1	**Meaning and scope of Accounting**
	Basic Accounting Concepts and Conventions –Objectives of Accounting - Accounting Transactions - Double Entry Book keeping - Journal, Ledger, Preparation of Trial Balance - Preparation of Cash Book.
2	**Depreciation**
	Depreciation - Meaning, Causes, Types - Straight Line Method - Written Down Value Method (Change in Method excluded) - Insurance Claims - Average Clause (Loss of stock only).
3	**Single Entry**
	Single Entry - Meaning, Features, Defects, Differences between Single Entry and Double Entry System – Statement of Affairs Method - Conversion Method (Only simple problems).
4	**Final Accounts of a sole trader**
	Preparation of Final Accounts of a Sole Trading Concern - Adjustments - Closing Stock, Outstanding and Prepaid items, Depreciation, Provision for Bad Debts, Provision for Discount on Debtors, Interest on Capital and Drawings

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2.Business Mathematics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Ratio, Proportion and Percentage	15
2	Profit & Loss	15
3	Interest and Annuity	15
4	Shares and Mutual Fund	15
	Total	**60**

Sr. No.	Modules / Units
1	**Ratio, Proportion and Percentage**
	Ratio- Definition, Continued ratio, Inverse Ratio, Proportion - Continued proportion, Direct proportion, Inverse proportion, Variation - Inverse variation, Joint variation Percentage- Meaning and computation of percentage
2	**Profit and Loss**
	Terms and formulae, Trade discount, Cash discount, problems involving cost price, selling price, trade discount, cash discount. Introduction to Commission and brokerage – problems on commission and brokerage
3	**Interest and Annuity**
	Simple interest, compound interest, Equated monthly instalments, reducing balance and flat rate of interest Annuity immediate- present value and future value Stated annual rate and effective annual rate
4	**Shares and Mutual Fund**
	Shares- Concept, face value, market value, dividend, Equity shares, preference shares, bonus shares, Mutual Fund- Simple problems on calculation of net income after considering entry load, exit load, dividend, change in net asset value

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3.Indian Financial System

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Financial System	15
2	Financial Institutions	15
3	The Non-banking financial institutions	15
4	Finance Companies	15
	Total	**60**

Sr. No.	Modules / Units
1	**Financial System**
	Meaning, nature, structure, role, flow of funds in financial system, financial systems and economic development. An overview of Indian Financial System.
2	**Financial Institutions**
	Institutional Framework, Reserve Bank of India: Objectives, Functions, Commercial Banking: Role & Development of Commercial Banking, Services by commercial banks, Problems and challenges in banking industry, Development Banks- Concept, objectives, & functions, promotional role, a brief historical perspective. An update on the performance of SFCs, LIC & GIC.
3	**Non-banking financial institutions**
	NBFCs- concept, nature of NBFCs, role, sources of finance, RBI guidelines. NABARD- role & functions; SEBI- Organization, Functions, SEBI as a regulator.
4	**Finance Companies**
	The Evolution of Finance Companies, The Present Status and the Micro Finance and its importance in Rural Economy.

Revised Syllabus of Courses of B.Com. (Financial Management)
Programme at Semester I
with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	10
2	Obstacles to Communication in Business World	10
3	Business Correspondence	12
4	Language and Writing Skills	13
	Total	**45**

1	**Theory of Communication**
	Concept of Communication: Meaning, Definition, Process, Need, FeedbackEmergence of Communication as a key concept in the Corporate and Global worldImpact of technological advancements on Communication **Channels and Objectives of Communication**: **Channels-** Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine **Objectives of Communication**: Information, Advice, Order and Instruction, Persuasion, Motivation, Education,Warning, and Boosting the Morale of Employees(A brief introduction to these objectives to be given) **Methods and Modes of Communication:** Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	**Obstacles to Communication in Business World**
	Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers **Listening:** Importance of Listening Skills, Cultivating good Listening Skills – 4 **Introduction to Business Ethics:** Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	**Business Correspondence**
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, **Personnel Correspondence:** Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]

Sr. No.	Modules / Units
4	**Language and Writing Skills**
	Commercial Terms used in Business Communication **Paragraph Writing:** Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] **Activities** ▪ Listening Comprehension ▪ Remedial Teaching ▪ Speaking Skills: Presenting a News Item, Dialogue and Speeches ▪ Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. ▪ Reading Comprehension: Analysis of texts from the fields of Commerce and Management

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity- 1	10
3	Concept of Disparity-2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Indian Society**
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	**Concept of Disparity- 1**
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	**Concept of Disparity-2**
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	**The Indian Constitution**
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	**Significant Aspects of Political Processes**
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NSS**
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level **National Service Scheme(NSS) Regular activities** Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	**Concept of Society and Social Issues in India**
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India **Basic social issues in India** Degeneration of value system, Family system, Gender issues, Regional imbalance
3	**Indian Constitution and Social Justice**
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development **Social Justice** Social Justice- the concept and its features Inclusive growth- the concept and its features
4	**Human Personality and National Integration**
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. **National integration & Communal Harmony** National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NCC, Nation-al Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training, Environment Awareness and Conservation	10
4	Personality Development and Leadership	10
5	Specialized Subject: Army/ Navy/ Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NCC, National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. • Genesis, Aims, Objectives of NCC & NCC Song • Organisation& Training • Incentives & Benefits • Religions, Culture, Traditions and Customs of India • National Integration: Importance and Necessity • Freedom Struggle
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • General and Words of Command • Attention, Stand at Ease and Stand Easy, Turning and Inclining at the Halt • Sizing, Forming Up in Three Ranks and Numbering, Open and Close Order March and Dressing • Saluting at the Halt, Getting On Parade, Dismissing and Falling Out • Marching, Length of Pace and Time of Marching in Quick Time and Halt, Slow March and Halt • Turning on the March and Wheeling. • Saluting on the March. • Formation of squad and Squad Drill.
3	**Adventure Training, Environment Awareness and Conservation**
	Adventure Training **Desired outcome**: The students will overcome fear & inculcate within them the sense of adventure , sportsmanship , espirit-d-corp and develop confidence , courage , determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing,Scuba Diving etc **Environment Awareness and Conservation** Desired outcome: The student will be aware of the conservation of natural resources and protection of environment. • Natural Resources – Conservation and Management • Water Conservation and Rainwater Harvesting

Sr. No.	Modules / Units
4	**Personality Development and Leadership**
	Desired outcome: The student will develop an all-round personality with adequate leadership traits to deal / contribute effectively in life. • Introduction to Personality Development • Factors Influencing /Shaping Personality: Physical, Social, Physiological, Philosophical and Psychological • Self Awareness Know yourself/ Insight • Change Your Mind Set • Communication Skills: Group Discussion / Lecturettes (Public Speaking) • Leadership Traits • Types of Leadership
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Armed Force** • Basic organisation of Armed Forces • Organisation of Army • Badges and Ranks **B. Introduction to Infantry and weapons and equipments** • Characteristics of 7.62mm SLR Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning **C. Military history** • Biographies of renowned Generals (Carriapa / Sam Manekshaw) • Indian Army War Heroes- PVCs **D. Communication** • Types of Communications • Characteristics of Wireless Technologies (Mobile, Wi-Fi etc.) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • History of the Indian Navy-Pre and Post Independence, Gallantry award winners • Organization of Navy- NHQ, Commands, Fleets, Ships and shore establishments • Types of Warships and their role • Organization of Army and Air Force- Operational and Training commands • Ranks of Officers and Sailors, Equivalent Ranks in the Three Services **B. Ship and Boat Modelling** • Principles of Ship Modelling • Maintenance and Care of tools

Sr. No.	Modules / Units
	C. Search and Rescue • SAR Organization in the Indian ocean **D. Swimming** Floating for three minutes and Free style swimming for 50 meters ***OR*** **AIR** **A. General Service Knowledge** • Development of Aviation • History of IAF **B. Principles of Flight** • Introduction • Laws of Motion • Glossary of Terms. **C. Airmanship** • Introduction • Airfield Layout • Rules of the Air • Circuit Procedure • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Introduction to Aero-engines

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

5.Foundation Course in Physical Education - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Relevant concepts in Physical Education	10
2	Components of Physical Fitness	15
3	Testing Physical Fitness	10
4	Effect of Exercise on various Body System	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Basic Relevant concepts in Physical Education**
	• Dimensions and determinants of Health, Fitness & Wellness • Concept of Physical Education and its importance • Concept of Physical Fitness and its types • Concept of Physical Activity, exercise and its types & benefits
2	**Components of Physical Fitness**
	• Concept of components of Physical Fitness • Concept and components of HRPF • Concept and components of SRPF • Importance of Physical Education in developing physical fitness components.
3	**Testing Physical Fitness**
	• Tests for measuring Cardiovascular Endurance • Tests for measuring Muscular Strength& Endurance • Tests for measuring Flexibility • Tests for measuring Body Composition
4	**Effect of Exercise on various Body System**
	• Effect of exercises on Musculoskeletal system • Effect of exercises on Circulatory System • Effect of exercises on Respiratory System • Effect of exercises on Glandular System

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

6.Business Environment

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business and its Environment	15
2	Business and Society	15
3	Contemporary Issues	15
4	International Environment	15
	Total	**60**

Sr. No.	Modules / Units
1	**Business and its Environment**
	a) Business Objectives, Dynamics of Business and its Environment, Types of Business Environment b) Environmental Analysis: Importance, Factors, PESTEL Analysis, SWOT Analysis
2	**Business and Society**
	a) Business Ethics: Nature and Scope of Ethics, Ethical Dilemmas, Corporate Culture and Ethical Climate b) Development of Business Entrepreneurship: Entrepreneurship and Economic Development, Micro, Small and Medium Enterprises Development (MSMED) Act, 2006, Entrepreneurship as a Career Option c) Consumerism and Consumer Protection: Consumerism in India, Consumer Protection Act 1986
3	**Contemporary Issues**
	a) Corporate Social Responsibility and Corporate Governance: Social Responsibility of Business, Ecology and Business, Carbon Credit b) Social Audit: Evolution of Social Audit, Benefits of Social Audit, Social Audit v/s Commercial Audit
4	**International Environment**
	a) Strategies for going Global: MNCs and TNCs, WTO b) Foreign Trade in India- Balance of Trade, FDI Investment Flows and its Implication for Indian Industries

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

7.Business Economics –I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	10
3	Supply and Production Decisions and Cost of Production	15
4	Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition	15
5	Pricing Practices	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	**Demand Analysis**
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts **Demand estimation and forecasting:** Meaning and significance - methods of demand estimation: survey and statistical methods *(numerical illustrations on trend analysis and simple linear regression)*
3	**Supply and Production Decisions and Cost of Production**
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale. **Cost concepts:** Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run *(hypothetical numerical problems to be discussed)*, LAC and Learning curve - Break even analysis *(with business applications)*
4	**Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition**
	Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under Monopoly **Monopolistic competition:**Equilibrium of a firm under monopolistic competition, debate over role of advertising *(topics to be taught using case studies from real life examples)* **Oligopolistic markets:** key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models *(with practical examples)*
5	**Pricing Practices**
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing *(case studies on how pricing methods are used in business world)*

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting- II	**03**
2	Business Statistics	**03**
3	Principles of Finance	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Environmental Science	**03**
7	Computer Skills - I	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - II
2	Foundation Course in NSS - II
3	Foundation Course in NCC- II
4	Foundation Course in Physical Education – II

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1. Financial Accounting - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Branch Accounts	15
2	Departmental Accounts	15
3	Hire Purchase& Instalment	15
4	Partnership Accounts	15
	Total	**60**

Sr. No.	Modules / Units
1	**Branch Accounts**
	Meaning / Classification of Branches Accounting for Dependent Branch Not Maintaining Full Books Debtors Method Stock and Debtors Method
2	**Departmental Accounts**
	Meaning Basis of Allocation of Expenses and Incomes / Receipts Inter Departmental Transfer: At Cost Price and Invoice Price Stock Reserve Departmental Trading and Profit and Loss Account and Balance Sheet
3	**Hire Purchase& Instalment**
	Meaning Calculation of Interest Accounting for Hire Purchase Transactions by Asset Purchase Method Based on Full Cash Price Journal Entries, Ledger Accounts and Disclosure in Balance Sheet for Hirer and Vendor (Excluding Default, Repossession and Calculation of Cash Price)
4	**Partnership Accounts**
	Admission of a partner- Retirement of a partner- Death of a partner Dissolution of a partnership- Insolvency of a partner (Application of Indian Partnership Act 1932) – Insolvency of all partners- Gradual realisation of assets and piecemeal distribution

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2. Business Statistics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Population and sample	15
2	Measures of Central tendency	15
3	Measures of Dispersion	15
4	Correlation and regression (for ungrouped data)	15
	Total	**60**

Sr. No.	Modules / Units
1	**Population and sample**
	Definition of statistics, scope of statistics in Management and financial markets, Concept of population and sample with illustration Methods of sampling- SRSWR, SRSWOR, stratified, systematic (description of sampling procedures only) Data condensation and graphical methods: Raw data, attributes and variables, classification, frequency distribution, cumulative frequency distribution Graphs- Histogram and frequency polygon Diagrams- Multiple bar, pie, subdivided bar
2	**Measures of Central tendency**
	Criteria for good measures of central tendency, arithmetic mean, median mode for grouped and ungrouped data, combined mean
3	**Measures of Dispersion**
	Concept of dispersion, absolute and relative measures of dispersion, range variance, standard deviation, coefficient of variation, quartile deviation, coefficient of quartile deviation
4	**Correlation and regression (for ungrouped data)**
	Concept of correlation, positive and negative correlation, Karl Pearson's Coefficient of Correlation, meaning of regression, two regression equations, Regression coefficients and properties

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3. Principles of Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Finance and Financial Planning	15
2	Capital Structure and Capitalisation	15
3	External Sources of Finance	15
4	Internal Sources of Finance	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Finance and Financial Planning**
	Finance, Definition, Nature and scope of Finance function Financial Management: Meaning, scope and objectives Organisational framework of financial management- Relationship of finance department with other departments- Role of Finance Manager Financial Planning: Concept- objectives-types- steps-significance- basic considerations- limitations
2	**Capital Structure and Capitalisation**
	Meaning of Capital Structure- Criteria of determining capital structure- factors influencing capital structure Meaning of Capitalisation, narrower and broader interpretation Overcapitalisation- Meaning, causes, consequences, remedies Undercapitalisation- Meaning, causes, consequences, remedies
3	**External Sources of Finance**
	Shares- Meaning, types, advantages, limitations Debentures- Meaning, types, advantages, limitations Public Deposits- Meaning, advantages, limitations Borrowing from banks- types of loans, advantages, limitations
4	**Internal Sources of Finance**
	Reserves and surplus, bonus shares, retained earnings, Dividend policy, Role of Depreciation, Importance, advantages and limitations of these sources

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	10
2	Group Communication	15
3	Business Correspondence	10
4	Language and Writing Skills	10
	Total	**45**

Sr. No.	Modules / Units
1	**Presentation Skills**
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	**Group Communication**
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit **Meetings:**Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions **Conference:**Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele – Conferencing **Public Relations:** Meaning, Functions of PR Department, External and Internal Measures of PR
3	**Business Correspondence**
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) **Only following to be taught in detail:-** Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	**Language and Writing Skills**
	Reports: Parts, Types, Feasibility Reports, Investigative Reports **Summarisation:** Identification of main and supporting/sub points Presenting these in a cohesive manner

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5. Foundation Course - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	**45**

Sr. No	Modules /Units
1	**Globalisation and Indian Society**
	Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	**Human Rights**
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	**Ecology**
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation- causes and impact on human life;Sustainable development- concept and components; poverty and environment
4	**Understanding Stress and Conflict**
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	**Managing Stress and Conflict in Contemporary Society**
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society

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Skill Enhancement Courses (SEC)

5. Foundation Course in NSS - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Socio-economic Survey and Special Camp	10
2	Orientation of the College Unit and Communication Skills	15
3	Rapport with Community and Programme Planning	10
4	Government Organisations /Non-Government Organisations	10
	Total	**45**

Sr. No.	Modules / Units
1	**Socio-economic Survey and Special Camp**
	Socio economic survey Socio-economic survey- its meaning and need, Process of Socio-economic survey- design of questionnaire; data collection, data analysis and report writing **Special camping activity** Concept of camp- Identification of community problems- Importance of group living- Team building- Adoption of village- Planning for camp- pre camping, during the course of camp and post camping activities
2	**Orientation of the College Unit and Communication Skills**
	Training and orientation of the program unit in the college Leadership training – formation of need based programmmes- Concept of campus to community(C to C) activities **Communication skills and Documentation** Communication skills- the concept, Verbal, Non-Verbal communication The documentation- Activity Report Writing – basics of NSS accounting – Annual Report – Press note and preparation
3	**Rapport with Community and Programme Planning**
	Working with individual group and community Ice breaking- interaction games – conflict resolution **Program planning** Programme planning- the concept and its features, requirements for successful implementation of program- program flow charting- feedback
4	**Government Organisations /Non-Government Organisations**
	Structure of Government Organisations and Non-Government Organisations Government organisations (GO)- its meaning -Legal set up, functioning, Sources of funding Non-Government organisations (NGO)- its meaning -Legal set up, functioning, Sources of funding National Service Scheme(NSS)- Government organisations (GO) and Non-Government organisations (NGO) **Government schemes for community development** Schemes os Government welfare departments for community development- provisions & examples

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Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	10
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Civil Defence Organisation and Its Duties/ NDMA • Types of Emergencies/ Natural Disaster • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. • 'Avan' model of NCC **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social service and its need, about NGOs and shall participate in community action programmes for betterment of the community. • Basics of Social Service, Weaker Sections of Our Society and Their Needs • Social/ Rural Development Project: MNREGA, SGSY, NSAP etc. • Contribution of Youth towards Social Welfare • Civic Responsibilities • Causes & Prevention of HIV/AIDS; Role of Youth
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Structure and Functioning of the Human Body • Hygiene and Sanitation (Personal and Food Hygiene) • Infectious & Contagious Diseases & Their Prevention
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Attention, Stand at Ease and Stand Easy • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • Ground / Take Up Arms • Present From the Order and Vice-versa • General Salute, Salami Shastra
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • Characteristics of a Rifle / Rifle Ammunition and its Fire Power • Stripping, Assembling, Care and Cleaning and Sight Setting of .22 rifle • Stripping, Assembling, Care and Cleaning of 7.62mm SLR • Loading, Cocking and Unloading • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Introduction to types of Maps and Conventional signs • Scales and Grid system • Topographical forms and technical terms • Relief, contours and Gradients • Cardinal points and Types of North • Types of bearings and use of Service Protractor • Prismatic compass and its use and GPS **B. Field Craft and Battle Craft** • Introduction • Judging distance • Description of ground • Recognition, Description and Indication of landmarks and targets ***OR*** **Navy** **A. `Naval Communication** • Introduction to Naval Modern Communication, Purpose and Principles ▪ Introduction of Naval communication ▪ Duties of various communication sub-departments • Semaphore ▪ Introduction of position of letters and prosigns ▪ Reading of messages ▪ Transmission of messages **B. Seamanship** • **Anchor work** ▪ Parts of Anchor and Cable, their identification • **Rigging** ▪ Types of ropes and breaking strength- stowing, maintenance and securing of ropes ▪ Practical Bends and Hitches: Reef Knot, Half hitch, Clove Hitch, Rolling Hitch, Timber Hitch, Bow Line, Round Turn and Two half hitch and Bow line on the Bight and its basic elements and uses. ▪ Introduction to Shackles, Hooks, Blocks and Derricks, Coiling Down and Splicing of rope **C. Boat work** • Parts of Boat and Parts of an Oar • Instruction on boat Pulling- Pulling orders • Steering of boat under oars, Practical instruction on Boat Pulling, Precautions while pulling

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Aircraft Controls • Landing Gear **B. Instruments** • Basic Flight Instruments **C. Aircraft Particulars** • Aircraft Particulars (Type specific) **D. Aero modelling** • History of Aero modelling • Materials used in Aero modelling • Type of Aero models • Flying/ Building of Aero models

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Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Development of Fitness	10
2	Health, Fitness and Diseases	15
3	Yoga Education	10
4	Daily Schedule of Achieving Quality of Life and Wellness	10
	Total	**45**

Sr. No.	Modules / Units
1	**Development of Fitness**
	• Benefits of physical fitness and exercise and principles of physical fitness • Calculation of fitness index level 1-4 • Waist-hip ratio Target Heart Rate, BMI and types and principles of exercise (FITT) • Methods of training – continues, Interval, circuit, Fartlek and Plyometric
2	**Health, Fitness and Diseases**
	• Definition of obesity and its management • Communicable diseases, their preventive and therapeutic aspectS • Factors responsible for communicable diseases • Preventive and therapeutic aspect of Communicable and non- communicable diseases
3	**Yoga Education**
	• Meaning and history of yoga • Ashtang yoga and types of yoga • Types of Suryanamaskar and Technique of Pranayam • Benefits of Yoga
4	**Daily Schedule of Achieving Quality of Life and Wellness**
	• Daily schedule based upon one's attitude, gender, age &occupation. • Basic – module: - Time split for rest, sleep, diet, activity & recreation. • Principles to achieve quality of life:- positive attitude, daily regular exercise, control over food habits & healthy hygienic practices.

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Core Courses (CC)

6. Environmental Science

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Environment – an overview	15
2	Natural Resources	15
3	Environment and economic activities	15
4	Environment Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Environment : an overview**
	Environment- structure, components and typology Ecosystem as part of environment- Functioning and levels of organisation Biodiversity- Classification, value, threats to biodiversity
2	**Natural Resources**
	Definition, importance and classification of natural resources Utilisation and conservation of water, forest, soil and energy resources Issues associated with natural resources
3	**Environment and Economic Activities**
	Economic activities-nature and pattern- primary,secondary and tertiary Environmental problems associated with economic activities Case studies with reference to India
4	**Environment Management**
	Environment management- Concept, need and relevance of environmental education Environmental Impact Assessment, Environmental audit Role of technology in Environment Management- GIS,GPS, Remote sensing as tools

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Core Courses (CC)

7.Computer Skills - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures IncludingPracticals
1	Computer Hardware	10
2	Windows	10
3	Internet	10
4	Word – 2013	15
4	Excel -2013	15
	Total	**60**

Sr. No.	Modules / Units
1	**Computer Hardware**
	Personal Computers- identification/demonstration of different storage Devices like CD and CD drive, hard disk- HDD, storing and retrieving data from various storage devices, identification of various input and output devices. Primary memory, RAM and ROM- Processor- CPU, it's speed- machine cycle, ports, computer buses, Different types of printers. Introduction to trouble shooting of personal computers.
2	**Windows**
	Introduction, features, various versions of windows, My computer, my documents, recycle bin, network neighbourhood, start menu, taskbar, file and folder operation (creating, copying, moving, deleting), system tools, creating shortcuts,
3	**Internet**
	What is internet, most popular internet services , functions of internet like email, WW, FTP, usenet, Instant messaging, internet telephony, using address book, working with task list, scheduling appointments, reminders, events
4	**Word – 2013**
	Getting started, The Word window, New documents, Document navigation, Editing text, Working with text, Undo and Redo commands, Cut, copy, and paste, Find and replace Text formatting, Character formatting, Tab settings, Paragraph formatting, Paragraph spacing and indents Tables, Creating tables, Working with table content, Changing the table structure Page layout, Headers and footers, Page setup Graphics, Adding graphics and clip art, Working with graphics Proofing, printing, and exporting, Spelling and grammar, AutoCorrect, Printing and exporting documents
5	**Excel- 2013**
	Fundamentals of Excel, Cut, Copy, Insert, Delete, Paste Special, Custom Formatting , Undo, Redo, Excel Formulas – Basic, Useful functions and Paste Function, Calc, Comments, Drawing toolbar, Edit, Replace, Delete, Clear, Essential Printing, Data Sorting, Hiding, AutoFormats, Protection, Basic Charts, Basic Formatting, If Function

Revised Syllabus of Courses of B.Com.(Financial Management) Programme at Semester I with effect from the Academic Year 2016-2017

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- *National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya,*
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- *Case material as a Training Aid for Field Workers, Gurmeet Hans.*
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- *Global Economy and Business Environment by Francis Cherunilam, Himalaya Publication House, Mumbai*
- *Business Environment: Text and Cases by Francis Cherunilam, Himalaya Publication House, Mumbai*
- *Indian Economy by Dutt and Sundaram, S. Chand and Company Pvt. Ltd., New Delhi*
- *Essentials of Business Environment by K. Aswathappa, Himalaya Publication House, Mumbai*

Reference Books
• *Business Environment by Justin Paul, Tata McGraw Hill Education Pvt. Ltd., New Delhi* • *Indian Economy by Misra and Puri, Himalaya Publishing House, Mumbai* • *Entrepreneurial Development by S.S. Khanka, S. Chand and Company Pvt. Ltd., New Delhi* • *Dynamics of Entrepreneurship by Vasanta Desai, Himalaya Publishing House, Mumbai* • *Entrepreneurship and Small Development Business Management by C.B. Gupta and S.S. Khanka, Sultan Chand and Sons, New Delhi* • *Entrepreneurship by David H. Holt, PHI Learning Pvt. Ltd., New Delhi* • *Management of Small-Scale Industries by Vasant Desai, Himalaya Publishing House, Mumbai* • *Business and Government by Francis Cherunilam, Himalaya Publishing House, Mumbai* • *Corporate Governance in India by Jayati Sarkar and Subrata Sarkar, Sage Publications, New Delhi* • *Corporate Governance: Principles, Policies and Practices by A.C. Fernando, Pearson Education India, New Delhi*
Business Economics - I
• *Mehta, P.L.: Managerial Economics – Analysis, Problem and Cases (S. Chand & Sons, N. Delhi, 2000)* • *Hirchey .M., Managerial Economics, Thomson South western (2003)* • *Salvatore, D.: Managerial Economics in a global economy (Thomson South Western Singapore, 2001)* • *Frank Robert.H, Bernanke. Ben S., Principles of Economics (Tata McGraw Hill (ed.3)* • *Gregory Mankiw., Principles of Economics, Thomson South western (2002 reprint)* • *Samuelson &Nordhas.: Economics (Tata McGraw Hills, New Delhi, 2002)* • *Pal Sumitra, Managerial Economics cases and concepts (Macmillan, New Delhi,2004)*

Revised Syllabus of Courses of B.Com.(Financial Management) Programme at Semester II with effect from the Academic Year 2016-2017

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Financial Accounting -II
• *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by LesileChandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai* • *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi* • *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida* • *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi* • *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi* • *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi* • *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, MehulRaithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
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- *Case material as a Training Aid for Field Workers, Gurmeet Hans.*
- *Social service opportunities in hospitals, Kapil K. Krishnan, TISS*
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Environmental Science

- *Environmental Geography, Singh, Savindra,PrayagPustakBhavan,*
- *Environmental Geography, GautamAlka,ShardaPustakBhavan, Allahabad,*
- *Environmental Management, Dr Swapan C Deb- Jaico*
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- *Basics of Environmental Sciences, Allaby M. 2002 ,Routledge, London*
- *Man's Impact on Environment, DetwylerT.R.McGraw-Hill, New York*
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Reference Books
Computer Skills – I
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Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I and II with effect from the Academic Year 2016-2017

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: **25 %**

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

UNIVERSITY OF MUMBAI
No. UG/104 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Com. (Financial Management) degree programme **vide** this office Circular No. UG/10 of 2014 dated 1st July, 2014 the Principals of affiliated Colleges in Commerce are hereby informed that the hereby informed that the approved by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.73 and that in accordance therewith, the revised syllabus as per Choice Based Credit System for B.Com (Financial Management) for (Sem. I to VI)-Course Structure (Sem. I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

24/10/16

(Dr.M.A. Khan)
REGISTRAR

MUMBAI – 400 032
October, 2016

To,

The Principals of affiliated Colleges in Commerce and the Heads of recognized Institutions concerned.

A.C/4.73 /24/06/2016

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No. UG/104-A of 2016-17 MUMBAI-400 032 25 October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Commerce,
2) The Director, Board of College and University Development,
3) The Controller of Examinations,
4) The Professor-cum- Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre.

24/10/16

(Dr.M.A. Khan)
REGISTRAR

PTO..

AC 24-06-2016
Item No. 4.73

University of Mumbai

B.Com. (Financial Management) Programme
Three Year Integrated Programme- Six Semesters
Course Structure

Under Choice Based Credit System

To be implemented from Academic Year- 2016-2017 Progressively

Board of Studies-in-Accountancy, University of Mumbai

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Financial Management)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting- I	**03**	1	Financial Accounting- II	**03**
2	Business Mathematics	**03**	2	Business Statistics	**03**
3	Indian Financial System	**03**	3	Principles of Finance	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Environment	**03**	6	Environmental Science	**03**
7	Business Economics - I	**03**	7	Computer Skills - I	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

S.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1, 2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	*Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
4	Entrepreneurial Development	**02**	4	IT in Management	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
5	Management Accounting	**03**	5	Corporate Finance	**03**
6	Business Law	**03**	6	Corporate Law	**03**
7	Business Regulatory Framework	**03**	7	Office Management	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)***		****List of DisciplineRelated Elective(DRE) Courses for Semester IV (Any Three)***	
1	Corporate Accounts -1	1	Corporate Accounts-2
2	Direct Tax – 1	2	Direct Tax-2
3	Indirect Tax- 1	3	IndirectTax-2
4	Investment Banking	4	Merchant Banking
5	Cost Accounting-1	5	Cost Accounting-2
Note: Course/ Subject selected in Semester III will continue in Semester IV			

T.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Financial Management-1	**04**	5	Financial Management-2	**04**
3	****Project Work***		***3***	****Project Work***	
6	Project Work I	**04**	6	Project Work II	**04**
	Total Credits	**20**		**Total Credits**	**20**

Note: *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 043 credits. A project work may be undertaken in any area of Elective Courses/ study area*

****List of Elective Courses for Semester V (Any Four)***		****List of Elective Courses for Semester VI (Any Four)***	
1	Corporate Accounting	1	Corporate Restructuring
2	Auditing-1	2	Auditing-2
3	Management Information systems	3	Financial Reporting
4	Business Ethics	4	OrganisationalBehaviour
5	Personal Financial Planning	5	Econometrics for Finance
6	Financial Analysis and Business Valuation	6	Security Analysis & Portfolio Management
Note: Course/ Subject selected in Semester V will continue in Semester VI			

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses
of
B.Com. (Financial Management)
Programme
First Year

Semester I and II

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year- 2016-2017)

Board of Studies-in-Accountancy, University of Mumbai

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Financial Management)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting-I	**03**	1	Financial Accounting-II	**03**
2	Business Mathematics	**03**	2	Business Statistics	**03**
3	Indian Financial system	**03**	3	Principles of Finance	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication -II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Environment	**03**	6	Environmental Science	**03**
7	Business Economics - I	**03**	7	Computer Skills - I	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Coursein NSS - I	2	Foundation Coursein NSS - II
3	Foundation Coursein NCC - I	3	Foundation Coursein NCC - II
4	Foundation CourseinPhysical Education - I	4	Foundation Coursein Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting - I	**03**
2	Business Mathematics	**03**
3	Indian Financial system	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication -I	**03**
2B	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Environment	**03**
7	Business Economics - I	**03**
	Total Credits	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***	
1	Foundation Course - I
2	Foundation Course - NSS – I
3	Foundation Course - NCC – I
4	Foundation Course - Physical Education – I

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1.Financial Accounting–I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Meaning and scope of Accounting	15
2	Depreciation	15
3	Single Entry	15
4	Final Accounts of a sole trader	15
	Total	**60**

Sr. No.	Modules / Units
1	**Meaning and scope of Accounting**
	Basic Accounting Concepts and Conventions –Objectives of Accounting - Accounting Transactions - Double Entry Book keeping - Journal, Ledger, Preparation of Trial Balance - Preparation of Cash Book.
2	**Depreciation**
	Depreciation - Meaning, Causes, Types - Straight Line Method - Written Down Value Method (Change in Method excluded) - Insurance Claims - Average Clause (Loss of stock only).
3	**Single Entry**
	Single Entry - Meaning, Features, Defects, Differences between Single Entry and Double Entry System – Statement of Affairs Method - Conversion Method (Only simple problems).
4	**Final Accounts of a sole trader**
	Preparation of Final Accounts of a Sole Trading Concern - Adjustments - Closing Stock, Outstanding and Prepaid items, Depreciation, Provision for Bad Debts, Provision for Discount on Debtors, Interest on Capital and Drawings

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2.Business Mathematics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Ratio, Proportion and Percentage	15
2	Profit & Loss	15
3	Interest and Annuity	15
4	Shares and Mutual Fund	15
	Total	**60**

Sr. No.	Modules / Units
1	**Ratio, Proportion and Percentage**
	Ratio- Definition, Continued ratio, Inverse Ratio, Proportion - Continued proportion, Direct proportion, Inverse proportion, Variation - Inverse variation, Joint variation Percentage- Meaning and computation of percentage
2	**Profit and Loss**
	Terms and formulae, Trade discount, Cash discount, problems involving cost price, selling price, trade discount, cash discount. Introduction to Commission and brokerage – problems on commission and brokerage
3	**Interest and Annuity**
	Simple interest, compound interest, Equated monthly instalments, reducing balance and flat rate of interest Annuity immediate- present value and future value Stated annual rate and effective annual rate
4	**Shares and Mutual Fund**
	Shares- Concept, face value, market value, dividend, Equity shares, preference shares, bonus shares, Mutual Fund- Simple problems on calculation of net income after considering entry load, exit load, dividend, change in net asset value

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3.Indian Financial System

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Financial System	15
2	Financial Institutions	15
3	The Non-banking financial institutions	15
4	Finance Companies	15
	Total	**60**

Sr. No.	Modules / Units
1	**Financial System**
	Meaning, nature, structure, role, flow of funds in financial system, financial systems and economic development. An overview of Indian Financial System.
2	**Financial Institutions**
	Institutional Framework, Reserve Bank of India: Objectives, Functions, Commercial Banking: Role & Development of Commercial Banking, Services by commercial banks, Problems and challenges in banking industry, Development Banks- Concept, objectives, & functions, promotional role, a brief historical perspective. An update on the performance of SFCs, LIC & GIC.
3	**Non-banking financial institutions**
	NBFCs- concept, nature of NBFCs, role, sources of finance, RBI guidelines. NABARD- role & functions; SEBI- Organization, Functions, SEBI as a regulator.
4	**Finance Companies**
	The Evolution of Finance Companies, The Present Status and the Micro Finance and its importance in Rural Economy.

Revised Syllabus of Courses of B.Com. (Financial Management)
Programme at Semester I
with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	10
2	Obstacles to Communication in Business World	10
3	Business Correspondence	12
4	Language and Writing Skills	13
	Total	**45**

1	**Theory of Communication**
	Concept of Communication: Meaning, Definition, Process, Need, FeedbackEmergence of Communication as a key concept in the Corporate and Global worldImpact of technological advancements on Communication **Channels and Objectives of Communication**: **Channels-** Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine **Objectives of Communication**: Information, Advice, Order and Instruction, Persuasion, Motivation, Education,Warning, and Boosting the Morale of Employees(A brief introduction to these objectives to be given) **Methods and Modes of Communication:** Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	**Obstacles to Communication in Business World**
	Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers **Listening:** Importance of Listening Skills, Cultivating good Listening Skills – 4 **Introduction to Business Ethics:** Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	**Business Correspondence**
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, **Personnel Correspondence:** Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]

Sr. No.	Modules / Units
4	**Language and Writing Skills**
	Commercial Terms used in Business Communication **Paragraph Writing:** Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] **Activities** ▪ Listening Comprehension ▪ Remedial Teaching ▪ Speaking Skills: Presenting a News Item, Dialogue and Speeches ▪ Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. ▪ Reading Comprehension: Analysis of texts from the fields of Commerce and Management

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity- 1	10
3	Concept of Disparity-2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Indian Society**
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	**Concept of Disparity- 1**
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	**Concept of Disparity-2**
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	**The Indian Constitution**
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	**Significant Aspects of Political Processes**
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NSS**
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level **National Service Scheme(NSS) Regular activities** Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	**Concept of Society and Social Issues in India**
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India **Basic social issues in India** Degeneration of value system, Family system, Gender issues, Regional imbalance
3	**Indian Constitution and Social Justice**
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development **Social Justice** Social Justice- the concept and its features Inclusive growth- the concept and its features
4	**Human Personality and National Integration**
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. **National integration & Communal Harmony** National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NCC, Nation-al Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training, Environment Awareness and Conservation	10
4	Personality Development and Leadership	10
5	Specialized Subject: Army/ Navy/ Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NCC, National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. • Genesis, Aims, Objectives of NCC & NCC Song • Organisation& Training • Incentives & Benefits • Religions, Culture, Traditions and Customs of India • National Integration: Importance and Necessity • Freedom Struggle
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • General and Words of Command • Attention, Stand at Ease and Stand Easy, Turning and Inclining at the Halt • Sizing, Forming Up in Three Ranks and Numbering, Open and Close Order March and Dressing • Saluting at the Halt, Getting On Parade, Dismissing and Falling Out • Marching, Length of Pace and Time of Marching in Quick Time and Halt, Slow March and Halt • Turning on the March and Wheeling. • Saluting on the March. • Formation of squad and Squad Drill.
3	**Adventure Training, Environment Awareness and Conservation**
	Adventure Training **Desired outcome**: The students will overcome fear & inculcate within them the sense of adventure , sportsmanship , espirit-d-corp and develop confidence , courage , determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing,Scuba Diving etc **Environment Awareness and Conservation** Desired outcome: The student will be aware of the conservation of natural resources and protection of environment. • Natural Resources – Conservation and Management • Water Conservation and Rainwater Harvesting

Sr. No.	Modules / Units
4	**Personality Development and Leadership**
	Desired outcome: The student will develop an all-round personality with adequate leadership traits to deal / contribute effectively in life. • Introduction to Personality Development • Factors Influencing /Shaping Personality: Physical, Social, Physiological, Philosophical and Psychological • Self Awareness Know yourself/ Insight • Change Your Mind Set • Communication Skills: Group Discussion / Lecturettes (Public Speaking) • Leadership Traits • Types of Leadership
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Armed Force** • Basic organisation of Armed Forces • Organisation of Army • Badges and Ranks **B. Introduction to Infantry and weapons and equipments** • Characteristics of 7.62mm SLR Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning **C. Military history** • Biographies of renowned Generals (Carriapa / Sam Manekshaw) • Indian Army War Heroes- PVCs **D. Communication** • Types of Communications • Characteristics of Wireless Technologies (Mobile, Wi-Fi etc.) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • History of the Indian Navy-Pre and Post Independence, Gallantry award winners • Organization of Navy- NHQ, Commands, Fleets, Ships and shore establishments • Types of Warships and their role • Organization of Army and Air Force- Operational and Training commands • Ranks of Officers and Sailors, Equivalent Ranks in the Three Services **B. Ship and Boat Modelling** • Principles of Ship Modelling • Maintenance and Care of tools

Sr. No.	Modules / Units
	C. Search and Rescue • SAR Organization in the Indian ocean **D. Swimming** Floating for three minutes and Free style swimming for 50 meters ***OR*** **AIR** **A. General Service Knowledge** • Development of Aviation • History of IAF **B. Principles of Flight** • Introduction • Laws of Motion • Glossary of Terms. **C. Airmanship** • Introduction • Airfield Layout • Rules of the Air • Circuit Procedure • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Introduction to Aero-engines

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

5.Foundation Course in Physical Education - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Relevant concepts in Physical Education	10
2	Components of Physical Fitness	15
3	Testing Physical Fitness	10
4	Effect of Exercise on various Body System	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Basic Relevant concepts in Physical Education**
	• Dimensions and determinants of Health, Fitness & Wellness • Concept of Physical Education and its importance • Concept of Physical Fitness and its types • Concept of Physical Activity, exercise and its types & benefits
2	**Components of Physical Fitness**
	• Concept of components of Physical Fitness • Concept and components of HRPF • Concept and components of SRPF • Importance of Physical Education in developing physical fitness components.
3	**Testing Physical Fitness**
	• Tests for measuring Cardiovascular Endurance • Tests for measuring Muscular Strength& Endurance • Tests for measuring Flexibility • Tests for measuring Body Composition
4	**Effect of Exercise on various Body System**
	• Effect of exercises on Musculoskeletal system • Effect of exercises on Circulatory System • Effect of exercises on Respiratory System • Effect of exercises on Glandular System

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

6.Business Environment

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business and its Environment	15
2	Business and Society	15
3	Contemporary Issues	15
4	International Environment	15
	Total	**60**

Sr. No.	Modules / Units
1	**Business and its Environment**
	a) Business Objectives, Dynamics of Business and its Environment, Types of Business Environment b) Environmental Analysis: Importance, Factors, PESTEL Analysis, SWOT Analysis
2	**Business and Society**
	a) Business Ethics: Nature and Scope of Ethics, Ethical Dilemmas, Corporate Culture and Ethical Climate b) Development of Business Entrepreneurship: Entrepreneurship and Economic Development, Micro, Small and Medium Enterprises Development (MSMED) Act, 2006, Entrepreneurship as a Career Option c) Consumerism and Consumer Protection: Consumerism in India, Consumer Protection Act 1986
3	**Contemporary Issues**
	a) Corporate Social Responsibility and Corporate Governance: Social Responsibility of Business, Ecology and Business, Carbon Credit b) Social Audit: Evolution of Social Audit, Benefits of Social Audit, Social Audit v/s Commercial Audit
4	**International Environment**
	a) Strategies for going Global: MNCs and TNCs, WTO b) Foreign Trade in India- Balance of Trade, FDI Investment Flows and its Implication for Indian Industries

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

7.Business Economics –I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	10
3	Supply and Production Decisions and Cost of Production	15
4	Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition	15
5	Pricing Practices	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	**Demand Analysis**
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts **Demand estimation and forecasting:** Meaning and significance - methods of demand estimation: survey and statistical methods *(numerical illustrations on trend analysis and simple linear regression)*
3	**Supply and Production Decisions and Cost of Production**
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale. **Cost concepts:** Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run *(hypothetical numerical problems to be discussed)*, LAC and Learning curve - Break even analysis *(with business applications)*
4	**Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition**
	Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under Monopoly **Monopolistic competition:**Equilibrium of a firm under monopolistic competition, debate over role of advertising *(topics to be taught using case studies from real life examples)* **Oligopolistic markets:** key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models *(with practical examples)*
5	**Pricing Practices**
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing *(case studies on how pricing methods are used in business world)*

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting- II	**03**
2	Business Statistics	**03**
3	Principles of Finance	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Environmental Science	**03**
7	Computer Skills - I	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - II
2	Foundation Course in NSS - II
3	Foundation Course in NCC- II
4	Foundation Course in Physical Education – II

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1. Financial Accounting - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Branch Accounts	15
2	Departmental Accounts	15
3	Hire Purchase& Instalment	15
4	Partnership Accounts	15
	Total	**60**

Sr. No.	Modules / Units
1	**Branch Accounts**
	Meaning / Classification of Branches Accounting for Dependent Branch Not Maintaining Full Books Debtors Method Stock and Debtors Method
2	**Departmental Accounts**
	Meaning Basis of Allocation of Expenses and Incomes / Receipts Inter Departmental Transfer: At Cost Price and Invoice Price Stock Reserve Departmental Trading and Profit and Loss Account and Balance Sheet
3	**Hire Purchase& Instalment**
	Meaning Calculation of Interest Accounting for Hire Purchase Transactions by Asset Purchase Method Based on Full Cash Price Journal Entries, Ledger Accounts and Disclosure in Balance Sheet for Hirer and Vendor (Excluding Default, Repossession and Calculation of Cash Price)
4	**Partnership Accounts**
	Admission of a partner- Retirement of a partner- Death of a partner Dissolution of a partnership- Insolvency of a partner (Application of Indian Partnership Act 1932) – Insolvency of all partners- Gradual realisation of assets and piecemeal distribution

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2. Business Statistics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Population and sample	15
2	Measures of Central tendency	15
3	Measures of Dispersion	15
4	Correlation and regression (for ungrouped data)	15
	Total	**60**

Sr. No.	Modules / Units
1	**Population and sample**
	Definition of statistics, scope of statistics in Management and financial markets, Concept of population and sample with illustration Methods of sampling- SRSWR, SRSWOR, stratified, systematic (description of sampling procedures only) Data condensation and graphical methods: Raw data, attributes and variables, classification, frequency distribution, cumulative frequency distribution Graphs- Histogram and frequency polygon Diagrams- Multiple bar, pie, subdivided bar
2	**Measures of Central tendency**
	Criteria for good measures of central tendency, arithmetic mean, median mode for grouped and ungrouped data, combined mean
3	**Measures of Dispersion**
	Concept of dispersion, absolute and relative measures of dispersion, range variance, standard deviation, coefficient of variation, quartile deviation, coefficient of quartile deviation
4	**Correlation and regression (for ungrouped data)**
	Concept of correlation, positive and negative correlation, Karl Pearson's Coefficient of Correlation, meaning of regression, two regression equations, Regression coefficients and properties

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3. Principles of Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Finance and Financial Planning	15
2	Capital Structure and Capitalisation	15
3	External Sources of Finance	15
4	Internal Sources of Finance	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Finance and Financial Planning**
	Finance, Definition, Nature and scope of Finance function Financial Management: Meaning, scope and objectives Organisational framework of financial management- Relationship of finance department with other departments- Role of Finance Manager Financial Planning: Concept- objectives-types- steps-significance- basic considerations- limitations
2	**Capital Structure and Capitalisation**
	Meaning of Capital Structure- Criteria of determining capital structure- factors influencing capital structure Meaning of Capitalisation, narrower and broader interpretation Overcapitalisation- Meaning, causes, consequences, remedies Undercapitalisation- Meaning, causes, consequences, remedies
3	**External Sources of Finance**
	Shares- Meaning, types, advantages, limitations Debentures- Meaning, types, advantages, limitations Public Deposits- Meaning, advantages, limitations Borrowing from banks- types of loans, advantages, limitations
4	**Internal Sources of Finance**
	Reserves and surplus, bonus shares, retained earnings, Dividend policy, Role of Depreciation, Importance, advantages and limitations of these sources

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Ability Enhancement Courses (AEC)

4. Business Communication - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	10
2	Group Communication	15
3	Business Correspondence	10
4	Language and Writing Skills	10
	Total	**45**

Sr. No.	Modules / Units
1	**Presentation Skills**
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	**Group Communication**
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit **Meetings:**Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions **Conference:**Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele – Conferencing **Public Relations:** Meaning, Functions of PR Department, External and Internal Measures of PR
3	**Business Correspondence**
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) **Only following to be taught in detail:-** Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	**Language and Writing Skills**
	Reports: Parts, Types, Feasibility Reports, Investigative Reports **Summarisation:** Identification of main and supporting/sub points Presenting these in a cohesive manner

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5. Foundation Course - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	**45**

Sr. No	Modules /Units
1	**Globalisation and Indian Society**
	Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	**Human Rights**
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	**Ecology**
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation- causes and impact on human life;Sustainable development- concept and components; poverty and environment
4	**Understanding Stress and Conflict**
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	**Managing Stress and Conflict in Contemporary Society**
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society

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Skill Enhancement Courses (SEC)

5. Foundation Course in NSS - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Socio-economic Survey and Special Camp	10
2	Orientation of the College Unit and Communication Skills	15
3	Rapport with Community and Programme Planning	10
4	Government Organisations /Non-Government Organisations	10
	Total	**45**

Sr. No.	Modules / Units
1	**Socio-economic Survey and Special Camp**
	Socio economic survey Socio-economic survey- its meaning and need, Process of Socio-economic survey- design of questionnaire; data collection, data analysis and report writing **Special camping activity** Concept of camp- Identification of community problems- Importance of group living- Team building- Adoption of village- Planning for camp- pre camping, during the course of camp and post camping activities
2	**Orientation of the College Unit and Communication Skills**
	Training and orientation of the program unit in the college Leadership training – formation of need based programmmes- Concept of campus to community(C to C) activities **Communication skills and Documentation** Communication skills- the concept, Verbal, Non-Verbal communication The documentation- Activity Report Writing – basics of NSS accounting – Annual Report – Press note and preparation
3	**Rapport with Community and Programme Planning**
	Working with individual group and community Ice breaking- interaction games – conflict resolution **Program planning** Programme planning- the concept and its features, requirements for successful implementation of program- program flow charting- feedback
4	**Government Organisations /Non-Government Organisations**
	Structure of Government Organisations and Non-Government Organisations Government organisations (GO)- its meaning -Legal set up, functioning, Sources of funding Non-Government organisations (NGO)- its meaning -Legal set up, functioning, Sources of funding National Service Scheme(NSS)- Government organisations (GO) and Non-Government organisations (NGO) **Government schemes for community development** Schemes os Government welfare departments for community development- provisions & examples

Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	10
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Civil Defence Organisation and Its Duties/ NDMA • Types of Emergencies/ Natural Disaster • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. • 'Avan' model of NCC **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social service and its need, about NGOs and shall participate in community action programmes for betterment of the community. • Basics of Social Service, Weaker Sections of Our Society and Their Needs • Social/ Rural Development Project: MNREGA, SGSY, NSAP etc. • Contribution of Youth towards Social Welfare • Civic Responsibilities • Causes & Prevention of HIV/AIDS; Role of Youth
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Structure and Functioning of the Human Body • Hygiene and Sanitation (Personal and Food Hygiene) • Infectious & Contagious Diseases & Their Prevention
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Attention, Stand at Ease and Stand Easy • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • Ground / Take Up Arms • Present From the Order and Vice-versa • General Salute, Salami Shastra
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • Characteristics of a Rifle / Rifle Ammunition and its Fire Power • Stripping, Assembling, Care and Cleaning and Sight Setting of .22 rifle • Stripping, Assembling, Care and Cleaning of 7.62mm SLR • Loading, Cocking and Unloading • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Introduction to types of Maps and Conventional signs • Scales and Grid system • Topographical forms and technical terms • Relief, contours and Gradients • Cardinal points and Types of North • Types of bearings and use of Service Protractor • Prismatic compass and its use and GPS **B. Field Craft and Battle Craft** • Introduction • Judging distance • Description of ground • Recognition, Description and Indication of landmarks and targets ***OR*** **Navy** **A. `Naval Communication** • Introduction to Naval Modern Communication, Purpose and Principles ▪ Introduction of Naval communication ▪ Duties of various communication sub-departments • Semaphore ▪ Introduction of position of letters and prosigns ▪ Reading of messages ▪ Transmission of messages **B. Seamanship** • **Anchor work** ▪ Parts of Anchor and Cable, their identification • **Rigging** ▪ Types of ropes and breaking strength- stowing, maintenance and securing of ropes ▪ Practical Bends and Hitches: Reef Knot, Half hitch, Clove Hitch, Rolling Hitch, Timber Hitch, Bow Line, Round Turn and Two half hitch and Bow line on the Bight and its basic elements and uses. ▪ Introduction to Shackles, Hooks, Blocks and Derricks, Coiling Down and Splicing of rope **C. Boat work** • Parts of Boat and Parts of an Oar • Instruction on boat Pulling- Pulling orders • Steering of boat under oars, Practical instruction on Boat Pulling, Precautions while pulling

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Aircraft Controls • Landing Gear **B. Instruments** • Basic Flight Instruments **C. Aircraft Particulars** • Aircraft Particulars (Type specific) **D. Aero modelling** • History of Aero modelling • Materials used in Aero modelling • Type of Aero models • Flying/ Building of Aero models

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Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Development of Fitness	10
2	Health, Fitness and Diseases	15
3	Yoga Education	10
4	Daily Schedule of Achieving Quality of Life and Wellness	10
	Total	**45**

Sr. No.	Modules / Units
1	**Development of Fitness**
	• Benefits of physical fitness and exercise and principles of physical fitness • Calculation of fitness index level 1-4 • Waist-hip ratio Target Heart Rate, BMI and types and principles of exercise (FITT) • Methods of training – continues, Interval, circuit, Fartlek and Plyometric
2	**Health, Fitness and Diseases**
	• Definition of obesity and its management • Communicable diseases, their preventive and therapeutic aspectS • Factors responsible for communicable diseases • Preventive and therapeutic aspect of Communicable and non- communicable diseases
3	**Yoga Education**
	• Meaning and history of yoga • Ashtang yoga and types of yoga • Types of Suryanamaskar and Technique of Pranayam • Benefits of Yoga
4	**Daily Schedule of Achieving Quality of Life and Wellness**
	• Daily schedule based upon one's attitude, gender, age &occupation. • Basic – module: - Time split for rest, sleep, diet, activity & recreation. • Principles to achieve quality of life:- positive attitude, daily regular exercise, control over food habits & healthy hygienic practices.

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Core Courses (CC)

6. Environmental Science

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Environment – an overview	15
2	Natural Resources	15
3	Environment and economic activities	15
4	Environment Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Environment : an overview**
	Environment- structure, components and typology Ecosystem as part of environment- Functioning and levels of organisation Biodiversity- Classification, value, threats to biodiversity
2	**Natural Resources**
	Definition, importance and classification of natural resources Utilisation and conservation of water, forest, soil and energy resources Issues associated with natural resources
3	**Environment and Economic Activities**
	Economic activities-nature and pattern- primary,secondary and tertiary Environmental problems associated with economic activities Case studies with reference to India
4	**Environment Management**
	Environment management- Concept, need and relevance of environmental education Environmental Impact Assessment, Environmental audit Role of technology in Environment Management- GIS,GPS, Remote sensing as tools

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Core Courses (CC)

7.Computer Skills - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures IncludingPracticals
1	Computer Hardware	10
2	Windows	10
3	Internet	10
4	Word – 2013	15
4	Excel -2013	15
	Total	**60**

Sr. No.	Modules / Units
1	**Computer Hardware**
	Personal Computers- identification/demonstration of different storage Devices like CD and CD drive, hard disk- HDD, storing and retrieving data from various storage devices, identification of various input and output devices. Primary memory, RAM and ROM- Processor- CPU, it's speed- machine cycle, ports, computer buses, Different types of printers. Introduction to trouble shooting of personal computers.
2	**Windows**
	Introduction, features, various versions of windows, My computer, my documents, recycle bin, network neighbourhood, start menu, taskbar, file and folder operation (creating, copying, moving, deleting), system tools, creating shortcuts,
3	**Internet**
	What is internet, most popular internet services , functions of internet like email, WW, FTP, usenet, Instant messaging, internet telephony, using address book, working with task list, scheduling appointments, reminders, events
4	**Word – 2013**
	Getting started, The Word window, New documents, Document navigation, Editing text, Working with text, Undo and Redo commands, Cut, copy, and paste, Find and replace Text formatting, Character formatting, Tab settings, Paragraph formatting, Paragraph spacing and indents Tables, Creating tables, Working with table content, Changing the table structure Page layout, Headers and footers, Page setup Graphics, Adding graphics and clip art, Working with graphics Proofing, printing, and exporting, Spelling and grammar, AutoCorrect, Printing and exporting documents
5	**Excel- 2013**
	Fundamentals of Excel, Cut, Copy, Insert, Delete, Paste Special, Custom Formatting , Undo, Redo, Excel Formulas – Basic, Useful functions and Paste Function, Calc, Comments, Drawing toolbar, Edit, Replace, Delete, Clear, Essential Printing, Data Sorting, Hiding, AutoFormats, Protection, Basic Charts, Basic Formatting, If Function

Revised Syllabus of Courses of B.Com.(Financial Management) Programme at Semester I with effect from the Academic Year 2016-2017

Reference Books

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Financial Accounting - I
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Indian Financial Systems
• *Gordon E. & Natarajan K. Financial Markets & Services, Himalaya Publishing House.* • *Indian Financial System, Machiraju.R.H, Vikas Publishing House.* • *Indian Financial System, Khan M.Y Tata Mcgraw Hill.* • *Financial Institutions and Markets, BholeL.M,TataMcgraw Hill.* • *The Indian Financial System, Desai, Vasantha Himalaya Publishing House.*
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- *Indian Society and Culture, Vinita Padey, Rawat Pub (2016)*
- *Social Problems in India, Ram Ahuja, Rawat Pub (2014)*
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- *National Humana rights commission- disability Manual*
- *Rural, Urban Migration : Trends, challenges & Strategies, S Rajagopalan, ICFAI- 2012*
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- *Urbanisation in India: Challenges, Opportunities & the way forward, I J Ahluwalia, Ravi Kanbur, P K Mohanty, SAGE Pub (2014)*
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- *Politics in India: structure, Process and Policy SubrataMitra, Rouutlege Pub*
- *Politics in India, Rajani Kothari, Orient Blackswan*
- *Problems of Communilism in india, Ravindra Kumar Mittal Pub*
- *Combating communalism in India: Key to National Integration, KawalKishor Bhardwaj, Mittal Pub*

Foundation Course in NSS

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- *University of Mumbai National Service Scheme Manual 2009.*
- *Avhan Chancellor's Brigade - NSS Wing, Training camp on Disaster Preparedness Guidelines, March 2012*
- *RashtriyaSevaYojanaSankalpana - Prof.Dr.SankayChakane, Dr.Pramod\Pabrekar, Diamond Publication, Pune*
- *National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya,*
- *Annual report of National Service Scheme (NSS) published by Dept. of Higher and Technical Education, Mantralaya,*
- *NSS Cell, Dept. of Higher and Technical Education, Mantralaya, UTKARSHA- Socio and cultural guidelines*
- *Case material as a Training Aid for Field Workers, Gurmeet Hans.*
- *Social service opportunities in hospitals, Kapil K. Krishnan, TISS*
- *New Trends in NSS, Research papers published by University of Pune*
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- *Chanakya's 7 Secrets of Leadership, Radhakrishanan Pillai and D.Shivnandhan, Jaico*
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- *The Habit of Winning., Iyer , Prakash, Penguin , India ; 2011*
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- *Freedom Struggle, Chandra Bipin, National Book Trust 1972*
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- *Global Economy and Business Environment by Francis Cherunilam, Himalaya Publication House, Mumbai*
- *Business Environment: Text and Cases by Francis Cherunilam, Himalaya Publication House, Mumbai*
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Revised Syllabus of Courses of B.Com.(Financial Management) Programme at Semester II with effect from the Academic Year 2016-2017

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• *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by LesileChandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai* • *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi* • *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida* • *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi* • *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi* • *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi* • *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, MehulRaithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
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Environmental Science

- *Environmental Geography, Singh, Savindra,PrayagPustakBhavan,*
- *Environmental Geography, GautamAlka,ShardaPustakBhavan, Allahabad,*
- *Environmental Management, Dr Swapan C Deb- Jaico*
- *Principles of Environmental Science, W Cunningham & M Cunningham*
- *Environmental Science, McKinney M.L. &Schoch, Jones & Bartlett*
- *Basics of Environmental Sciences, Allaby M. 2002 ,Routledge, London*
- *Man's Impact on Environment, DetwylerT.R.McGraw-Hill, New York*
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Reference Books
Computer Skills – I
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Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester I and II with effect from the Academic Year 2016-2017

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: **25 %**

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

UNIVERSITY OF MUMBAI
No. UG/ 106 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Com. (Accounting & Finance) degree programme **vide** this office Circular No. UG/28 of 2015 dated 22nd July, 2015 the Principals of affiliated Colleges in Commerce and the Professor-cum- Director, Institute of Distance and Open Learning (IDOL) are hereby informed that the approved by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.77 and that in accordance therewith, the revised syllabus as per Choice Based Credit System for B.Com (Accounting & Finance)for (Sem. I to VI)-Course Structure (Sem. I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

24/10/16.

MUMBAI – 400 032
October, 2016

(Dr.M.A. Khan)
REGISTRAR

To,

The Principals of affiliated Colleges in Commerce and the Professor-cum-Director, Institute of Distance and Open Learning (IDOL).

A.C/4.77 /24/06/2016

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No. UG/106-A of 2016-17 MUMBAI-400 032 25 October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Commerce,
2) The Director, Board of College and University Development,
3) The Controller of Examinations,
4) The Co-Ordinator, University Computerization Centre.

24/10/16.

(Dr.M.A. Khan)
REGISTRAR

PTO..

AC 24-06-2016
Item No. 4.77

University of Mumbai

B.Com. (Accounting & Finance) Programme
Three Year Integrated Programme- Six Semesters
Course Structure

Under Choice Based Credit *System*

To be implemented from Academic Year- 2016-2017 Progressively

Board of Studies-in-Accountancy

B.Com. (Accounting & Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com. (Accounting & Finance)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting (Elements of Financial Accounting) - I	**03**	1	Financial Accounting (Special Accounting Areas) - II	**03**
2	Cost Accounting (Introduction and Element of cost) - I	**03**	2	Auditing (Introduction and Planning) - I	**03**
3	Financial Management (Introduction to Financial Management) - I	**03**	3	Taxation - I (Indirect Taxes I)	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Commerce (Business Environment) - I	**03**	6	Business Law (Business Regulatory Framework) - I	**03**
7	Business Economics - I	**03**	7	Business Mathematics	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

S.Y.B.Com. (Accounting & Finance)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	**Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC) - Skill Enhancement Course (SEC)***		***2***	***Ability Enhancement Courses (AEC) - Skill Enhancement Course (SEC)***	
4	Information Technology in Accountancy - I	**02**	4	Information Technology in Accountancy - II	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
5	Commerce (Financial Market Operations) - II	**03**	5	Management (Introduction to Management) - I	**03**
6	Business Law (Business Regulatory Framework) - II	**03**	6	Business Law (Company Law) - III	**03**
7	Business Economics - II	**03**	7	Research Methodology in Accounting and Finance	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Elective Courses (EC) for Semester III (Any Three)***		*****List of Elective Courses (EC) for Semester IV (Any Three)***	
1	Financial Accounting (Special Accounting Areas) - III	1	Financial Accounting (Special Accounting Areas) - IV
2	Cost Accounting (Methods of Costing) - II	2	Wealth Management
3	Auditing (Techniques of Auditing and Audit Procedures) - II	3	Auditing - III
4	Taxation - II (Indirect Taxes Paper- II)	4	Taxation - III (Indirect Taxes- III)
5	Operation Research	5	Management Accounting (Introduction to Management Accounting) - I
Note: Course selected in Semester III will continue in Semester IV			

T.Y.B.Com. (Accounting & Finance)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Management (Management Applications) - II	**04**	5	Economics (Indian Economy) - III	**04**
3	✓ ***Project Work***		***3***	✓ ***Project Work***	
6	Project Work I	**04**	6	Project Work II	**04**
	Total Credits	**20**		**Total Credits**	**20**

✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 03 credits. A project work may be undertaken in any area of Elective Courses/ study area*

****List of Elective Courses for Semester V (Any Four)***		****List of Elective Courses for Semester VI (Any Four)***	
1	Financial Accounting - V	1	Financial Accounting - VI
2	Cost Accounting - IV	2	Cost Accounting - V
3	Financial Management - II	3	Financial Management - III
4	Taxation - IV (Direct Taxes- I)	4	Taxation - V (Direct Taxes- II)
5	International Finance - I	5	Financial Accounting - VII
6	Financial Analysis and Business Valuation	6	Security Analysis and Portfolio Management
Note: Course selected in Semester V will continue in Semester VI			

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. (Accounting & Finance)
Programme
First Year
Semester I and II

Under Choice Based Credit, Grading and Semester *System*

With effect from Academic Year- 2016-2017

Board of Studies-in-Accountancy

B.Com. (Accounting & Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Accounting & Finance)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting(Elements of Financial Accounting) - I	**03**	1	Financial Accounting(Special Accounting Areas) - II	**03**
2	Cost Accounting (Introduction and Element of cost) - I	**03**	2	Auditing (Introduction and Planning) - I	**03**
3	Financial Management (Introduction to Financial Management) - I	**03**	3	Taxation - I (Indirect Taxes I)	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Commerce (Business Environment) - I	**03**	6	Business Law (Business Regulatory Framework) - I	**03**
7	Business Economics - I	**03**	7	Business Mathematics	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course- I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

B.Com. (Accounting & Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting(Elements of Financial Accounting) - I	**03**
2	Cost Accounting (Introduction and Element of cost) - I	**03**
3	Financial Management (Introduction to Financial Management) - I	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**
2B	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Commerce (Business Environment) - I	**03**
7	Business Economics - I	**03**
	Total Credits	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***	
1	Foundation Course - I
2	Foundation Course in NSS - I
3	Foundation Course in NCC - I
4	Foundation Course in Physical Education - I

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1.Financial Accounting - Elements of Financial Accounting-I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Accounting Standards Issued by ICAI and Inventory Valuation	15
2	Final Accounts	15
3	Departmental Accounts	15
4	Accounting for Hire Purchase	15
	Total	**60**

Sr. No.	Modules / Units
1	**Accounting Standards Issued by ICAI and Inventory Valuation**
	• **Accounting Standards:** Concepts, Benefits, Procedures for Issue of Accounting Standards Various AS: **AS – 1: Disclosure of Accounting Policies** (a) Purpose (b) Areas of Policies (c) Disclosure of Policies (d)Disclosure ofChange in Policies(e) Illustrations **AS – 2: Valuation of Inventories (Stock)** (a) Meaning, Definition (b) Applicability (c) Measurement of Inventory (d) Disclosure inFinal Account(e) Explanation with Illustrations **AS – 9: Revenue Recognition** (a) Meaning and Scope (b) Transactions Excluded (c) Sale of Goods (d) Rendering of Services (e) Effects ofUncertainties (f) Disclosure (g) Illustrations • **Inventory Valuation** Meaning of Inventories Cost for Inventory Valuation Inventory Systems : Periodic Inventory System and Perpetual Inventory System Valuation: Meaning and Importance Methods of Stock Valuation as per AS – 2: FIFO and Weighted Average Method Computation of Valuation of Inventory as on Balance Sheet Date: If Inventory is taken on a Date After the Balance Sheet or Before the Balance Sheet
2	**Final Accounts**
	• Expenditure a) Capital (b) Revenue Receipts a) Capital (b) Revenue • Adjustments and Closing Entries • Final Accounts of Manufacturing Concerns (Proprietary Firm)
3	**Departmental Accounts**
	Meaning Basis of Allocation of Expenses and Incomes / Receipts Inter Departmental Transfer: At Cost Price and Invoice Price Stock Reserve Departmental Trading and Profit and Loss Account and Balance Sheet
4	**Accounting for Hire Purchase**
	Meaning Calculation of Interest Accounting for Hire Purchase Transactions by Asset Purchase Method Based on Full Cash Price Journal Entries, Ledger Accounts and Disclosure in Balance Sheet for Hirer and Vendor (Excluding Default, Repossession and Calculation of Cash Price)

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2.Cost Accounting - Introduction and Elementsof Cost-I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Cost Accounting	15
2	Material Cost	15
3	Labour Cost	15
4	Overheads	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Cost Accounting**
	Evolution Objectives and Scope of Cost Accounting Importance and Advantages of Cost Accounting Difference between Cost Accounting and Financial Accounting Limitations of Financial Accounting Definitions: Cost, Costing and Cost Accounting Classification of Cost on Different Bases Cost Allocation and Apportionment Coding System Essentials of Good Costing System
2	**Material Cost**
	Material Cost: The Concept Material Control Procedure Documentation Stock Ledger, Bin Card Stock Levels Economic Order Quantity (EOQ)
3	**Labour Cost**
	Labour Cost: The Concept Composition of Labour Cost Labour Cost Records Overtime / Idle Time / Incentive Schemes
4	**Overheads**
	Overheads: The Concept Classification of overheads on different bases Apportionment and Absorption of Overheads

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3. Financial Management - Introduction to Financial Management - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Financial Management	12
2	Concepts in Valuation	12
3	Leverage	12
4	Types of Financing	12
5	Cost of Capital	12
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Financial Management**
	Introduction Meaning Importance Scope and Objectives Profit vs Value Maximization
2	**Concepts in Valuation**
	The Time Value of Money Present Value Internal Rate of Return Bonds Returns The Returns from Stocks Annuity Techniques of Discounting Techniques of Compounding
3	**Leverage**
	Introduction EBIT & EPS Analysis Types of Leverages: Operating Leverage, Financial Leverage & Composite Leverage Relationship between Operating Leverage and Financial Leverage (Including Practical Problems)
4	**Types of Financing**
	Introduction Needs of Finance and Sources: Long Term, Medium Term, Short Term Long Term Sources of Finance Short Term Sources of Finance
5	**Cost of Capital**
	Introduction Definition and Importance of Cost of Capital Measurement of Cost of Capital WACC (Including Practical Problems)

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	15
2	Obstacles to Communication in Business World	15
3	Business Correspondence	15
4	Language and Writing Skills	15
	Total	**60**

Sr. No.	Modules / Units
1	**Theory of Communication**
	Concept of Communication: Meaning, Definition, Process, Need, FeedbackEmergence of Communication as a key concept in the Corporate and Global worldImpact of technological advancements on Communication **Channels and Objectives of Communication**: **Channels-** Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine **Objectives of Communication**: Information, Advice, Order and Instruction, Persuasion, Motivation, Education,Warning, and Boosting the Morale of Employees(A brief introduction to these objectives to be given) **Methods and Modes of Communication:** Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	**Obstacles to Communication in Business World**
	Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers **Listening:** Importance of Listening Skills, Cultivating good Listening Skills – 4 **Introduction to Business Ethics:** Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	**Business Correspondence**
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, **Personnel Correspondence:** Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]

Sr. No.	Modules / Units
4	**Language and Writing Skills**
	Commercial Terms used in Business Communication **Paragraph Writing:** Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] **Activities** ▪ Listening Comprehension ▪ Remedial Teaching ▪ Speaking Skills: Presenting a News Item, Dialogue and Speeches ▪ Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. ▪ Reading Comprehension: Analysis of texts from the fields of Commerce and Management

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course -I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity- 1	10
3	Concept of Disparity-2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Indian Society**
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	**Concept of Disparity- 1**
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	**Concept of Disparity-2**
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	**The Indian Constitution**
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	**Significant Aspects of Political Processes**
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NSS**
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level **National Service Scheme(NSS) Regular activities** Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	**Concept of Society and Social Issues in India**
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India **Basic social issues in India** Degeneration of value system, Family system, Gender issues, Regional imbalance
3	**Indian Constitution and Social Justice**
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development **Social Justice** Social Justice- the concept and its features Inclusive growth- the concept and its features
4	**Human Personality and National Integration**
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. **National integration & Communal Harmony** National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NCC, National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training, Environment Awareness and Conservation	10
4	Personality Development and Leadership	10
5	Specialized Subject: Army/ Navy/ Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NCC, National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. • Genesis, Aims, Objectives of NCC & NCC Song • Organisation& Training • Incentives & Benefits • Religions, Culture, Traditions and Customs of India • National Integration: Importance and Necessity • Freedom Struggle
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • General and Words of Command • Attention, Stand at Ease and Stand Easy, Turning and Inclining at the Halt • Sizing, Forming Up in Three Ranks and Numbering, Open and Close Order March and Dressing • Saluting at the Halt, Getting On Parade, Dismissing and Falling Out • Marching, Length of Pace and Time of Marching in Quick Time and Halt, Slow March and Halt • Turning on the March and Wheeling. • Saluting on the March. • Formation of squad and Squad Drill.
3	**Adventure Training, Environment Awareness and Conservation**
	Adventure Training **Desired outcome**: The students will overcome fear & inculcate within them the sense of adventure , sportsmanship , espirit-d-corp and develop confidence , courage , determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing,Scuba Diving etc **Environment Awareness and Conservation** Desired outcome: The student will be aware of the conservation of natural resources and protection of environment. • Natural Resources – Conservation and Management • Water Conservation and Rainwater Harvesting

Sr. No.	Modules / Units
4	**Personality Development and Leadership**
	Desired outcome: The student will develop an all-round personality with adequate leadership traits to deal / contribute effectively in life. • Introduction to Personality Development • Factors Influencing /Shaping Personality: Physical, Social, Physiological, Philosophical and Psychological • Self Awareness Know yourself/ Insight • Change Your Mind Set • Communication Skills: Group Discussion / Lecturettes (Public Speaking) • Leadership Traits • Types of Leadership
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Armed Force** • Basic organisation of Armed Forces • Organisation of Army • Badges and Ranks **B. Introduction to Infantry and weapons and equipments** • Characteristics of 7.62mm SLR Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning **C. Military history** • Biographies of renowned Generals (Carriapa / Sam Manekshaw) • Indian Army War Heroes- PVCs **D. Communication** • Types of Communications • Characteristics of Wireless Technologies (Mobile, Wi-Fi etc.) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • History of the Indian Navy-Pre and Post Independence, Gallantry award winners • Organization of Navy- NHQ, Commands, Fleets, Ships and shore establishments • Types of Warships and their role • Organization of Army and Air Force- Operational and Training commands • Ranks of Officers and Sailors, Equivalent Ranks in the Three Services **B. Ship and Boat Modelling** • Principles of Ship Modelling • Maintenance and Care of tools

Sr. No.	Modules / Units
	C. Search and Rescue • SAR Organization in the Indian ocean **D. Swimming** Floating for three minutes and Free style swimming for 50 meters ***OR*** **AIR** **A. General Service Knowledge** • Development of Aviation • History of IAF **B. Principles of Flight** • Introduction • Laws of Motion • Glossary of Terms. **C. Airmanship** • Introduction • Airfield Layout • Rules of the Air • Circuit Procedure • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Introduction to Aero-engines

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Relevant concepts in Physical Education	10
2	Components of Physical Fitness	15
3	Testing Physical Fitness	10
4	Effect of Exercise on various Body System	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Basic Relevant concepts in Physical Education**
	• Dimensions and determinants of Health, Fitness & Wellness • Concept of Physical Education and its importance • Concept of Physical Fitness and its types • Concept of Physical Activity, exercise and its types & benefits
2	**Components of Physical Fitness**
	• Concept of components of Physical Fitness • Concept and components of HRPF • Concept and components of SRPF • Importance of Physical Education in developing physical fitness components.
3	**Testing Physical Fitness**
	• Tests for measuring Cardiovascular Endurance • Tests for measuring Muscular Strength& Endurance • Tests for measuring Flexibility • Tests for measuring Body Composition
4	**Effect of Exercise on various Body System**
	• Effect of exercises on Musculoskeletal system • Effect of exercises on Circulatory System • Effect of exercises on Respiratory System • Effect of exercises on Glandular System

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

6.Commerce-
Business Environment - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business and its Environment	15
2	Business and Society	15
3	Contemporary Issues	15
4	International Environment	15
	Total	**60**

Sr. No.	Modules / Units
1	**Business and its Environment**
	a) Business Objectives, Dynamics of Business and its Environment, Types of Business Environment b) Environmental Analysis: Importance, Factors, PESTEL Analysis, SWOT Analysis
2	**Business and Society**
	a) Business Ethics: Nature and Scope of Ethics, Ethical Dilemmas, Corporate Culture and Ethical Climate b) Development of Business Entrepreneurship: Entrepreneurship and Economic Development, Micro, Small and Medium Enterprises Development (MSMED) Act, 2006, Entrepreneurship as a Career Option c) Consumerism and Consumer Protection: Consumerism in India, Consumer Protection Act 1986
3	**Contemporary Issues**
	a) Corporate Social Responsibility and Corporate Governance: Social Responsibility of Business, Ecology and Business, Carbon Credit b) Social Audit: Evolution of Social Audit, Benefits of Social Audit, Social Audit v/s Commercial Audit
4	**International Environment**
	a) Strategies for going Global: MNCs and TNCs, WTO b) Foreign Trade in India- Balance of Trade, FDI Investment Flows and its Implication for Indian Industries

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

7.Business Economics - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	10
3	Supply and Production Decisions and Cost of Production	15
4	Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition	15
5	Pricing Practices	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	**Demand Analysis**
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts **Demand estimation and forecasting:** Meaning and significance - methods of demand estimation : survey and statistical methods *(numerical illustrations on trend analysis and simple linear regression)*
3	**Supply and Production Decisions and Cost of Production**
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale. **Cost concepts:** Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run *(hypothetical numerical problems to be discussed)*, LAC and Learning curve - Break even analysis *(with business applications)*
4	**Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition**
	Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under Monopoly **Monopolistic competition:**Equilibrium of a firm under monopolistic competition, debate over role of advertising *(topics to be taught using case studies from real life examples)* **Oligopolistic markets:** key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models *(with practical examples)*
5	**Pricing Practices**
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing *(case studies on how pricing methods are used in business world)*

B.Com. (Accounting & Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting(Special Accounting Areas) - II	**03**
2	Auditing (Introduction and Planning) - I	**03**
3	Taxation - I (Indirect Taxes I)	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Law (Business Regulatory Framework) - I	**03**
7	Business Mathematics	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - II
2	Foundation Course in NSS - II
3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - II

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Elective Courses (EC)

1. Financial Accounting - Special Accounting Areas - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Accounting from Incomplete Records	15
2	Consignment Accounts	15
3	Branch Accounts	15
4	Fire Insurance Claims	15
	Total	**60**

Sr. No.	Modules / Units
1	**Accounting from Incomplete Records**
	Introduction Problems on Preparation of Final Accounts of Proprietary Trading Concern (Conversion Method)
2	**Consignment Accounts**
	Accounting for Consignment Transactions Valuation of Stock Invoicing of Goods at Higher Price (Excluding Overriding Commission, Normal/Abnormal Losses)
3	**Branch Accounts**
	Meaning / Classification of Branches Accounting for Dependent Branch Not Maintaining Full Books Debtors Method Stock and Debtors Method
4	**Fire Insurance Claims**
	Computation of Loss of Stock by Fire Ascertainment of Claim as per the Insurance Policy Exclude: Loss of Profit and Consequential Loss

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2. Auditing - Introduction and Planning - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Auditing	15
2	Audit Planning, Procedures and Documentation	15
3	Auditing Techniques	15
4	Internal Audit	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Auditing**
	• **Basics** Financial Statements, Users of Financial Information, Definition of Auditing, Objectives of Auditing - Primary and Secondary, Expression of Opinion, Detection of Frauds and Errors, Inherent Limitations of Audit • **Errors and Frauds** Concepts, Reasons and Circumstances, Types of Errors -Commission, Omission, Principle and Compensating, Types of Frauds, Risk of Fraud and Error in Audit, Auditor's Duties and Responsibilities in Respect of Fraud • **Principles of Audit** Integrity, Objectivity, Independence, Confidentiality, Skills and Competence, Materiality and Work Performed by Others, Documentation, Planning, Audit Evidence, Accounting System and Internal Control, Audit Conclusions and Reporting • **Types of Audit** Meaning, Advantages and Disadvantages of Balance Sheet Audit, Interim Audit, Continuous Audit, Concurrent Audit, Annual Audit • **Miscellaneous** Advantages of Independent Audit, Qualities of Auditors, Auditing Vs Accounting, Auditing Vs Investigation, View the Concept True and Fair • **Accounting Concepts Relevant to Auditing** Materiality, Going Concern
2	**Audit Planning, Procedures and Documentation**
	• **Audit Planning** Meaning, Objectives, Factors to be Considered, Sources of Obtaining Information, Discussions with Client, Overall Audit Plan • **Audit Programme** Meaning, Factors to be Considered, Advantages, Disadvantages, Overcoming Disadvantages, Methods of Work, Instruction before Commencing Works of Audit, Overall Audit Approach • **Audit working Papers** Meaning, Importance, Factors Determining Form and Contents, Main Functions / Importance, Features, Contents of Permanent Audit File, Temporary Audit File, Ownership, Custody, Access of Other Parties to Audit Working Papers, Auditors Lien on Working Papers, Auditors Lien on Client's Books • **Audit Notebook** Meaning, Structure, Contents, General Information, Current Information and Importance

Sr. No.	Modules / Units
3	**Auditing Techniques**
	• **Test Check** Test Checking Vs Routing Checking, Test Check Meaning, Features, Factors to be Considered, When Test Checks can be Used, Advantages, Disadvantages and Precautions. • **Audit Sampling** Audit Sampling, Meaning, Purpose, Factors in Determining Sample Size - Sampling Risk, Tolerable Error and Expected Error, Methods of Selecting Sample Items Evaluation of Sample Results Auditors Liability in Conducting Audit based on Sample • **Internal Control** Meaning and Purpose, Review of Internal Control, Advantages, Auditors Duties, Review of Internal Control, Inherent Limitations of Internal Control, Internal Control Samples for Sales and Debtors, Purchases and Creditors, Wages and Salaries • **Internal Checks Vs Internal Control, Internal Checks Vs Test Checks**
4	**Internal Audit**
	Meaning, Basic Principles of Establishing Internal Audit, Objectives, Evaluation of Internal Audit by Statutory Auditor, Usefulness of Internal Audit Internal Audit Vs External Audit, Internal Checks Vs Internal Audit

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3. Taxation - Indirect Taxes - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	**Maharashtra Value Added Tax (MVAT), Act 2002:** Introduction	20
2	**Maharashtra Value Added Tax (MVAT), Act 2002**: Registration Procedure and Rules: Section 16	10
3	**Maharashtra Value Added Tax (MVAT), Act 2002:**Audit Section 22 and 61	20
4	**Maharashtra Value Added Tax (MVAT), Act 2002:**Penalty and Interest	10
	Total	**60**

Sr. No.	Modules / Units
1	**Maharashtra Value Added Tax (MVAT), Act 2002:**
	Introduction **Definitions** Section: 2 (4)Businesses; 2 (8)Dealers; 2 (12) Goods; 2 (13)Importer; 2 (15)Manufacturer; 2 (20)Purchase Price; 2 (22)Resale; 2 (24)Sales 2 (25)Sales Price; 2 (27)Service; 2 (33)Turnover of Sales and Rule 3 **Incidence of Levy of Tax** Sec. 3 Incidence of Tax Sec. 4 Tax Payable Sec. 5 Tax Not Leviable on Certain Goods Sec. 6 Levy of Sales Tax on Goods specified in the Schedule Sec. 7 Rate of Tax on Packing Material Sec. 8 Certain Sale and Purchase not Liable for Tax **Payment of Tax and Recovery** Section: 42 - Composition of Tax and Notification 1505/CR-105/Taxation-1 **Set Off, Refund, etc.** Section 48 and 49 Set Off, Refund etc. Along with Rules 52, 53, 54, 55
2	**Maharashtra Value Added Tax (MVAT), Act 2002**: Registration Procedure and Rules: Section 16
3	**Maharashtra Value Added Tax (MVAT), Act 2002:** Audit Section 22 and 61
4	**Maharashtra Value Added Tax (MVAT), Act 2002:** Penalty and Interest

Notes:

1. *The Syllabus is restricted to Study of Particular Sections, Specifically Mentioned Rules and Notifications Only.*
2. *All Modules / Units include Computational Problems / Case Study.*
3. *The Law in force on 1st April Immediately Preceding the Commencement of Academic Year will be Applicable for Ensuing Examinations.*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	15
2	Group Communication	15
3	Business Correspondence	15
4	Language and Writing Skills	15
	Total	**60**

Sr. No.	Modules / Units
1	**Presentation Skills**
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	**Group Communication**
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit **Meetings:**Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions **Conference:**Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele – Conferencing **Public Relations:** Meaning, Functions of PR Department, External and Internal Measures of PR
3	**Business Correspondence**
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) **Only following to be taught in detail:-** Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	**Language and Writing Skills**
	Reports: Parts, Types, Feasibility Reports, Investigative Reports **Summarisation:** Identification of main and supporting/sub points Presenting these in a cohesive manner

Skill Enhancement Courses (SEC)

5. Foundation Course – II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	**45**

Sr. No	Modules /Units
1	**Globalisation and Indian Society**
	Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	**Human Rights**
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	**Ecology**
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation- causes and impact on human life;Sustainable development- concept and components; poverty and environment
4	**Understanding Stress and Conflict**
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	**Managing Stress and Conflict in Contemporary Society**
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course in NSS - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Socio-economic Survey and Special Camp	10
2	Orientation of the College Unit and Communication Skills	15
3	Rapport with Community and Programme Planning	10
4	Government Organisations /Non-Government Organisations	10
	Total	**45**

Sr. No.	Modules / Units
1	**Socio-economic Survey and Special Camp**
	Socio economic survey Socio-economic survey- its meaning and need, Process of Socio-economic survey- design of questionnaire; data collection, data analysis and report writing **Special camping activity** Concept of camp- Identification of community problems- Importance of group living- Team building- Adoption of village- Planning for camp- pre camping, during the course of camp and post camping activities
2	**Orientation of the College Unit and Communication Skills**
	Training and orientation of the program unit in the college Leadership training – formation of need based programmmes- Concept of campus to community(C to C) activities **Communication skills and Documentation** Communication skills- the concept, Verbal, Non-Verbal communication The documentation- Activity Report Writing – basics of NSS accounting – Annual Report – Press note and preparation
3	**Rapport with Community and Programme Planning**
	Working with individual group and community Ice breaking- interaction games – conflict resolution **Program planning** Programme planning- the concept and its features, requirements for successful implementation of program- program flow charting- feedback
4	**Government Organisations /Non-Government Organisations**
	Structure of Government Organisations and Non-Government Organisations Government organisations (GO)- its meaning -Legal set up, functioning, Sources of funding Non-Government organisations (NGO)- its meaning -Legal set up, functioning, Sources of funding National Service Scheme(NSS)- Government organisations (GO) and Non-Government organisations (NGO) **Government schemes for community development** Schemes os Government welfare departments for community development- provisions & examples

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Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	10
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Civil Defence Organisation and Its Duties/ NDMA • Types of Emergencies/ Natural Disaster • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. • 'Avan' model of NCC **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social service and its need, about NGOs and shall participate in community action programmes for betterment of the community. • Basics of Social Service, Weaker Sections of Our Society and Their Needs • Social/ Rural Development Project: MNREGA, SGSY, NSAP etc. • Contribution of Youth towards Social Welfare • Civic Responsibilities • Causes & Prevention of HIV/AIDS; Role of Youth
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Structure and Functioning of the Human Body • Hygiene and Sanitation (Personal and Food Hygiene) • Infectious & Contagious Diseases & Their Prevention
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Attention, Stand at Ease and Stand Easy • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • Ground / Take Up Arms • Present From the Order and Vice-versa • General Salute, Salami Shastra
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • Characteristics of a Rifle / Rifle Ammunition and its Fire Power • Stripping, Assembling, Care and Cleaning and Sight Setting of .22 rifle • Stripping, Assembling, Care and Cleaning of 7.62mm SLR • Loading, Cocking and Unloading • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Introduction to types of Maps and Conventional signs • Scales and Grid system • Topographical forms and technical terms • Relief, contours and Gradients • Cardinal points and Types of North • Types of bearings and use of Service Protractor • Prismatic compass and its use and GPS **B. Field Craft and Battle Craft** • Introduction • Judging distance • Description of ground • Recognition, Description and Indication of landmarks and targets ***OR*** **Navy** **A. `Naval Communication** • Introduction to Naval Modern Communication, Purpose and Principles ▪ Introduction of Naval communication ▪ Duties of various communication sub-departments • Semaphore ▪ Introduction of position of letters and prosigns ▪ Reading of messages ▪ Transmission of messages **B. Seamanship** • **Anchor work** ▪ Parts of Anchor and Cable, their identification • **Rigging** ▪ Types of ropes and breaking strength- stowing, maintenance and securing of ropes ▪ Practical Bends and Hitches: Reef Knot, Half hitch, Clove Hitch, Rolling Hitch, Timber Hitch, Bow Line, Round Turn and Two half hitch and Bow line on the Bight and its basic elements and uses. ▪ Introduction to Shackles, Hooks, Blocks and Derricks, Coiling Down and Splicing of rope **C. Boat work** • Parts of Boat and Parts of an Oar • Instruction on boat Pulling- Pulling orders • Steering of boat under oars, Practical instruction on Boat Pulling, Precautions while pulling

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Aircraft Controls • Landing Gear **B. Instruments** • Basic Flight Instruments **C. Aircraft Particulars** • Aircraft Particulars (Type specific) **D. Aero modelling** • History of Aero modelling • Materials used in Aero modelling • Type of Aero models • Flying/ Building of Aero models

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Development of Fitness	10
2	Health, Fitness and Diseases	15
3	Yoga Education	10
4	Daily Schedule of Achieving Quality of Life and Wellness	10
	Total	**45**

Sr. No.	Modules / Units
1	**Development of Fitness**
	• Benefits of physical fitness and exercise and principles of physical fitness • Calculation of fitness index level 1-4 • Waist-hip ratio Target Heart Rate, BMI and types and principles of exercise (FITT) • Methods of training – continues, Interval, circuit, Fartlek and Plyometric
2	**Health, Fitness and Diseases**
	• Definition of obesity and its management • Communicable diseases, their preventive and therapeutic aspectS • Factors responsible for communicable diseases • Preventive and therapeutic aspect of Communicable and non- communicable diseases
3	**Yoga Education**
	• Meaning and history of yoga • Ashtang yoga and types of yoga • Types of Suryanamaskar and Technique of Pranayam • Benefits of Yoga
4	**Daily Schedule of Achieving Quality of Life and Wellness**
	• Daily schedule based upon one's attitude, gender, age &occupation. • Basic – module: - Time split for rest, sleep, diet, activity & recreation. • Principles to achieve quality of life:- positive attitude, daily regular exercise, control over food habits & healthy hygienic practices.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Core Courses (CC)

6. Business Law - Business Regulatory Framework - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Law of Contract 1872	15
2	Sale of Goods Act 1930	15
3	Negotiable Instrument Act 1881	15
4	Consumer Protection Act 1986	15
	Total	**60**

Sr. No.	Modules / Units
1	**Law of Contract 1872**
	(a) Nature of Contract (b) Classification of Contracts (c) Offer and Acceptance (d) Capacity of Parties to Contract (e) Free Consents (f) Consideration (g) Legality of Object (h) Agreement DeclaredVoid (i) Performance of Contract (j) Discharge of Contract (k) Remedies for Breach of Contract (l) Indemnity (m) Guarantee (n) Bailment and Pledge (o) Agency
2	**Sale of Goods Act 1930**
	(a) Formation of Contract of Sale (b) Goods and their Classifications (c) Price, Conditions and Warranties (d) Transfer of Properties in Goods (e) Performance of Contract of Sales (f) Unpaid Seller and his Rights (g) Sale by Auction (h) Hire Purchase Agreement
3	**Negotiable Instrument Act 1881**
	(a) Definition of Negotiable Instruments (b) Features of Negotiable Instruments (c) Promissory Note (d) Bill of Exchange and Cheque (e) Holder and Holder in due Course (f) Crossing of a Cheque (g) Types of Crossing (h) Dishonour and Discharge of Negotiable Instruments
4	**Consumer Protection Act 1986**
	(a) Salient Features (b) Definition of Consumers (c) Deficiency in Service (d) Defects in Goods

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester II with Effect from the Academic Year 2016-2017

Core Courses (CC)

7.Business Mathematics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Ratio, Proportion and Percentage	15
2	Profit and Loss	15
3	Interest and Annuity	15
4	Shares and Mutual Fund	15
	Total	**60**

Sr. No.	Modules / Units
1	**Ratio, Proportion and Percentage**
	Ratio- Definition, Continued ratio, Inverse Ratio, Proportion - Continued proportion, Direct proportion, Inverse proportion, Variation - Inverse variation, Joint variation Percentage- Meaning and computation of percentage
2	**Profit and Loss**
	Terms and formulae, Trade discount, Cash discount, problems involving cost price, selling price, trade discount, cash discount. Introduction to Commission and brokerage – problems on commission and brokerage
3	**Interest and Annuity**
	Simple interest, compound interest, Equated monthly instalments, reducing balance and flat rate of interest Annuity immediate- present value and future value Stated annual rate and effective annual rate
4	**Shares and Mutual Fund**
	Shares- Concept, face value, market value, dividend, Equity shares, preference shares, bonus shares, Mutual Fund- Simple problems on calculation of net income after considering entry load, exit load, dividend, change in net asset value

Revised Syllabus of Courses of B.Com.(Accounting and Finance) Programme at Semester I with effect from the Academic Year 2016-2017

Reference Books

Reference Books
Financial Accounting - Elements of Financial Accounting - Paper I
• *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by LesileChandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai* • *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi* • *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida* • *Compendium of Statement and Standard of Accounting, ICAI* • *Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Company Accounting Standards by ShrinivasanAnand, Taxman, New Delhi* • *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi* • *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi* • *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi* • *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, MehulRaithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
Cost Accounting - Introduction and Element of Cost - Paper I
• *Lectures on Costing by Swaminathan: S. Chand and Company (P) Ltd., New Delhi* • *Cost Accounting by C.S. Rayudu, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting by JawaharLal and Seema Srivastava, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting by Ravi M. Kishore, Taxmann Ltd., New Delhi* • *Principles and Practices of Cost Accounting by N.K. Prasad, Book Syndicate Pvt. Ltd., Calcutta* • *Cost Accounting Theory and Practice by B.K. Bhar, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting Principles and Practice by M.N. Arora, Vikas Publishing House Pvt. Ltd., New Delhi* • *Advanced Cost and Management Accounting: Problems and Solutions by V.K. Saxena and C.D. Vashist, S. Chand and Company (P) Ltd., New Delhi* • *Cost Accounting by S.P. Jain and K.L. Narang, Kalyani Publishers, Ludhiana* • *Modern Cost and Management Accounting by M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
Financial Management (Introduction to Financial Management) - Paper I
• *Fundamentals of Financial Management by D. Chandra Bose, PHI Learning Pvt. Ltd., New Delhi* • *Fundamentals of Financial Management by Bhabotosh Banerjee, PHI Learning Pvt. Ltd., New Delhi* • *Fundamentals of Financial Management by Vyuptakesh Sharma, Pearson Education, New Delhi* • *Fundamentals of Financial Management by J.C. Van Horne, Prentice Hall of India, New Delhi* • *Financial Management: Text and Problems by M.Y. Khan and P.K. Jain, Tata McGraw Hill, New Delhi* • *Financial Management: Theory and Practice by Prasanna Chandra, Tata McGraw Hill, New Delhi* • *Financial Management by I.M. Pandey, Vikas Publishing House, New Delhi*

Reference Books

Business Communication - I

- *Agarwal, Anju D(1989) A Practical Handbook for Consumers, IBH.*
- *Alien, R.K.(1970) Organisational Management through Communication.*
- *Ashley,A(1992) A Handbook Of Commercial Correspondence, Oxford University Press.*
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- *Health and Hygiene, Manoj. J.S., Agra University Publication*
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- *Indian Contract Act, Sales of Goods Act and Partnership Act by T.R. Desai, Sarkar and Sons Pvt. Ltd., Kolkata*
- *The Negotiable Instrument Act by J.S. Khergamwala, N.M. TripathiPvt. L.td., Mumbai*
- *The Principles of Mercantile Law by Avtar Singh, Eastern Book Company, Lucknow*
- *Business Law by M.C. Kuchal, Vikas Publishing House, New Delhi*
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Revised Syllabus of Courses of B.Com.(Accounting and Finance) Programme at Semester I and II with effect from the Academic Year 2016-2017

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: **25 %**

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

UNIVERSITY OF MUMBAI
No. UG/108 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Com. (Investment Management) degree programme **vide** this office Circular No. UG/23 of 2014 dated 21st July, 2015 the Principals of affiliated Colleges in Commerce are hereby informed that the approved by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.79 and that in accordance therewith, the revised syllabus as per Choice Based Credit System for B.Com (Investment Management)for (Sem. I to VI)-Course Structure (Sem. I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

24/10/16

(Dr.M.A. Khan)
REGISTRAR

MUMBAI – 400 032
October, 2016

To,

The Principals of affiliated Colleges in Commerce and the Heads of recognized Institutions concerned.

A.C/4.79 /24/06/2016

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No. UG/108 -A of 2016-17 MUMBAI-400 032 25 October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Commerce,
2) The Director, Board of College and University Development,
3) The Controller of Examinations,
4) The Professor-cum- Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre.

24/10/16

(Dr.M.A. Khan)
REGISTRAR

PTO..

AC 24-06-2016
Item No. 4.79

University of Mumbai

B.Com. (Investment Management) Programme
Three Year Integrated Programme- Six Semesters
Course Structure

Under Choice Based Credit *System*

To be implemented from Academic Year- 2016-2017 Progressively

Board of Studies-in-Banking & Finance, University of Mumbai

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Investment Management)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Basic of Investment & Wealth Creation	**03**	1	Introduction to Wealth Management	**03**
2	Introduction to Accounting-I	**03**	2	Introduction to Accounting-II	**03**
3	Introduction to Financial System	**03**	3	Introduction to Financial Markets	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication-I	**03**	4	Business Communication-II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Economics-I	**03**	6	Introduction to Financial Intermediaries	**03**
7	Quantitative Techniques	**03**	7	Investment Banking	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

S.Y.B.Com. (Investment Management)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1, 2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	*Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
4	Information Technology in Investment-I	**02**	4	Information Technology in Investment-II	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
5	Introduction to Derivatives	**03**	5	Valuation of Derivatives	**03**
6	Cost & Management Accounting	**03**	6	Business Economics-II	**03**
7	Basics of Contract & Corporate Laws	**03**	7	Investment Laws	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)***		****List of Discipline Related Elective(DRE) Courses for Semester IV (Any Three)***	
1	Investment Banking	1	Financial Management
2	Marketing of Investment Products	2	Actuarial Analysis in Investment
3	Taxation in Investment Management	3	Management of Investment Portfolio
4	Fundamental Analysis	4	Equity Research
5	Study of Investment Strategies	5	Financial Statement Analysis

T.Y.B.Com. (Investment Management)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Fixed Income Analysis-I	**04**	5	Fixed Income Analysis-II	**04**
3	**** Project Work***		***3***	****Project Work***	
6	Project on Internship Training	**04**	6	Project work	**04**
	Total Credits	**20**		**Total Credits**	**20**

Note: *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ study area*

****List of Elective Courses for Semester V (Any Four)***		****List of Elective Courses for Semester VI (Any Four)***	
1	Operation in Equity Market	1	Operations in Currency and Commodity Markets
2	Technical Analysis of Investment	2	Risk Management of Market Risk and Operation Risk
3	Credit Risk Management	3	Ethics in Investment Markets
4	Alternative Investment	4	International Investment Management
5	Treasury Management	5	Venture Capital and Private Equity
6	Behavioural Finance	6	Financial Journalism

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses
of
B.Com. (Investment Management)
Programme
First Year
Semester I and II

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year- 2016-2017)

Board of Studies-in-Banking & Finance, University of Mumbai

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Investment Accounting)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Basic of Investment & Wealth Creation	**03**	1	Introduction to Wealth Management	**03**
2	Introduction to Accounting-I	**03**	2	Introduction to Accounting-II	**03**
3	Introduction to Financial System	**03**	3	Introduction to Financial Markets	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication-I	**03**	4	Business Communication-II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Economics-I	**03**	6	Introduction to Financial Intermediaries	**03**
7	Quantitative Techniques	**03**	7	Investment Banking	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Coursein NSS - II
3	Foundation Coursein NCC - I	3	Foundation Coursein NCC - II
4	Foundation Coursein Physical Education - I	4	Foundation Course inPhysical Education - II
Note: Course selected in Semester I will continue in Semester II			

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	***Elective Courses (EC)***	
1	Basic of Investment & Wealth Creation	**03**
2	Introduction to Accounting-I	**03**
3	Introduction to Financial System	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication-I	**03**
2B	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Economics-I	**03**
7	Quantitative Techniques	**03**
	Total Credits	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***	
1	Foundation Course - I
2	Foundation Course in NSS - I
3	Foundation Course in NCC - I
4	Foundation Course in Physical Education - I

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1.Basic of Investment & Wealth Creation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	General Principles Of Investing	15
2	Financial Mathematics - I	15
3	Financial Mathematics – II	15
4	Risk Profiling of Products and Investors – Asset Allocation	15
	Total	**60**

Sr. No.	Modules / Units
1	**General Principles Of Investing**
	Introduction to Investment, Savings Vs. Investment, Investing Vs. Speculation, Investing Vs. Borrowing, Why is investment necessary, When to Start Investing, **What is meant by interest Rate,**Factors determining interest rates, Simple Interest and Compound Interest, **Investment Objectives** – Setting SMART Goals, **Asset Classes available for investments** – Financial Assets Vs. Non-Financial Assets, Important attributes of Various asset classes – Safety (Risk), Liquidity, Yield. Co-relation between various asset classes **Debt Management** - Purpose, Need and responsibilities, Short Term Debt Vs. Long Term Debt, Fixed Rate Vs. Variable Rate Mortgages, Consumer Loans, Refinancing, Hire Purchase Credit Cards, Leasing **Personal Financial Statement Analysis** Cash inflows and cash outflows, income and Expenditure statement, Budgeting and forecasting, Monitoring budgets and provisions for savings, Personal Balance Sheet and **Forms Of Business Ownership** Sole Proprietorship; Partnership Firm; Limited Liability Partnership; Limited Liability Companies; Trusts; Foundations/Exempt Organizations; Co-operative Societies
2	**Financial Mathematics - I**
	Time Value Of Money Present Value; Net Present Value; Future Value; Annuities – Immediate and Deferred; Growing Annuities and Inflation adjusted Annuities **Calculation of returns** Nominal Rate of Return, Effective Rate of Return, Internal Rate of Return, Holding Period Return (HPR), Compounded Annual rate of Return (CAGR), Real Rate of Return after adjusting for Inflation, Rate of Return after adjusting taxes
3	**Financial Mathematics – II**
	Total Assets – Net Worth and Financial Ratios Net worth and its components, Liquidity Ratios, Debt to income Ratio, debt to financial assets, debt to total assets, savings Ratio **Loan Calculations** EMI Calculation; Loan restructuring – Present Value of future payments; Loan repayment schedules; Loan repayments with varying interest rates; Amortization; Home Equity; Refinancing cost; Fixed EMI Vs. Fixed Tenure.
4	**Risk Profiling of Products and Investors – Asset Allocation**
	Types of Investment Risk Market Risk – Systematic and unsystematic, Inflation Risk, Interest Rate Risk, Credit Risk, Maturity Risk, Liquidity Risk, reinvestment risk, Exchange Rate Risk. Regulatory Risk, Investment Manager (Alpha) Risk, Business Risk **Product Profiling in terms of Risk and Tenure** Short Term Products – Low Returns with Capital Protection Medium Term Products – Inflation beating with adequate Capital protection Long Term Products – Managed Risk for wealth creation in the long term

Sr. No.	Modules / Units
	Risk Profiling of Investor Understanding Investor's investment psychology and investment behaviour; Riskbased on investor'slifestage; Risk based on investors earnings, income generation and assets; Risk Tolerance – risk capacity and risk appetite; classifying investors as per their risk profile; matching products to investors risk profile and tenure of goals **Asset Allocation** Asset Allocation – Base of Investment Planning; Asset Classes – Equity, Debt, Cash. Precious metals; Expected rate of return; Goal Specific Asset Allocation; Change of asset allocation while approaching goals; Selection of asset mix as per clients goals **Types of Asset Allocation Strategies** Strategic, Tactical and Life Stage asset allocation **Wealth Creation – Factors and Principles** Income and Savings Ratio; Allocation of savings to asset classes; Consistency in savings and monitoring; Taking advantage of opportunities in various asset classes; Overall effective yield and tax aspects; Wealth protection and wealth erosion

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2. Introduction to Accounting-I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Accounting	15
2	Classification of Income & Expenses & Accounting Standards	15
3	Final Accounts	15
4	Hire purchase	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Accounting**
	Meaning and scope of Accounting Need, development and definition ofaccounting,Branches of accounting, Objectives of accounting.Basic accounting terms, accounting concept& conventions, Disclosures: Accounting Principles: International accounting standards (only routines). Accounting standards in India: Concepts, Benefits, Procedures for Issue of Accounting Standards.Various AS: **AS – 1: Disclosure of Accounting Policies** (a) Purpose (b) Areas of Policies (c) Disclosure of Policies (d) Disclosure ofChange in Policies(e) Illustrations **AS – 2: Valuation of Inventories (Stock)** (a) Meaning, Definition (b) Applicability (c) Measurement of Inventory (d) Disclosure inFinal Account(e) Explanation with Illustrations **AS – 9: Revenue Recognition** (a) Meaning and Scope (b) Transactions Excluded (c) Sale of Goods (d) Rendering of Services (e) Effects ofUncertainties (f) Disclosure (g) Illustrations
2	**Classification of Income & Expenses & Accounting Standards**
	Accounting Transactions: Accounting Cycle; Journal; Rules of debit and credit Compound journal entry; Opening entry; Relationship between journal and Ledger, Rules regarding posting; Tribal balance Sub division of journal. Capital & Revenue: Classification of Income; Classification of Expenditure Classification of receipts. Accounting concept of income; Sources Documents, Bank Reconciliation Statement
3	**Final Accounts**
	Final accounts; Manufacturing account; Trading account, Profit and Loss account, Balance sheet, Adjustment entries
4	**Hire purchase**
	Meaning, Calculation of Interest, Accounting for Hire Purchase Transactions by Asset Purchase Method Based on Full Cash Price, Journal Entries, Ledger Accounts and Disclosure in Balance Sheet for Hirer and Vendor

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3.Introduction to Financial System

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	An introduction to the financial system	15
2	Intermediation versus non intermediation	15
3	Financial institutions and Financial services	15
4	Financial regulators and Financial instruments	15
	Total	**60**

Sr. No.	Modules / Units
1	**An introduction to the financial system**
	• Overview of financial system • Functions of a financial system • Evolution of financial systems (bank oriented to capital market oriented) • Financial systems in India compared with those in developed nations and developing nations • Constituents of the financial system and interrelationships between various components
2	**Intermediation versus non intermediation**
	• **Intermediation versus non intermediation** ▪ Intermediation: definition, role, features, mediums ▪ Non-intermediation: definition, role, features, mediums, how non intermediaries support intermediation. • **Financial markets** ▪ Kinds of financial markets (multiple ways to classify markets) ▪ Features, Role and functions of each market ▪ Size, Structure, participants and importance of each market
3	**Financial institutions and Financial services**
	• **Financial institutions** ▪ Kinds of financial institutions ▪ Intermediary financial institutions and non-intermediary financial institutions ▪ Features, Role and functions of each kind of institution ▪ Size, Structure, participants and importance of each kind of institution • **Financial services** ▪ Meaning and features of financial services ▪ Role and functions of financial services ▪ Kinds of financial services: Intermediation based i.e. fund ▪ Kinds of financial services: Non Intermediation based i.e. fee ▪ A table showing the institutions and services offered
4	**Financial regulators and Financial instruments**
	• **Financial regulators** ▪ Meaning and features of financial regulators ▪ Role and functions of financial regulators ▪ Kinds of financial regulators ▪ A table showing the various regulators, the markets they regulate • **Financial instruments** ▪ Meaning and classification of financial instruments (multiple ways of classifying financial instruments) ▪ Types of financial instruments ▪ Evaluation of financial instruments (risk return trade-off) ▪ Characteristics of financial instruments ▪ New financial instruments

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester I with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	15
2	Obstacles to Communication in Business World	15
3	Business Correspondence	15
4	Language and Writing Skills	15
	Total	**60**

Sr. No.	Modules / Units
1	**Theory of Communication**
	Concept of Communication: Meaning, Definition, Process, Need, Feedback Emergence of Communication as a key concept in the Corporate and Global world Impact of technological advancements on Communication **Channels and Objectives of Communication**: **Channels-** Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine **Objectives of Communication**: Information, Advice, Order and Instruction, Persuasion, Motivation, Education, Warning, and Boosting the Morale of Employees (A brief introduction to these objectives to be given) **Methods and Modes of Communication:** Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	**Obstacles to Communication in Business World**
	Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers **Listening:** Importance of Listening Skills, Cultivating good Listening Skills – 4 **Introduction to Business Ethics:** Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	**Business Correspondence**
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, **Personnel Correspondence:** Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]

Sr. No.	Modules / Units
4	**Language and Writing Skills**
	Commercial Terms used in Business Communication **Paragraph Writing:** Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] **Activities** ▪ Listening Comprehension ▪ Remedial Teaching ▪ Speaking Skills: Presenting a News Item, Dialogue and Speeches ▪ Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. ▪ Reading Comprehension: Analysis of texts from the fields of Commerce and Management

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Skill Enhancement Courses (SEC)

5. Foundation Course -I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity- 1	10
3	Concept of Disparity-2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Indian Society**
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	**Concept of Disparity- 1**
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	**Concept of Disparity-2**
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	**The Indian Constitution**
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	**Significant Aspects of Political Processes**
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

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Skill Enhancement Courses (SEC)

5.Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NSS**
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level **National Service Scheme(NSS) Regular activities** Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	**Concept of Society and Social Issues in India**
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India **Basic social issues in India** Degeneration of value system, Family system, Gender issues, Regional imbalance
3	**Indian Constitution and Social Justice**
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development **Social Justice** Social Justice- the concept and its features Inclusive growth- the concept and its features
4	**Human Personality and National Integration**
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. **National integration & Communal Harmony** National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

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Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NCC, National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training, Environment Awareness and Conservation	10
4	Personality Development and Leadership	10
5	Specialized Subject: Army/ Navy/ Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NCC, National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. • Genesis, Aims, Objectives of NCC & NCC Song • Organisation& Training • Incentives & Benefits • Religions, Culture, Traditions and Customs of India • National Integration: Importance and Necessity • Freedom Struggle
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • General and Words of Command • Attention, Stand at Ease and Stand Easy, Turning and Inclining at the Halt • Sizing, Forming Up in Three Ranks and Numbering, Open and Close Order March and Dressing • Saluting at the Halt, Getting On Parade, Dismissing and Falling Out • Marching, Length of Pace and Time of Marching in Quick Time and Halt, Slow March and Halt • Turning on the March and Wheeling. • Saluting on the March. • Formation of squad and Squad Drill.
3	**Adventure Training, Environment Awareness and Conservation**
	Adventure Training **Desired outcome**: The students will overcome fear & inculcate within them the sense of adventure , sportsmanship , espirit-d-corp and develop confidence , courage , determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing,Scuba Diving etc **Environment Awareness and Conservation** Desired outcome: The student will be aware of the conservation of natural resources and protection of environment. • Natural Resources – Conservation and Management • Water Conservation and Rainwater Harvesting

Sr. No.	Modules / Units
4	**Personality Development and Leadership**
	Desired outcome: The student will develop an all-round personality with adequate leadership traits to deal / contribute effectively in life. • Introduction to Personality Development • Factors Influencing /Shaping Personality: Physical, Social, Physiological, Philosophical and Psychological • Self Awareness Know yourself/ Insight • Change Your Mind Set • Communication Skills: Group Discussion / Lecturettes (Public Speaking) • Leadership Traits • Types of Leadership
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Armed Force** • Basic organisation of Armed Forces • Organisation of Army • Badges and Ranks **B. Introduction to Infantry and weapons and equipments** • Characteristics of 7.62mm SLR Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning **C. Military history** • Biographies of renowned Generals (Carriapa / Sam Manekshaw) • Indian Army War Heroes- PVCs **D. Communication** • Types of Communications • Characteristics of Wireless Technologies (Mobile, Wi-Fi etc.) ***OR*** **Navy** **A. Naval orientation and service subjects** • History of the Indian Navy-Pre and Post Independence, Gallantry award winners • Organization of Navy- NHQ, Commands, Fleets, Ships and shore establishments • Types of Warships and their role • Organization of Army and Air Force- Operational and Training commands • Ranks of Officers and Sailors, Equivalent Ranks in the Three Services **B. Ship and Boat Modelling** • Principles of Ship Modelling • Maintenance and Care of tools

Sr. No.	Modules / Units
	C. Search and Rescue • SAR Organization in the Indian ocean **D. Swimming** Floating for three minutes and Free style swimming for 50 meters ***OR*** **AIR** **A. General Service Knowledge** • Development of Aviation • History of IAF **B. Principles of Flight** • Introduction • Laws of Motion • Glossary of Terms. **C. Airmanship** • Introduction • Airfield Layout • Rules of the Air • Circuit Procedure • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Introduction to Aero-engines

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Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Relevant concepts in Physical Education	10
2	Components of Physical Fitness	15
3	Testing Physical Fitness	10
4	Effect of Exercise on various Body System	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Basic Relevant concepts in Physical Education**
	• Dimensions and determinants of Health, Fitness & Wellness • Concept of Physical Education and its importance • Concept of Physical Fitness and its types • Concept of Physical Activity, exercise and its types & benefits
2	**Components of Physical Fitness**
	• Concept of components of Physical Fitness • Concept and components of HRPF • Concept and components of SRPF • Importance of Physical Education in developing physical fitness components.
3	**Testing Physical Fitness**
	• Tests for measuring Cardiovascular Endurance • Tests for measuring Muscular Strength& Endurance • Tests for measuring Flexibility • Tests for measuring Body Composition
4	**Effect of Exercise on various Body System**
	• Effect of exercises on Musculoskeletal system • Effect of exercises on Circulatory System • Effect of exercises on Respiratory System • Effect of exercises on Glandular System

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Core Courses (CC)

6.Business Economics- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	10
3	Supply and Production Decisions and Cost of Production	15
4	Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition	15
5	Pricing Practices	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	**Demand Analysis**
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts **Demand estimation and forecasting:** Meaning and significance - methods of demand estimation : survey and statistical methods *(numerical illustrations on trend analysis and simple linear regression)*
3	**Supply and Production Decisions and Cost of Production**
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale. **Cost concepts:** Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run *(hypothetical numerical problems to be discussed)*, LAC and Learning curve - Break even analysis *(with business applications)*
4	**Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition**
	Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under Monopoly **Monopolistic competition:** Equilibrium of a firm under monopolistic competition, debate over role of advertising. *(topics to be taught using case studies from real life examples)* **Oligopolistic markets:** key attributes of oligopoly - Collusive and non-collusive oligopoly market - Price rigidity - Cartels and price leadership models *(with practical examples)*
5	**Pricing Practices**
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing *(case studies on how pricing methods are used in business world)*

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Core Courses (CC)

7. Quantitative Techniques

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction, Organising, Data, Frequency Distribution, Data Representation	10
2	Measures of Central Tendencies	10
3	Measures of Dispersion	10
4	Correlation and Regression	10
5	Investment Analysis	10
6	Concept of real functions and Derivatives	10
Total		**60**

Sr. No.	Modules / Units
1	**Introduction, Organising, Data, Frequency Distribution, Data Representation**
	Introduction to Statistics: Definition, Uses in business and management with limitations. **Data:** Types of data their different methods of collection, Census and sample survey. **Presentation of data:**Tabular form, frequency distribution and graphical representation of data.(Frequency curve,polygon, ogive curve Histogram).
2	**Measures of Central Tendencies**
	Arithmetic mean, median and mode, geometric mean with their applications in financial institutions and limitations
3	**Measures of Dispersion**
	Absolute measures – Range,QuartileDeviation,Mean deviation and standard deviation.Coeff.of range, Coeff.of Quartile deviation and Coeff. of variations with their utility and limitations in business and management
4	**Correlation and Regression**
	Karl Pearson's Coeff.of correlation, Coeff. of determination r^2, Spearman's rank Coeff. of correlation, Regression equations their uses in forecasting.
5	**Investment Analysis**
	Financial mathematics. Simple interest,compound interest-nominal rate effective rate and continuous compounding. Immediate ordinary annuity, its present value and future value. Equated monthly installments (EMI) using reducing interest system amortization of loans and sinking funds.Depreciation of assets.
6	Concept of real functions and Derivatives
	Concept of real functions: constant functions, linear functions, x^n,e^x,a^x,logx **Derivatives and their applications:** Derivative as a measure of rate. Different types of derivatives of a function. Rules of derivatives multiplication and quotient rule. Second order derivatives. Application of derivatives marginal cost marginal revenue, elasticity of demand, maxima and minima for functions in economics and business and commerce, management etc.

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***	
1	Introduction to Wealth Management	**03**
2	Introduction to Accounting-II	**03**
3	Introduction to Financial Markets	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication-II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Introduction to Financial Intermediaries	**03**
7	Investment Banking	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - II
2	Foundation Course in NSS - II
3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - II

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Elective Courses (EC)

1.Introduction to Wealth Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Wealth management	15
2	Role of Insurance in Wealth Management	15
3	Retirement Planning	15
4	Estate Planning	15
	Total	**60**

Sr. No.	Modules / Units
1	**Overview of Wealth management**
	Introduction to Wealth management Definition of Wealth management; understanding wealth management; wealth management process; phases in wealth management process; wealth management market in India **Holistic Planning Framework** Sources of wealth; human Capital; Financial Capital; Financial Life Cycle; Working Life – Pre-family independence; Family; Pre-retirement; Retirement – Active retirement; Passive Retirement; Elderly Care; Retirement related risk – risk identification; Market Risk, Asset Allocation Risk, Interest Rate Risk, Inflation Risk, Health/liquidity risk, Longevity Risk **The Financial Planning process** Establish and define the relationship with the client; Personal Fact Finding; Analyze Client's financial status, Risk profile and determine financial goals; Develop financial planning recommendation and present it to client; Implement client's financial planning recommendations; Monitor and review the client's situation **Asset Classes** Debt as an asset class; Role of debt in wealth management; risk of investing in debt securities; Equity as an asset class – investing in stocks
2	**Role of Insurance in Wealth Management**
	Analysis of Live Cover, Strategies and Products Assessment and identification of Risk Cover – Gathering data on current Life Insurance Cover; Identifying clients life insurance needs Analysis of Life Insurance Needs – Economic Value of human life; Replacement of the future income of the insured; Replacement of the expenses and financial liabilities of the insured; provision in the life cover of certain financial goals and financial liabilities; Review of coverage for changes in income, assets and financial liabilities **Life Insurance** Types of Life Insurance Policies - Term Insurance; Whole Life Insurance: Endowment Policy; Investment Linked Insurance (ULIP); Insurance Linked annuities; Life insurance Policy riders Calculation of Claim amount and other benefits – Types of Bonus; Maturity Claim; Death Claim; Surrender Value; Return on Savings Component; Taxation aspect of various insurance Policies **General Insurance** Health Insurance and Accident Insurance – Individual Vs. Family floater Policy; Critical Illness policy; Group health Insurance; Personal and group accident Insurance; Personal Disability Insurance – Permanent and Temporary, Partial and

Sr. No.	Modules / Units
	Total; Scope of benefits – long term and short term disability; Property and Liability Insurance – basis of property cover – Reinstatement, Book or Market Value; Insuring House, Household items, business unit, plant and machinery; personal Umbrella Policy; miscellaneous oversees travel insurance; Motor Insurance – Comprehensive and Mandatory Third party coverage; No claim Bonus and claims **Other business specific Insurance** – professional Indemnity Insurance; Keyman Insurance; Marine Insurance, Cargo and Hull Insurance; Inland Transit Insurance **Introduction to the following Acts** Insurance Regulatory and Development Authority(IRDA)Act-1999; TheInsuranceAct-1938; PublicLiabilityInsuranceAct-1991; MotorVehicleAct-1988 EmployeeStateInsuranceAct-1948
3	**Retirement Planning**
	Employee Benefits and Superannuation Benefits Employee Benefits – Salary and Bonus; Reimbursement of expenses; Health Benefits; Group Insurance; LTA, TA, Concessional Loans Defined Benefit Plans and Limitations – Characteristics of DB Plans, Types of Defined Benefit Plans, their Features, Applicability and withdrawal norms, Taxability Defined Contribution Plans and Limitations – Characteristics of DC Plans, Types of Defined contribution Plans, their features, Applicability. And withdrawal norms, taxability Superannuation benefits and schemes –Trust Funds, Private Fund Managers, and Insurance Companies, Benefits - on retirement, Voluntary retirement and Death **Retirement Needs and Factors in retirement Planning** Introduction to retirement planning - Significance of retirement planning; Purpose and need of retirement planning; Role of Wealth planner in retirement planning; Importance of starting early; Analysis of Client's Life Cycle – Early earning stage and established earning stage; stability and visibility of earnings; Accumulation and Distribution phase; Life Expectancy Vs. Retirement age; Early Vs. Delayed retirement; Risk of living longer than expected; Factors considered in retirement planning – Nature of Income; salaried, bonus and self-employed; standard of living; time horizon; inflation in accumulation and distribution phase; profile of assets sustainable till retirement; income generating potential of fixed assets; liquidity aspects of fixed and other assets; Profile of financial and other liabilities nearing retirement Analysis of client's retirement needs – Estimating household expenses on retirement; Corpus estimated to meet post retirement needs; Alternate

Sr. No.	Modules / Units
	arrangements for supplementing retirement corpus; cost of escalation of medical expenses in post-retirement; charitable activities and social work **Retirement Planning Process** Ascertain client's current primary household expenses; Estimate average expected inflation rate pre and post-retirement; Estimate client's expenses post-retirement; Ascertain client's income from fixed assets/other sources post-retirement; Estimate client couple's life expectancy; Estimate basic corpus accommodating client's other special purposes; Ear mark client's non-liquid/non-consumption assets and their future value; Estimate Net Corpus to be accumulated; Ascertain client's current sources of income and saving potential; Prioritize investible surplus in various financial goals including retirement;Ascertain risk profile of client and changes with life stages; Ascertain risk capacity as per age and asset profile; Ascertain client's Asset Allocation to create retirement corpus; Optimize rate of return from the chosen Asset Classes **Income Streams during Retirement –** Employer Provided superannuation plans; Provident Fund; Public Provident Fund; Small Savings Schemes; NPS; Pension Plans from MF's and Insurance Companies; Reverse Mortgage to supplement post retirement expenses.
4	**Estate Planning**
	Estate PlanningOverview–Theconceptof EstatePlanning; PurposeandNeed of EstatePlanning; RisksandDrawbacks involvedin Estate Planning; Hindu andIndian Succession Act;Succession-Testate andIntestate **Estate PlanningProcess –** Collectcomprehensiveinformationandexaminecircumstancestoset Estateplanning goals;Determinevalueofclient'sestateandliquidity aspects; Estimatecostoftransferand other expenses; Developaplan oftransfer; Implement planandreviewperiodically **MethodsofEstatePlanning -** Will; Trust; Insurance; Gift; Power ofAttorney; Transfer ofpropertyandpartition **Will –CharacteristicsandContentsofaWill**; Types of Will-Unprivileged, Privileged, Joint, Mutual and Conditional; Legal requirements and Testamentary capacity; Modifying or revokingWill; Probate Process **Powers of Attorney –** Use and purpose; Types-General and Special; Revocation; Role of the executor Trust - Classification of Trust – Revocable and Irrevocable **Characteristics of Trust**– Discretionary and Determinate; Different types of a family trust; Family trust V/s Will; Parties to Trust; Rules relating to perpetuities; Other Provisions

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Elective Courses (EC)

2.Introduction to Accounting-II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Investment Accounting w.r.t AS 13	15
2	Foreign currency transactions vide AS 11	15
3	Accounts of Non–Trading Institutions & Service Industries	15
4	Issue of Shares and Debentures, Redemption of Preference shares	15
	Total	**60**

Sr. No.	Modules / Units
1	**Investment Accounting w.r.t AS 13**
	For shares (variable income bearing securities) For debenture bonds etc. (fixed income bearing securities) Accounting for transactions of purchase and sales of investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method Columnar format for investment account
2	**Foreign currency transactions vide AS 11**
	Accounting for translation of foreign currency transactions vide AS 11 (excluding foreign branches and forward exchange contracts and hedging contracts) “In relation to purchase and sale of goods, services and assets and loan and credittransactions." Computation and treatment of exchange differences
3	**Accounts of Non–Trading Institutions & Service Industries**
4	**Issue of Shares and Debentures, Redemption of Preference shares**

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Elective Courses (EC)

3. Introduction to Financial Markets

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	An introduction to the financial markets	20
2	Capital markets and Money markets	10
3	Foreign exchange markets, Commodity markets and Derivative markets	20
4	Market exchanges and Market regulators	10
	Total	**60**

Sr. No.	Modules / Units
1	**An introduction to the financial markets**
	• Overview of financial markets • of a financial markets • Structure of financial markets (multiple ways to classify markets Functions) • Capital formation process through markets
2	**Capital markets and Money markets**
	• **Capital markets:** Meaning, classification and structure, Various sub-segments of the market, Role played by the capital market, Capital market instruments, Participants in these markets, Various capital market regulators, Advantages and drawbacks • **Money markets:** Meaning, classification and structure, Various sub-segments of the market, Role played by the money market, Capital market instruments, Participants in these markets, Various money market regulators, Advantages and drawbacks
3	**Foreign exchange markets, Commodity markets and Derivative markets**
	• **Foreign exchange markets:** Meaning, classification and structure, Role played by the forex market, Capital market instruments, Participants in these markets, Various market regulators, Advantages and drawbacks, The link between exchange rates, forex markets and the currency reserves of a country • **Commodity markets:** Meaning, classification and structure, Functions of the commodity market, Debate on commodity market as a financial market, Evolution of the commodity market, Structure and working of the market, Regulation of the market, Advantages and drawbacks • **Derivative markets:** Meaning, classification and structure, Functions of the derivative market, Evolution of the derivative market, Structure and working of the market, Regulation of the market, Advantages and drawbacks
4	**Market exchanges and Market regulators**
	• **Market exchanges:** Types of exchanges, Role played by exchanges, NSE, BSE, MCX, OTCEI • **Market regulators:** SEBI

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Ability Enhancement Courses (AEC)

4. Business Communication - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	15
2	Group Communication	15
3	Business Correspondence	15
4	Language and Writing Skills	15
	Total	**60**

Sr. No.	Modules / Units
1	**Presentation Skills**
	Presentations:(to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	**Group Communication**
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit **Meetings:** Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions **Conference:** Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele – Conferencing **Public Relations:** Meaning, Functions of PR Department, External and Internal Measures of PR
3	**Business Correspondence**
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) **Only following to be taught in detail:-** Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	**Language and Writing Skills**
	Reports: Parts, Types, Feasibility Reports, Investigative Reports **Summarisation:** Identification of main and supporting/sub points Presenting these in a cohesive manner

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Skill Enhancement Courses (SEC)

5. Foundation Course – II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	**45**

Sr. No	Modules /Units
1	**Globalisation and Indian Society**
	Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	**Human Rights**
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	**Ecology**
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation- causes and impact on human life;Sustainable development- concept and components; poverty and environment
4	**Understanding Stress and Conflict**
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	**Managing Stress and Conflict in Contemporary Society**
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course in NSS - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Socio-economic Survey and Special Camp	10
2	Orientation of the College Unit and Communication Skills	15
3	Rapport with Community and Programme Planning	10
4	Government Organisations /Non-Government Organisations	10
	Total	**45**

Sr. No.	Modules / Units
1	**Socio-economic Survey and Special Camp**
	Socio economic survey Socio-economic survey- its meaning and need, Process of Socio-economic survey- design of questionnaire; data collection, data analysis and report writing **Special camping activity** Concept of camp- Identification of community problems- Importance of group living- Team building- Adoption of village- Planning for camp- pre camping, during the course of camp and post camping activities
2	**Orientation of the College Unit and Communication Skills**
	Training and orientation of the program unit in the college Leadership training – formation of need based programmmes- Concept of campus to community(C to C) activities **Communication skills and Documentation** Communication skills- the concept, Verbal, Non-Verbal communication The documentation- Activity Report Writing – basics of NSS accounting – Annual Report – Press note and preparation
3	**Rapport with Community and Programme Planning**
	Working with individual group and community Ice breaking- interaction games – conflict resolution **Program planning** Programme planning- the concept and its features, requirements for successful implementation of program- program flow charting- feedback
4	**Government Organisations /Non-Government Organisations**
	Structure of Government Organisations and Non-Government Organisations Government organisations (GO)- its meaning -Legal set up, functioning, Sources of funding Non-Government organisations (NGO)- its meaning -Legal set up, functioning, Sources of funding National Service Scheme(NSS)- Government organisations (GO) and Non-Government organisations (NGO) **Government schemes for community development** Schemes os Government welfare departments for community development- provisions & examples

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Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	10
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Civil Defence Organisation and Its Duties/ NDMA • Types of Emergencies/ Natural Disaster • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. • 'Avan' model of NCC **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social service and its need, about NGOs and shall participate in community action programmes for betterment of the community. • Basics of Social Service, Weaker Sections of Our Society and Their Needs • Social/ Rural Development Project: MNREGA, SGSY, NSAP etc. • Contribution of Youth towards Social Welfare • Civic Responsibilities • Causes & Prevention of HIV/AIDS; Role of Youth
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Structure and Functioning of the Human Body • Hygiene and Sanitation (Personal and Food Hygiene) • Infectious & Contagious Diseases & Their Prevention
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Attention, Stand at Ease and Stand Easy • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • Ground / Take Up Arms • Present From the Order and Vice-versa • General Salute, Salami Shastra
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • Characteristics of a Rifle / Rifle Ammunition and its Fire Power • Stripping, Assembling, Care and Cleaning and Sight Setting of .22 rifle • Stripping, Assembling, Care and Cleaning of 7.62mm SLR • Loading, Cocking and Unloading • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Introduction to types of Maps and Conventional signs • Scales and Grid system • Topographical forms and technical terms • Relief, contours and Gradients • Cardinal points and Types of North • Types of bearings and use of Service Protractor • Prismatic compass and its use and GPS **B. Field Craft and Battle Craft** • Introduction • Judging distance • Description of ground • Recognition, Description and Indication of landmarks and targets ***OR*** **Navy** **A. Naval Communication** • Introduction to Naval Modern Communication, Purpose and Principles ▪ Introduction of Naval communication ▪ Duties of various communication sub-departments • Semaphore ▪ Introduction of position of letters and prosigns ▪ Reading of messages ▪ Transmission of messages **B. Seamanship** • **Anchor work** ▪ Parts of Anchor and Cable, their identification • **Rigging** ▪ Types of ropes and breaking strength- stowing, maintenance and securing of ropes ▪ Practical Bends and Hitches: Reef Knot, Half hitch, Clove Hitch, Rolling Hitch, Timber Hitch, Bow Line, Round Turn and Two half hitch and Bow line on the Bight and its basic elements and uses. ▪ Introduction to Shackles, Hooks, Blocks and Derricks, Coiling Down and Splicing of rope **C. Boat work** • Parts of Boat and Parts of an Oar • Instruction on boat Pulling- Pulling orders • Steering of boat under oars, Practical instruction on Boat Pulling, Precautions while pulling

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Aircraft Controls • Landing Gear **B. Instruments** • Basic Flight Instruments **C. Aircraft Particulars** • Aircraft Particulars (Type specific) **D. Aero modelling** • History of Aero modelling • Materials used in Aero modelling • Type of Aero models • Flying/ Building of Aero models

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Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Development of Fitness	10
2	Health, Fitness and Diseases	15
3	Yoga Education	10
4	Daily Schedule of Achieving Quality of Life and Wellness	10
	Total	**45**

Sr. No.	Modules / Units
1	**Development of Fitness**
	• Benefits of physical fitness and exercise and principles of physical fitness • Calculation of fitness index level 1-4 • Waist-hip ratio Target Heart Rate, BMI and types and principles of exercise (FITT) • Methods of training – continues, Interval, circuit, Fartlek and Plyometric
2	**Health, Fitness and Diseases**
	• Definition of obesity and its management • Communicable diseases, their preventive and therapeutic aspectS • Factors responsible for communicable diseases • Preventive and therapeutic aspect of Communicable and non- communicable diseases
3	**Yoga Education**
	• Meaning and history of yoga • Ashtang yoga and types of yoga • Types of Suryanamaskar and Technique of Pranayam • Benefits of Yoga
4	**Daily Schedule of Achieving Quality of Life and Wellness**
	• Daily schedule based upon one's attitude, gender, age &occupation. • Basic – module: - Time split for rest, sleep, diet, activity & recreation. • Principles to achieve quality of life:- positive attitude, daily regular exercise, control over food habits & healthy hygienic practices.

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Core Courses (CC)

6.Introduction to Financial Intermediaries

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Basics of Financial Intermediaries	15
2	Taxonomy of Financial Intermediaries	15
3	Theories and Management of Financial Intermediation	15
4	Future Trends	15
	Total	**60**

Sr. No.	Modules / Units
1	**Basics of Financial Intermediaries**
	• Definition of Financial System • Meaning of Financial Intermediaries • Need for financial intermediation in the Financial System • Role and functions of Financial Intermediaries • Benefits of Financial Intermediaries (w. r. t economies of Scale) • Implication of financial intermediation (effect on economic development , Hirshliefer Model) • Registration of Financial Intermediaries
2	**Taxonomy of Financial Intermediaries**
	Taxonomy of Financial Intermediaries(Banks, Credit Unions, Financial Advisors and Brokers, Insurance Companies, Investment Schemes and Mutual Funds , Pension funds , Non Banking Financial Companies ,Financial Institution – IDFC, ILFS, PFC, NABARD, SIDBI) Credit Rating Agencies – Role and Importance
3	**Theories and Management of Financial Intermediation**
	Theories of Financial Intermediation • Transaction costs • Liquidity insurance • Information asymmetry **Management of Financial Intermediaries and Issues pertaining to** • Performance measurement • ALM for liquidity risk • Credit Risk • Interest Rate Risks • Regulation of DMAT
4	**Future Trends**
	• Financial Intermediaries – Global Perspective • Future and Challenges in Financial Intermediaries

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester II with Effect from the Academic Year 2016-2017

Core Courses (CC)

7.Investment Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction of Investment Banking	15
2	Concepts of Investment Banking	15
3	Risk and Return	15
4	Investment Banking Activities	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction of Investment Banking**
	Investment its meaning and scope, types of asset classes, asset allocation, creating portfolio and process of portfolio management
2	**Concepts of Investment Banking**
	Investment banking concepts, Private placement methods, role of venture capital firms in raising funds, due diligence methods
3	**Risk and Return**
	Risk and return concepts, types of risk and its application, ASBA, IPO and FPO, SEBI disclosures and other regulators.
4	**Investment Banking Activities**
	Industry analysis, role of IPO in value unlocking, recent trends and developments, investments banking activities

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester I with effect from the Academic Year 2016-2017

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Basic of Investment & Wealth Creation
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Introduction to Accounting-I
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- *National Humana rights commission- disability Manual*
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Foundation Course in NSS

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- *New Trends in NSS, Research papers published by University of Pune*
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- *Applied Mathematics for Business Economics and the Social Sciences by Frank S. Budnick, Tata McGraw Hill, New Delhi*
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- *Introduction to Statistical Methods by C.B. Gupta and Vijay Gupta, Vikas Publication House, Delhi*
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- *Commerce Mathematics by Om P. Chug, etc., Anmol Publication Ltd., New Delhi*
- *Mathematics for Economics and Business by J. Soper, Blackwell Publishing, U.S.A.*
- *Fundamentals of Statistics by D.N. Elhance and VeenaElhance, KitabMahal, Allahabad*

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester II with effect from the Academic Year 2016-2017

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Introduction to Accounting-II
• *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by LesileChandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai* • *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi* • *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida* • *Compendium of Statement and Standard of Accounting, ICAI* • *Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Company Accounting Standards by ShrinivasanAnand, Taxman, New Delhi* • *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi* • *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi* • *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi* *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, MehulRaithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
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Business Communication-II
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- *Environmental Studies – Dr. Vijay Kumar Tiwari , Himalayan Pub. (2010)*
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- *New Trends in NSS, Research papers published by University of Pune*
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- *Cadet's Hand book – Common subject..all wings, BY DG NCC, New Delhi.*
- *Cadet's Hand book – Specialised Subjects, Army, Navy, Air-force, BY DG NCC, New Delhi.*
- *NCC OTA Precise, BY DG NCC, New Delhi.*
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Introduction to Financial Intermediaries

- *Meir Kohn: Financial Institutions and Markets, Tata McGrah Hill*
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- *Vasantha Desai: The Indian Financial System, HPH*
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- *NishikantaJha ; Mergers Acquisitions and Corporate Restructurings*
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Investment Banking

- *Joshua Rosenbaum and Joshua Pearl, Investment Banking: Valuation, Leveraged Buyouts, and Mergers and Acquisitions, Wiley Publication; 2 edition (May 28, 2013)*
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Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester I and II with effect from the Academic Year 2016-2017

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: 25 %

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

UNIVERSITY OF MUMBAI
No. UG/ 180 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Sc. degree course , **vide** this office Circular No. UG/133 of 2011, dated 13th June, 2011 and the Principals of affiliated Colleges in Science are hereby informed that the recommendation made by the Board of Studies in Statistics at its meeting held on 14th June, 2016 has been accepted by the Academic Council meeting held on 14th July, 2016 **vide** item No. 4.85 and that in accordance therewith, the revised syllabus as per the Choice Based Credit System for F.Y. B.Sc. programme in Statistics (Sem. I &II), which are available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

MUMBAI – 400 032
22 November, 2016

(Dr.M.A.Khan)
REGISTRAR

To,

The Principals of the affiliated Colleges in Science.

A.C/4.85/14.07.2016

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No. UG/ 180 -A of 2016 MUMBAI-400 032 22 November, 2016

Copy forwarded with Compliments for information to:-

1) The Co-ordinator, Faculties of Science,
2) The Chairman, Board of Studies in Zoology,
3) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
4) The Director, Board of College and University Development,
5) The Co-Ordinator, University Computerization Centre,
6) The Controller of Examinations.

(Dr.M.A.Khan)
REGISTRAR

PTO..

COURSE USST101: DESCRIPTIVE STATISTICS-1

Unit I - Types of Data and Data Condensation: a) Concept of population and sample. Finite ,Infinite population ,Notion of SRS ,SRSWOR and SRSWR b) Types of Characteristics, Different types of scales: nominal, ordinal, interval and ratio. c) Collection of Primary data: concept of a questionnaire and a schedule, Secondary data d) Types of data: Qualitative and quantitative data; Time series data and cross section data, discrete and continuous data. e) Tabulation. f) Dichotomous classification- for two and three attributes, Verification for consistency. g) Association of attributes: Yule's coefficient of association Q. Yule's coefficient of Colligation,	**15 Lectures**
Unit II–Classification of Data and Measures of central tendency **i)Classification of Data** a) Univariate frequency distribution of discrete and continuous variables. Cumulative frequency distribution. b) Graphical representation of frequency distribution by Histogram, frequency polygon, Cumulative frequency curve. Stem and leaf diagram. **ii)Measures of central tendency** a)Concept of central tendency of data. Requirements of good measure b) Locationalaverages: Median, Mode, and Partition Values: Quartiles, Deciles, and Percentiles. c)Mathematical averages Arithmetic mean (Simple, weighted mean, combined mean), Geometric mean, Harmonic mean, d)Empirical relation between mean, median and mode e)Merits and demerits of using different measures &their applicability	**15 Lectures**
Unit III - Measures of Dispersion, Skewness & Kurtosis a) Concept of dispersion. Requirements of good measure. b) Absolute and Relative measures of dispersion: Range, Quartile Deviation, Mean absolute deviation, Standard deviation. c) Variance and Combined variance, raw moments and central moments and relations between them. Their properties d) Concept of Skewness and Kurtosis: Measures of Skewness: Karl Pearson's, Bowley's and Coefficient of skewness based on moments.Measure of Kurtosis, e) Box Plot	**15 Lectures**

COURSE USST201: DESCRIPTIVE STATISTICS-1I

UNIT – I:Correlation and regression analysis a) Scatter Diagram, Product moment correlation coefficient and its properties. Spearman's Rank correlation.(With and without ties) b) Concept of linear regression. Principle of least squares. Fitting a straight line by method of least squares. c) Relation between regression coefficients and correlation coefficient. d) Fitting of curves reducible to linear form by transformation. Concept and use of coefficient of determination (R^2). **e)** Fitting a quadratic curve by method of least squares.	**15 Lectures**
UNIT – II : Time Series Definition of time series .Its component. Models of time series. Estimation of trend by: i) Freehand curve method ii) method of semi average iii)Method of Moving average iv) Method of least squares(linear trend only) Estimation of seasonal component by i) method of simple average ii) Ratio to moving average iii)Ratio to trend method .	**15 Lectures**
Unit III - Index Numbers a) Index numbers as comparative tool. Stages in the construction of Price Index Numbers. b) Measures of Simple and Composite Index Numbers. Laspeyre's, Paasche's, Marshal-Edgeworth's, Dobisch & Bowley's and Fisher's Index Numbers formula. c) Quantity Index Numbers and Value Index Numbers Time reversal test,Factor reversal test, Circular test. d) Fixed base Index Numbers, Chain base Index Numbers.Base shifting, splicing and deflating. e) Cost of Living Index Number.Concept of Real Income based on Wholesale Price Index Number	**15 Lectures**

SEMESTER I : Practicals

1. **Tabulation**
2. **Attributes**
3. **Classification of Data**
4. **Diagrammatic representation.**
5. **Measures of central tendency**
6. **Measures of dispersion**
7. **Practical using Excel and R**

   i)Classification of Data and Diagrammatic representation.

   ii)Measures of central tendency

   iii)Measures of dispersion

SEMESTER II: Practicals

1. **Correlation analysis**
2. **Regression analysis**
3. **Fitting of curve**
4. **Time series**
5. **Index number-I**
6. **Index number-II**
7. **Practical using Excel and R**

   i) Correlation analysis

   ii) Regression analysis

   iii) Fitting of curve

Proposed syllabus F.Y.B.Sc

SEMESTER I

COURSE USST102

STATISTICAL METHODS-1

UNIT – I

Elementary Probability Theory :

Trial, random experiment, sample point and sample space.

Definition of an event. Operation of events, mutually exclusive and exhaustive events.

Classical (Mathematical) and Empirical definitions of Probability and their properties.

Theorems on Addition and Multiplication of probabilities.

Independence of events, pairwise and mutual independence for three event Conditional probability, Bayes theorem and its applications.

UNIT – II

Concept of Discrete random variable and properties of its probability distribution :

Random variable. Definition and properties of probability distribution and cumulative distribution function of discrete random variable.

Raw and Central moments(definition only) and their relationship.(upto order four).

Concepts of Skewness and Kurtosis and their uses.

Expectation of a random variable. Theorems on Expectation & Variance.

Joint probability mass function of two discrete random variables.

Marginal and conditional distributions. Theorems on Expectation &Variance,

Covariance and Coefficient of Correlation. Independence of two random variables.

UNIT – III

Some Standard Discrete Distributions:

Discrete Uniform, Binomial and Poisson distributions and derivation of their mean and variance.

Recurrence relation for probabilities of Binomial and Poisson distributions .Poisson approximation to Binomial distribution .Hyper geometric distribution, Binomial approximation to hyper geometric distribution.

SEMESTER II

COURSE USST202

STATISTICAL METHODS-2

UNIT – IV

Continuous random variable :

Concept of Continuous random variable and properties of its

probability distribution

Probability density function and cumulative distribution function.

Their graphical representation.

Expectation of a random variable and its properties. Measures of location, dispersion, skewness

and kurtosis. Raw and central moments (simple illustrations).

UNIT – V

Some Standard Continuous Distributions :

Uniform, Exponential (location scale parameter) , memory less property of exponential distribution and Normal distribution.

Derivations of mean, median and variance for Uniform and Exponential distributions. Properties

of Normal distribution (without proof). Normal approximation to Binomial and Poisson

distribution (statement only). Properties of Normal curve. Use of normal tables.

UNIT – VI

Elementary topics on Estimation and Testing of hypothesis:

Sample from a distribution :

Concept of a statistic, estimate and its sampling distribution. Parameter and it's estimator.

Concept of bias and standard error of an estimator.

Central Limit theorem (statement only).

Sampling distribution of sample mean and sample proportion. (For large sample only)

Standard errors of sample mean and sample proportion.

Point and Interval estimate of single mean, single proportion from sample of large size.

Statistical tests :

Concept of hypothesis

Null and alternate hypothesis,

Types of errors, Critical region, Level of significance.

Large sample tests (using central limit theorem, if necessary)

For testing specified value of population mean

For testing specified value in difference of two means

For testing specified value of population proportion

For testing specified value of difference of population proportion

(Development of critical region is not expected.)

Use of central limit theorem**.**

PRACTICALS IN STATISTICS

Distribution of the topics for the practicals

SEMESTER I Course code USSTP1

Sr.No	(B)
1	Probability.
2	Discrete Random Variables
3	Bivariate Probability Distributions.
4	Binomial distribution
5	Poisson distribution
6	Hyper geometric distribution
7	Practicals Using R Binomial, Poisson, Hyper geometric distribution

SEMESTER II

Course code USSTP2

Sr.No	(B)
1	Continuous Random Variables
2	Uniform, Exponential and Normal Distributions
3	Applications of central limit theorem and normal approximation
4	Testing of Hypothesis
5	Large Sample Tests
6	2,3,4,5, Practicals Using R

REFERENCES .

1 Medhi J. : Statistical Methods, An Introductory Text, Second Edition, New Age International Ltd.

2 Agarwal B.L. : Basic Statistics, New Age International Ltd.

3 Spiegel M.R. : Theory and Problems of Statistics, Schaum' s Publications series. Tata McGraw-Hill.

4 Kothari C.R. : Research Methodology, Wiley Eastern Limited.

5 David S. : Elementary Probability, Cambridge University Press.

6 Hoel P.G. : Introduction to Mathematical Statistics, Asia Publishing House.

7 Hogg R.V. and Tannis E.P. : Probability and Statistical Inference. McMillan Publishing Co. Inc.

8 Pitan Jim : Probability, Narosa Publishing House.

9 Goon A.M., Gupta M.K., Dasgupta B. : Fundamentals of Statistics, Volume II : The World Press Private Limited, Calcutta.

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University of Mumbai

No. UG/17 of 2020-21

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities, Science & Technology Faculty is invited to this office circular No.UG/57 of 2018-19, dated 6th July, 2018 relating to the revised syllabus for the F.Y.B.Sc/F.Y.B.A. in Mathematics (Sem. I & II).

They are hereby informed that the recommendations made by the Board of Studies in Mathematics at its meeting held on 11th March, 2020 vide item No.1 and subsequently made by the Board of Deans at its meeting held on 20th July, 2020 vide item No.54 have been accepted by the Academic Council at its meeting held on 23rd July, 2020 vide item No. 4.106 and that in accordance therewith, the revised syllabus practical book of F.Y. B.Sc./ F.Y.B.A. in Mathematics under the (CBCS) in 75:25 pattern has been brought into force with effect from the academic year 2020 -21 accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Vinod Patil)
I/c REGISTRAR

MUMBAI – 400 032
17th November, 2020

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities, Science &Technology Faculty.(Circular No.UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.106/23/07/2020

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No. UG/17 -A of 2020-21 MUMBAI-400 032 17th November, 2020

Copy forwarded with Compliments for information to:-

1) The Dean, Faculty of Humanities, Science & Technology,
2) The Chairman, Board of Studies in Mathematics,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. Vinod Patil)
I/c REGISTRAR

Copy to :-

1. **The Director of Board of Student Development.,**
2. **The Deputy Registrar (Eligibility and Migration Section)**
3. **The Director of Students Welfare,**
4. **The Executive Secretary to the to the Vice-Chancellor,**
5. **The Pro-Vice-Chancellor**
6. **The Registrar and**
7. **The Assistant Registrar, Administrative sub-centers, Ratnagiri, Thane & Kalyan, for information.**

1. **The Director of Board of Examinations and Evaluation**
2. **The Finance and Accounts Officers**
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6. **The Deputy Registrar (Accounts Section), Vidyanagari**
7. **The Deputy Registrar, Affiliation Section**
8. **The Professor-cum- Director, Institute of Distance and Open Learning Education,**
9. **The Director University Computer Center (IDE Building), Vidyanagari,**
10. **The Deputy Registrar (Special Cell),**
11. **The Deputy Registrar, (PRO)**
12. **The Deputy Registrar, Academic Authorities Unit (1 copies) and**
13. **The Assistant Registrar, Executive Authorities Unit**

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. **The Assistant Registrar Constituent Colleges Unit**
2. **BUCTU**
3. **The Deputy Accountant, Unit V**
4. **The In-charge Director, Centralize Computing Facility**
5. **The Receptionist**
6. **The Telephone Operator**
7. **The Secretary MUASA**
8. **The Superintendent, Post-Graduate Section**
9. **The Superintendent, Thesis Section**

for information.

Cover Page

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Sr. No.	Heading	Particulars
1	Title of the Course	Mathematics (F.Y.B.Sc / F.Y.B.A)
2	Eligibility for Admission	XII th Science with Maths
3	Passing Marks	40/100
4	Ordinances / Regulations (if any)	-
5	No. of Years / Semesters	Two Semesters
6	Level	~~P.G.~~ / U.G./ ~~Diploma~~ / ~~Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	~~New~~ / Revised **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year 2020-2021

Date: 20/03/2020

Signature:

Name of BOS Chairperson / Dean: Prof. Dr. R.P. Deore

UNIVERSITY OF MUMBAI

Syllabus

for F. Y. B. Sc. / F. Y. B. A. Semester I & II (CBCS)

Program: B. Sc. / B. A.

Course: Mathematics

with effect from the academic year 2020-2021

F. Y. B. Sc. (CBCS) SEMESTER I

CALCULUS I				
Course Code	UNIT	TOPICS	Credits	L/Week
USMT 101	I	Real Number System	2	3
	II	Sequences in $\mathbb{R}$		
	III	First Order First Degree Differential Equations		
ALGEBRA I				
USMT 102	I	Integers and Divisibility	2	3
	II	Functions, Relations and Binary Operations		
	III	Polynomials		
PRACTICALS				
USMTP01	-	Practicals based on USMT101, USMT102	2	2

F. Y. B. A. (CBCS) SEMESTER I

CALCULUS I				
Course Code	UNIT	TOPICS	Credits	L/Week
UAMT 101	I	Real Number System	3	3
	II	Real Sequences		
	III	First Order First Degree Differential Equations		
Tutorials				
	-	Tutorials based on UAMT101		

F. Y. B. Sc. (CBCS) SEMESTER II

CALCULUS II				
Course Code	UNIT	TOPICS	Credits	L/Week
USMT 201	I	Limits and Continuity	2	3
	II	Differentiability of functions		
	III	Applications of Differentiability		
DISCRETE MATHEMATICS				
USMT 202	I	Preliminary Counting	2	3
	II	Advanced Counting		
	III	Permutations and Recurrence Relation		
PRACTICALS				
USMTP02	-	Practicals based on USMT201, USMT202	2	2

F. Y. B. A. (CBCS) SEMESTER II

CALCULUS II				
Course Code	UNIT	TOPICS	Credits	L/Week
	I	Limits and Continuity		
	II	Differentiability of functions		
UAMT 201	III	Applications of Differentiability	3	3
TUTORIALS				
	-	Tutorials based on UAMT201		

Revised Syllabus in Mathematics
Choice Based Credit System
F. Y. B. Sc. / B. A. 2020-2021

Preamble:
The University of Mumbai has brought into force the revised syllabi as per the Choice Based Credit System (CBCS) for the First year B. Sc/ B. A. Programme in Mathematics from the academic year 2020-2021.

Mathematics has been fundamental to the development of science and technology. In recent decades, the extent of application of Mathematics to real world problems has increased by leaps and bounds. Taking into consideration the rapid changes in science and technology and new approaches in different areas of mathematics and related subjects like Physics, Statistics and Computer Sciences, the board of studies in Mathematics with concern of teachers of Mathematics from different colleges affiliated to University of Mumbai has prepared the syllabus of F.Y.B. Sc. / F. Y. B. A. Mathematics. The present syllabi of F. Y. B. Sc. for Semester I and Semester II has been designed as per U. G. C. Model curriculum so that the students learn Mathematics needed for these branches, learn basic concepts of Mathematics and are exposed to rigorous methods gently and slowly. The syllabi of F. Y. B. Sc. / F. Y. B. A. would consist of two semesters and each semester would comprise of two courses for F. Y. B. Sc. Mathematics and one course for each semester for F. Y. B. A. Mathematics. Course I is 'Calculus I and Calculus II'. Calculus is applied and needed in every conceivable branch of science. Course II, 'Algebra I and Discrete Mathematics' develops mathematical reasoning and logical thinking and has applications in science and technology.

Aims:

(1) Give the students a sufficient knowledge of fundamental principles, methods and a clear perception of innumerous power of mathematical ideas and tools and know how to use them by modeling, solving and interpreting.

(2) Reflecting the broad nature of the subject and developing mathematical tools for continuing further study in various fields of science.

(3) Enhancing students' overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.

(4) A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences

Course outcomes:

1. Calculus (Sem I & II): This course gives introduction to basic concepts of Analysis with rigor and prepares students to study further courses in Analysis. Formal proofs are given lot of emphasis in this course which also enhances understanding of the subject of Mathematics as a whole. The portion on first order, first degree differentials prepares learner to get solutions of so many kinds of problems in all subjects of Science and also prepares learner for further studies of differential equations and related fields.

2. Algebra I (Sem I) & Discrete Mathematics (Sem II): This course gives expositions to number systems (Natural Numbers & Integers), like divisibility and prime numbers and

their properties. These topics later find use in advanced subjects like cryptography and its uses in cyber security and such related fields.

Teaching Pattern for Semester I

[1.] Three lectures per week per course.

[2.] One Practical per week per batch for each of the courses USMT101, USMT 102 (the batches to be formed as prescribed by the University).

[3.] One Tutorial per week per batch for course UAMT101 (the batches to be formed as prescribed by the University).

Teaching Pattern for Semester II

[1.] Three lectures per week per course.

[2.] One Practical per week per batch for each of the courses USMT201, USMT 202. (the batches to be formed as prescribed by the University).

[3.] One Tutorial per week per batch for the course UAMT201 (the batches to be formed as prescribed by the University).

F.Y.B.Sc. / F.Y.B.A. Mathematics

SEMESTER I

USMT 101 / UAMT 101: CALCULUS I

Note: All topics have to be covered with proof in details (unless mentioned otherwise) and examples.

Unit 1 : Real Number System (15 Lectures)

(1) Real number system $\mathbb{R}$ and order properties of $\mathbb{R}$, absolute value $|\ |$ and its properties.

(2) AM-GM inequality, Cauchy-Schwarz inequality, Intervals and neighbourhoods, interior points, limit point, Hausdorff property.

(3) Bounded sets, statements of I.u.b. axiom and its consequences, supremum and infimum, maximum and minimum, Archimedean property and its applications, density of rationals.

Unit II: Sequences in $\mathbb{R}$ (15 Lectures)

(1) Definition of a sequence and examples, Convergence of sequences, every convergent sequences is bounded. Limit of a convergent sequence and uniqueness of limit, Divergent sequences.

(2) Convergence of standard sequences like $\left(\frac{1}{1+na}\right)\ \forall a > 0,\ \ (b^n)\ \forall b,\ 0 < b < 1,\ \ (c^{\frac{1}{n}})\ \forall c > 0,\ \ \&\ \ (n^{\frac{1}{n}})$.

(3) Algebra of convergent sequences, sandwich theorem, monotone sequences, monotone convergence theorem and consequences as convergence of $\left(\left(1+\frac{1}{n}\right)^n\right)$.

(4) Definition of subsequence, subsequence of a convergent sequence is convergent and converges to the same limit, definition of a Cauchy sequences, every convergent sequences s a Cauchy sequence and converse.

Unit III: First order First degree Differential equations (15 Lectures)

Review of Definition of a differential equation, order, degree, ordinary differential equation and partial differential equation, linear and non linear ODE. Solution of homogeneous and non-homogeneous differential equations of first order and first degree. Notion of partial derivatives.

(1) Exact Equations: General solution of Exact equations of first order and first degree. Necessary and sufficient condition for $Mdx + Ndy = 0$ to be exact. Non-exact equations: Rules for finding integrating factors (without proof) for non exact equations, such as :

i) $\frac{1}{M\ x + N\ y}$ is an I.F. if $M\ x + N\ y \neq 0$ and $Mdx + Ndy = 0$ is homogeneous.

ii) $\frac{1}{M\ x - N\ y}$ is an I.F. if $M\ x - N\ y \neq 0$ and $Mdx + Ndy = 0$ is of the form $f_1(x,y)\ y\ dx + f_2(x,y)\ x\ dy = 0$.

iii) $e^{\int f(x)\ dx}$ (resp $e^{\int g(y)\ dy}$) is an I.F. if $N \neq 0$ (resp $M \neq 0$) and $\frac{1}{N}\left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}\right)$ $\left(\text{resp}\frac{1}{M}\left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}\right)\right)$ is a function of x (resp y) alone, say $f(x)$ (resp $g(y)$).

iv) Linear and reducible linear equations of first order, finding solutions of first order differential equations of the type for applications to orthogonal trajectories, population growth, and finding the current at a given time.

(2) Reduction of order :

(i) If the differential equation does not contain only the original function y, that is equations of Type $F(x, y', y'') = 0$.

(ii) If the differential equation does not contain the independent variable x that is, equations of Type $F(y, y', y'') = 0$.

Reference Books:

1. R. R. Goldberg, Methods of Real Analysis, Oxford and IBH, 1964.
2. K. G. Binmore, Mathematical Analysis, Cambridge University Press, 1982.
3. R. G. Bartle- D. R. Sherbert, Introduction to Real Analysis, John Wiley & Sons, 1994.
4. Sudhir Ghorpade and Balmohan Limaye, A course in Calculus and Real Analysis, Springer International Ltd, 2000.
5. G. F. Simmons, Differential Equations with Applications and Historical Notes, McGraw Hill, 1972.
6. E. A. Coddington , An Introduction to Ordinary Differential Equations.Prentice Hall, 1961.
7. W. E. Boyce, R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, Wiely, 2013.

Additional Reference Books

1. T. M. Apostol, Calculus Volume I, Wiley & Sons (Asia) Pte, Ltd.
2. Richard Courant-Fritz John, A Introduction to Calculus and Analysis, Volume I, Springer.
3. Ajit kumar and S. Kumaresan, A Basic Course in Real Analysis, CRC Press, 2014.
4. James Stewart, Calculus, Third Edition, Brooks/ cole Publishing Company, 1994.
5. D. A. Murray, Introductory Course in Differential Equations, Longmans, Green and Co., 1897.
6. A. R. Forsyth, A Treatise on Differential Equations, MacMillan and Co.,1956.

ALGEBRA I
USMT 102

Prerequisite :
Set Theory: Set, subset, union and intersection of two sets, empty set, universal set, complement of a set, De Morgan's laws, Cartesian product of two sets, Relations, Permutations ${}^nP_r$ and Combinations ${}^nC_r$.
Complex numbers: Addition and multiplication of complex numbers, modulus, amplitude and conjugate of a complex number.

Unit I : Integers & Divisibility (15 Lectures)

(1) Statements of well-ordering property of non-negative integers, Principle of finite induction (first and second) as a consequence of Well-Ordering Principle.

(2) Divisibility in integers, division algorithm, greatest common divisor (g.c.d.) and least common multiple (l.c.m.) of two non zero integers, basic properties of g.c.d. such as existence and uniqueness of g.c.d. of two non zero integers $a\&b$ and that the g.c.d. can be expressed as $ma + nb$ for some $m, n \in \mathbb{Z}$, Euclidean algorithm.

(3) Primes, Euclid's lemma, Fundamental Theorem of arithmetic, The set of primes is infinite, there are arbitrarily large gaps between primes, there exists infinitely many primes of the form $4n - 1$ or of the form $6n - 1$.

(4) Congruence, definition and elementary properties, Results about linear congruence equations. Examples.

Unit II : Functions, Relations and Binary Operations (15 Lectures)

(1) Definition of relation and function, domain, co-domain and range of a function, composite functions, examples, Direct image $f(A)$ and inverse image $f^{-1}(B)$ for a function f, injective, surjective, bijective functions, Composite of injective, surjective, bijective functions when defined, invertible functions, bijective functions are invertible and conversely, examples of functions including constant, identity, projection, inclusion, Binary operation as a function, properties, examples.

(2) Equivalence relation, Equivalence classes, properties such as two equivalences classes are either identical or disjoint, Definition of partition, every partition gives an equivalence relation and vice versa.

(3) Congruence is an equivalence relation on $\mathbb{Z}$, Residue classes and partition of $\mathbb{Z}$, Addition modulo$n$, Multiplication modulo n, examples.

Unit III: Polynomials (15 Lectures)

(1) Definition of a polynomial, polynomials over F where $F = \mathbb{Q}, \mathbb{R}$ or $\mathbb{C}$, Algebra of polynomials, degree of polynomial, basic properties.

(2) Division algorithm in $F[X]$ (without proof), and g.c.d of two polynomials and its basic properties, Euclidean algorithm (proof of the above results may be given only in the case of $\mathbb{Q}[X]$ with a remark that the results as well as the proofs remain valid in the case of $\mathbb{R}[X]$ or $\mathbb{C}[X]$).

(3) Roots of a polynomial, relation between roots and coefficients, multiplicity of a root. Elementary consequences such as the following.

(i) Remainder theorem, Factor theorem.

(ii) A polynomial of degree n has at most n roots.

(iii) Complex and non-real roots of a polynomials in $\mathbb{R}[X]$ occur in conjugate pairs.

(Emphasis on examples and problems in polynomials with real coefficients).

(4) Necessary condition for a rational number $\frac{p}{q}$ to be a root of a polynomial with integer coefficients (viz. p divides the constant coefficient and q divides the leading coefficient), corollary for monic polynomials (viz. a rational root of monic polynomial with integer coefficients is necessarily an integer). Simple consequence such as the irrationality is necessarily of $\sqrt{p}$ for any prime number p. Irreducible polynomials in $\mathbb{Q}[x]$, Unique Factorisation Theorem. Examples.

Reference Books:

1. David M. Burton, Elementary Number Theory, Seventh Edition, McGraw Hill Education (India) Private Ltd.

2. 2. Norman L. Biggs, Discrete Mathematics, Revised Edition, Clarendon Press, Oxford 1989.

Additional Reference Books

1. I. Niven and S. Zuckerman, Introduction to the theory of numbers, Third Edition, Wiley Eastern, New Delhi, 1972.

2. G. Birkoff and S. Maclane, A Survey of Modern Algebra, Third Edition, Mac Millan, New York, 1965.

3. N. S. Gopalkrishnan, University Algebra, Ne Age International Ltd, Reprint 2013.

4. I .N. Herstein, Topics in Algebra, John Wiley, 2006.

5. P. B. Bhattacharya S. K. Jain and S. R. Nagpaul, Basic Abstract Algebra, New Age International, 1994.

6. Kenneth Rosen, Discrete Mathematics and its applications, Mc-Graw Hill, International Edition, Mathematics Series.

PRACTICALS FOR F.Y.B.Sc
USMTP01 – Practicals

A. **Practicals for USMT101/ UAMT 101:**

(1) Algebraic and Order Properties of Real Numbers and Inequalities

(2) Hausdorff Property and LUB Axiom of $\mathbb{R}$, Archimedian Property.

(3) Convergence and divergence of sequences, bounded sequences, Sandwich Theorem.

(4) Cauchy sequences, monotonic sequences, non-monotonic sequences.

(5) Solving exact and non-exact, linear, reducible to linear differential equations.

(6) Reduction of order of Differential Equations, Applications of Differential Equations.

(7) Miscellaneous Theoretical Questions based on full paper.

B. **Practicals for USMT102:**

(1) Mathematical induction ,Division Algorithm, Euclidean algorithm in $\mathbb{Z}$, Examples on expressing the gcd. of two non zero integers $a\&b$ as $ma + nb$ for some $m, n \in \mathbb{Z}$,

(2) Primes and the Fundamental theorem of Arithmetic, Euclid's lemma, there exists infinitely many primes of the form $4n - 1$ or of the form $6n - 1$.

(3) Functions, Bijective and Invertible functions, Compositions of functions.

(4) Binary Operation, Equivalence Relations, Partition and Equivalence classes.

(5) Polynomial (I)

(6) Polynomial (II)

(7) Miscellaneous Theoretical Questions based on full paper.

TUTORIALS FOR F.Y.B.A

Tutorials for UAMT101 :

(1) Algebraic and Order Properties of Real Numbers and Inequalities

(2) Hausdorff Property and LUB Axiom of $\mathbb{R}$, Archimedian Property.

(3) Convergence and divergence of sequences, bounded sequences, Sandwich Theorem.

(4) Cauchy sequences, monotonic sequences, non-monotonic sequences.

(5) Solving exact and non-exact, linear, reducible to linear differential equations.

(6) Reduction of order of Differential Equations, Applications of Differential Equations.

(7) Miscellaneous Theoretical Questions based on full paper.

Semester II
USMT 201 / UAMT201: CALCULUS II

Unit-I: Limits and Continuity (15 Lectures)

{Brief review: Domain and range of a function, injective function, surjective function, bijective function, composite of two functions (when defined), Inverse of a bijective function. Graphs of some standard functions such as $|x|$, e^x, $\log x$, ax^2+bx+c, $\frac{1}{x}$, x^n $n \geq 3$), $\sin x$, $\cos x$, $\tan x$, $\sin\left(\frac{1}{x}\right)$, $x^2 \sin\left(\frac{1}{x}\right)$ over suitable intervals of $\mathbb{R}$. No direct questions to be added.}

(1) $\varepsilon - \delta$ definition of Limit of a function, uniqueness of limit if it exists, algebra of limits, limits of composite function, sandwich theorem, left-hand-limit $\lim\limits_{x \longrightarrow a^-} f(x)$, right-hand-limit $\lim\limits_{x \longrightarrow a^+} f(x)$, non-existence of limits, $\lim\limits_{x \longrightarrow -\infty} f(x)$, $\lim\limits_{x \longrightarrow \infty} f(x)$ and $\lim\limits_{x \longrightarrow a} f(x) = \pm\infty$.

(2) Continuous functions: Continuity of a real valued function at a point and on a set using $\epsilon - \delta$ definition, examples, Continuity of a real valued function at end points of domain using $\epsilon - \delta$ definition, f is continuous at a if and only if $\lim\limits_{x \longrightarrow a} f(x)$ exists and equals to $f(a)$, Sequential continuity, Algebra of continuous functions, discontinuous functions, examples of removable and essential discontinuity.

(3) Intermediate Value theorem and its applications, Bolzano-Weierstrass theorem (statement only): A continuous function on a closed and bounded interval is bounded and attains its bounds.

Unit-II: Differentiability of functions (15 Lectures)

(1) Differentiation of real valued function of one variable: Definition of differentiability of a function at a point of an open interval, examples of differentiable and non differentiable functions, differentiable functions are continuous but not conversely, algebra of differentiable functions.

(2) Chain rule, Higher order derivatives, Leibniz rule, Derivative of inverse functions, Implicit differentiation (only examples)

Unit-III: Applications of differentiability (15 Lectures)

(1) Rolle's Theorem, Lagrange's and Cauchy's Mean Value Theorems, applications and examples, Monotone increasing and decreasing functions, examples.

(2) L-Hospital rule (without proof), examples of indeterminate forms, Taylor's theorem with Lagrange's form of remainder with proof, Taylor polynomial and applications.

(3) Definition of critical point, local maximum/minimum, necessary condition, stationary points, second derivative test, examples, concave/convex functions, point of inflection.

(4) Sketching of graphs of functions using properties.

Reference books:

1. R. R. Goldberg, Methods of Real Analysis, Oxford and IBH, 1964.

2. James Stewart, Calculus, Third Edition, Brooks/ Cole Publishing company, 1994.

3. T. M. Apostol, Calculus, Vol I, Wiley And Sons (Asia) Pte. Ltd.

4. Sudhir Ghorpade and Balmohan Limaye, A course in Calculus and Real Analysis, Springer International Ltd, 2000.

Additional Reference:

1. Richard Courant and Fritz John, A Introduction to Calculus and Analysis, Volume-I, Springer.

2. Ajit Kumar and S. Kumaresan, A Basic course in Real Analysis, CRC Press, 2014.

3. K. G. Binmore, Mathematical Analysis, Cambridge University Press, 1982.

4. G. B. Thomas, Calculus, 12th Edition 2009

USMT 202: DISCRETE MATHEMATICS

Unit I: Preliminary Counting (15 Lectures)

(1) Finite and infinite sets, countable and uncountable sets examples such as $\mathbb{N}$, $\mathbb{Z}$, $\mathbb{N} \times \mathbb{N}$, $\mathbb{Q}$ $(0,1)$, $\mathbb{R}$.

(2) Addition and multiplication Principle, counting sets of pairs, two ways counting.

(3) Stirling numbers of second kind. Simple recursion formulae satisfied by $S(n,k)$ for $k = 1, 2, \cdots, n-1, n$.

(4) Pigeonhole principle simple and strong form and examples, its applications to geometry.

Unit II: Advanced Counting (15 Lectures)

(1) Permutation and combination of sets and multi-sets, circular permutations, emphasis on solving problems.

(2) Binomial and Multinomial Theorem, Pascal identity, examples of standard identities such as the following with emphasis on combinatorial proofs.

- $\sum_{k=0}^{r} \binom{m}{k}\binom{n}{r-k} = \binom{m+n}{r}$
- $\sum_{i=0}^{k} \binom{k}{i}^2 = \binom{2k}{k}$
- $\sum_{i=r}^{n} \binom{i}{r} = \binom{n+1}{r+1}$
- $\sum_{i=0}^{n} \binom{n}{i} = 2^n$

(3) Non-negative integer solutions of equation $x_1 + x_2 + \cdots + x_k = n$.

(4) Principal of inclusion and exclusion, its applications, derangements, explicit formula for d_n, deriving formula for Euler's function $\phi(n)$.

Unit III: Permutations and Recurrence relation (15 lectures)

(1) Permutation of objects, S_n, composition of permutations, results such as every permutation is a product of disjoint cycles, every cycle is a product of transpositions, signature of a permutation, even and odd permutations, cardinality of S_n, A_n.

(2) Recurrence Relations, definition of homogeneous, non-homogeneous, linear, non-linear recurrence relation, obtaining recurrence relations of Tower of Hanoi, Fibonacci sequence, etc. in counting problems, solving homogeneous as well as non homogeneous recurrence relations by using iterative methods, solving a homogeneous recurrence relation of second degree using algebraic method proving the necessary result.

Recommended Books:

1. Norman Biggs, Discrete Mathematics, Oxford University Press.
2. Richard Brualdi, Introductory Combinatorics, John Wiley and sons.
3. V. Krishnamurthy, Combinatorics-Theory and Applications, Affiliated East West Press.
4. Discrete Mathematics and its Applications, Tata McGraw Hills.
5. Schaum's outline series, Discrete mathematics,
6. Allen Tucker, Applied Combinatorics, John Wiley and Sons.
7. Sharad Sane, Combinatorial Techniques, Springer.

PRACTICALS FOR F.Y.B.Sc
USMTP02-Practicals

A. **Practicals for USMT201 :**

(1) Limit of a function and Sandwich theorem, Continuous and discontinuous function.

(2) Algebra of limits and continuous functions, Intermediate Value theorem, Bolzano-Weierstrass theorem.

(3) Properties of differentiable functions, derivatives of inverse functions and implicit functions.

(4) Higher order derivatives, Leibnitz Rule.

(5) Mean value theorems and its applications, L'Hospital's Rule, Increasing and Decreasing functions.

(6) Extreme values, Taylor's Theorem and Curve Sketching.

(7) Miscellaneous Theoretical Questions based on full paper.

B. **Practicals for USMT202:**

(1) Counting principles, Two way counting.

(2) Stirling numbers of second kind, Pigeon hole principle.

(3) Multinomial theorem, identities, permutation and combination of multi-set.

(4) Inclusion-Exclusion principle. Euler phi function.

(5) Composition of permutations, signature of permutation, inverse of permutation.

(6) Recurrence relation.

(7) Miscellaneous Theoretical Questions based on full paper.

TUTORIALS FOR F.Y.B.A

Tutorials for UAMT201 :

(1) Limit of a function and Sandwich theorem, Continuous and discontinuous function.

(2) Algebra of limits and continuous functions, Intermediate Value theorem, Bolzano-Weierstrass theorem.

(3) Properties of differentiable functions, derivatives of inverse functions and implicit functions.

(4) Higher order derivatives, Leibnitz Rule.

(5) Mean value theorems and its applications, L'Hospital's Rule, Increasing and Decreasing functions.

(6) Extreme values, Taylor's Theorem and Curve Sketching.

(7) Miscellaneous Theoretical Questions based on full paper.

Scheme of Examination (75:25)

The performance of the learners shall be evaluated into two parts. The learner's performance shall be assessed by Internal Assessment with 25 percent marks in the first part and by conducting the Semester End Examinations with 75 percent marks in the second part. The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below:-

I. **Internal Evaluation of 25 Marks:**

F.Y.B.Sc. :

(i) One class Test of 20 marks to be conducted during Practical session.
Paper pattern of the Test:
Q1: Definitions/ Fill in the blanks/ True or False with Justification (04 Marks).
Q2: Multiple choice 5 questions. (10 Marks: 5×2)
Q3: Attempt any 2 from 3 descriptive questions. (06 marks: 2×3)

(ii) Active participation in routine class: 05 Marks.

F.Y.B.A. :

(i) One class Test of 20 marks to be conducted during Tutorial session.
Paper pattern of the Test:
Q1: Definitions/ Fill in the blanks/ True or False with Justification (04 Marks).
Q2: Multiple choice 5 questions. (10 Marks: 5×2)
Q3: Attempt any 2 from 3 descriptive questions. (06 marks: 2×3)

(ii) Journal : 05 Marks.

II. **Semester End Theory Examinations :** There will be a Semester-end external Theory examination of 75 marks for each of the courses USMT101/UAMT101, USMT102 of Semester I and USMT201/UAMT201, USMT202 of semester II to be conducted by the college.

1. Duration: The examinations shall be of 2 and $\frac{1}{2}$ hours duration.
2. Theory Question Paper Pattern:
   a) There shall be FOUR questions. The first three questions Q1, Q2, Q3 shall be of 20 marks, each based on the units I, II, III respectively. The question Q4 shall be of 15 marks based on the entire syllabus.
   b) All the questions shall be compulsory. The questions Q1, Q2, Q3, Q4 shall have internal choices within the questions. Including the choices, the marks for each question shall be 25-27.
   c) The questions Q1, Q2, Q3, Q4 may be subdivided into sub-questions as a, b, c, d & e, etc and the allocation of marks depends on the weightage of the topic.
3. **Semester End Examinations Practicals:**
   At the end of the Semesters I & II Practical examinations of three hours duration and 100 marks shall be conducted for the courses USMTP01, USMTP02.
   In semester I, the Practical examinations for USMT101 and USMT102 are held together by the college.
   In Semester II, the Practical examinations for USMT201 and USMT202 are held together by the college.

   Paper pattern: The question paper shall have two parts A and B.
   Each part shall have two Sections.

   Section I Objective in nature: Attempt any Eight out of Twelve multiple choice questions (04 objective questions from each unit) ($8 \times 3 = 24$ Marks).

   Section II Problems: Attempt any Two out of Three (01 descriptive question from each unit) ($8 \times 2 = 16$ Marks).

Practical Course	Part A	Part B	Marks out of	duration
USMTP01	Questions from USMT101	Questions from USMT102	80	3 hours
USMTP02	Questions from USMT201	Questions from USMT202	80	3 hours

Marks for Journals and Viva:
For each course USMTP01 (USMT101, USMT102) and USMTP02 (USMT201, USMT202):

1. Journal: 10 marks (5 marks for each journal).
2. Viva: 10 marks.

Each Practical of every course of Semester I and II shall contain at least 10 objective questions and at least 6 descriptive questions.
A student must have a certified journal before appearing for the practical examination.
In case a student does not posses a certified journal he/she will be evaluated for 80 marks.
He/she is not qualified for Journal + Viva marks.

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AC-6-6-12

Item No. 4.121

UNIVERSITY OF MUMBAI

Syllabus for M.Sc. Semester I &II

Program: M.Sc.

Course: Environmental Sciences

(Credit Based Semester and Grading System with effect from the academic year 2012–2013)

M. Sc. Environmental Sciences Syllabus

Credit Based and Grading System

To be implemented from the Academic year 2012-2013

1. The credit system will be implemented from the year 2012-13.
2. Each student is expected to take 4 credits per theory paper and two credits per practical in each semester.
3. At the end of each semester each student will be examined both in the theory and in the practicals. Similarly the student has to appear for the internal examination of theory and practicals as per the ordinances.
4. The candidate is expected to submit a journal certified by the head of the department or institution at the time of the practical examination.
5. A candidate will not be allowed to appear for the practical examination unless he or she produces a certified journal or a certificate from the head of the institution or department stating that the journal is lost and the candidate has performed the required number of experiments satisfactorily. The list of the experiments performed by the candidate should be attached with such certificate
6. Use of non programmable calculators is allowed both at the theory and the practical examination.

Semester-I papers:

1) Ecology and Ecosystem
2) Biodiversity
3) Environment and Natural resources
4) Environmental Pollution

Semester-II papers:

1) Environmental monitoring and Assessment
2) Pollution control technology

3) Green Technology
4) Environment Acts Rules and Regulations

SEMESTER-I

PSEVS101

Ecology and Ecosystem: (Credit: 4)

Unit I **(10 L)**

Ecology: Definition, principle and scope of ecology, aquatic and terrestrial ecology, freshwater ecology, marine ecology, estuarine ecology, Community concept, types of community, succession process, competition and Coexistence, types of interactions: predation, parasitism, antibiosis, commensalism, cooperation and mutualism, population growth.

Unit II **(20L)**

Concept of Biosphere and ecosystem: Biomes, Population parameters, structure, Growth Regulation, Interaction between populations, life, history, strategies. Types of ecosystem, eco system of India, Characteristics of eco system, structure of ecosystem and function of an ecosystem, population Dynamics, Carrying capacity. Abiotic and Biotic environment, limiting factors, adaptation, Habitat and niche, nature of environment. Littoral Zones: Fauna of intertidal zones, their distribution and adaptations, ecological importance of mangrove vegetation, distribution of mangrove areas in India, salinity ingress in coastal areas.

Marine Environment: Biota in different types of zones, its diversity-plankton, nekton, benthos, their adaptations and productivity, Indian marine territory, Exclusive Economic Zones (EEZ)

Dynamic biogeography: routes of migration of plants and animals, their impact on local ecosystems, trade routes, shipping, accidental import, weeds, ballast water.

Unit III **(15L)**

Organization of Ecological systems: Ecosystem components, Producers, consumers and decomposer, Food chains, food web and ecological pyramids, Biotic and abiotic components, Ecological pyramids, Bioaccumulation and biomagnifications, mass and energy transfer in successive trophical level.

Unit IV **(15L)**

Energy and Ecological succession: Flow and energy fixation, construction of ecological pyramids. Biogeochemical cycles: Hydrological cycles, carbon cycle, oxygen cycle, nitrogen cycle, sulfur cycle, phosphorus cycle-its importance and applications. Primary succession, secondary succession and ecological climax, impacts of development of ecosystem, population, commumnity ecology, predator and prey relationship.

Texts/References:

1) E. P. Odum (1996) Fundamentals of Ecology, Nataraj Publisher, Dehra Dun.
2) K.M.M. Dakshini (1999) Principle and Practices in Plant Ecology, CRC, Boston.
3) M.C. Dash (1994) Fundamentals of Ecology, Tata McGraw Hill, New Delhi.
4) M.C. Molles Jr. (1999) Ecology- Concepts and Application, McGraw Hill, New Delhi.
5) V. Ingegnoli (2002) Landscape Ecology: a widening foundation, Springer, Bonn.
6) E.J. Kormondi (1999) Concepts of Ecology, Prentice Hall of India, New Delhi.
7) Chapman, J.L. and Reiss M.J. (2005) Ecology Principles and Applications, Cambridge University Press, London.
8) E.P. Odum and G. W. Barrett (2005) Fundamentals of Ecology, Thomson Asia Pvt. Ltd., Singapore.
9) S.V.S. Rana (2005) Essentials of Ecology and Environmental Sciences, Prentice Hall of India, New Delhi.
10) Environment And Ecology-EAS105/EAS 205-R.Rajagopalan

11) Environmental Studies From Crisis To Cure-2nd Edition-R.Rajagopalan

12) Environmental Biotechnology-Alan Scragg,Oxford University Press.

PSEVS 102

Biodiversity: (Credit: 4)

Unit I **(15L)**

Biodiversity concept and components: Biodiversity concept, Biodiversity-components, Biodiversity-Types, Biodiversity-importance, ecological importance, economical importance, key stone umbrella and flagship species, Economic value of biodiversity, ecotone and niche.

Unit II **(20L)**

Biodiversity and evaluation: Biodiversity- values, Biodiversity status: National status and Global status, hotspot; threatened species, IUCN Red list, endangered species, vulnerable species, rare species, extinct species and endemic species. Climate change, induced losses. common flora and fauna in India-Aquatic: phytoplankton, Zooplankton and macrophyes.Terrestrial: Forests; Endangered and threatended speceis.

Unit III **(10L)**

Biodiversity Convention and Biodiversity Act: IPRs, national and international programs for biodiversity conservation. Wildlife values and eco-tourism, wildlife distribution in India, problem in wildlife protection, role of WWF, WCU, CITES, TRAFFIC, Wildlife Protection Act 1972.

Unit IV **(15L)**

Biodiversity Conservation: Importance of Biodiversity conservation, Different approaches for Biodiversity conservation-In-situ conservation: sanctuaries, biospheres reserves, national parks, nature reserves, preservation plots. Ex-situ conservation: botanical gardens, zoos, aquaria, homestead garden; herbarium; In-vitro Conservation: germplasm and gene Bank; tissue culture: pollen and spore bank, DNA bank.

Texts/References:

1) Sustaining Life: How Human Health Depends on Biodiversity Eric Chivian Aaron Bernstein (2008)
2) Shahid Naeem, Daniel E. Bunker, Andy Hector and Michel Loreau (2009)Biodiversity, ecosystem fuctioning and human well being: An ecological and economic perspective
3) S.K. Agarwal et al (1996) Biodiversity and Environment, APH, Dehra Dun.
4) S.S. Negi (1993) Biodiversity and its Conservation in India, Indus Publications, New Delhi.
5) W.W. Collins and C.O. Qualset (1998) Biodiversity in Agro-ecosystem, CRC, Boston.
6) V.K. Krishnamurthy (2003) Text Book of Biodiversity, Science Publisher, Chennai.
7) P.S. Ramakrishnan (2000) Mountain Biodiversity, Land Use Dynamics and Traditional Ecological Knowledge, Oxford and IBH, New Delhi
8) Global Biodiversity strategy: WRI, IUCN & UNEP
9) Ecotourism and Sustainable Development: Singh; Abhijeet Pub

PSEVS103
Environment and natural resources: (Credit: 4)

Unit I **(10L)**

Environment: Definition of Environment, Earth, Man and Environment, Evolution of environment, Physico-chemical and Biological Characteristics of environment. Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere. Geographical classification, Distribution and zones.

Unit II **(20L)**

Mass and energy: Transfer of mass and energy across various interfaces. First and second laws of thermodynamics, heat transfer processes, Biochemical cycles, gaseous and sedimentary turnover rate and turnover item, General relationship between landscape and climate. Climates of India, Indian monsoon, Drought, Tropical cyclones and western disturbances. Atmosphere stability and instability, tem-

perature inversion and mixing heights, heat balance of the earth- atmosphere system, global climate change.

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Unit III **(20L)**

Natural resources: Types of natural resources, Forest resources: use and over-exploitation, deforestation, timber extraction, mining, dams and their effects on forests and tribal people. Water resources: use and utilization of surfaces and ground water, floods drought, dams-benefits and problems. Mineral resources: environmental effects of extracting and using mineral sources. Food resources: World food problems overgrazing, effects of modern agriculture, fertilizers-pesticides problems, Water logging, salinity. Land resources: Land as a resource, Land degradation, man induced landslides, soil erosion and desertification

Unit IV **(10L)**

Energy resources: Concept and demand of energy, Growing energy needs, Renewable and non-renewable sources, use of alternate energy sources, Wind energy, Solar energy, water as source of energy, Biofuels prodution, use and sustainability, use and over exploitation of energy sources and associated problems. Role of an individual in conservation of natural resources. Equitable use resources for sustainable lifestyles.

Texts/References:

1) Renewable Energy – Environment and Development: M. Dayal; Konark Pub. Pvt. Ltd. Alternative Energy: S. Vandana; APH Publishing Corporation
2) Nuclear Energy – Principles, practice and prospects: S. K. Agarwal; APH Publishing Corporation
3) S. Glassstone, D. Van Nastrand, Source book on atomic energy, 3rd Edition, Germany, 1967
4) M. Eisendbud, Environmental radioactivity, Academic Press
5) E.D.Enger, B.E. Smith, Environmental Sciences- Astudy of Inter relationships, WCB Publication
6) Bio-Energy Resources: Chaturvedi; Concept Pub.
7) National Energy – policy, crisis and growth: V S. Mahajan; Ashis Publishing House
8) Geography and Energy – Commercial energy systems and national policies: J. D. Chapman

PSEVS104
Environmental Pollution: (Credit: 4)

Unit I **(20L)**

Introduction to Environmental pollution, Air and Water Pollution: Definition and sources of pollution; Different types of pollution and their global, regional and local aspects. Types and sources of air pollutants; Reaction of pollutants in air forming smog, PAN, Acid rain; Atmospheric diffusion and stack performance; Transport of pollutants; Effects of air pollutants on flora and fauna; Sinks of atmospheric gases. Sources of water and their contamination; Types of pollutants, various industrial effluents such as pulp and paper mills, oil exploration and refinery, petrochemicals, iron and steel industries, domestic wastes ,organic debris, agricultural wastes, pesticides; Eutrophication - causes and effects and control measures.

Unit II **(10L)**

Soil pollution and solid waste pollution: Causes of soil pollution; Effects of Fungicides and weedicides on soil components, residual toxicity and pollution. Different kinds of synthetic fertilizer (N, P, K), and their interactions with different components of soil, their toxicity and pollution. Industrial effluents and their interactions with soil components, Contamination by radio nuclides. Solid waste pollution: sources, nature, classification and environmental effects.

Unit III **(15L)**

Radiation and Noise pollution: Radioactive decay; Interaction of radiation with matter; Biological impact and health hazards associated with radiation, Units of radioactivity and radiation dose; Protection against ionizing isotopes and their applications in waste water and air pollution analysis and treatment; Radioactive waste disposal. Basic properties of sound waves – plane and spherical waves, sound pressure, loudness and intensity levels, decibel; Sources of Noise Pollution–Measurement and analysis of sound, Measures to control noise pollution.

Unit IV **(15L)**

Thermal pollution, Oil Pollution and Electronic waste (E-waste): Definition and sources, Chemical and biological effects of thermal pollution, Effect on marine life, bacteria and water quality and other aquatic biota; Thermal pollution from power plants and their control. Oil pollution and marine ecology, sources of oil pollution, factors effecting fate of oil after spillage movement, spreading, evaporation, emulsification, dispersion, remote sensing in water quality monitoring. Sources and types and constituents of E-wastes and its environmental consequences.

Texts/References:

1) J.N.B. Bell (2002) Air Pollution and Plant Life, 2nd Edition, John Wiley and Sons, New Delhi.

2) Christon J. Hurst, Ronald L. Crawford, Guy R. Knudsen, Michael J. McInerney, Manual of Environmental Microbiology, 2nd edition, ASM Press. 2001.

3) Bruce Rittman, Perry L. McCarty. Environmental Biotechnology: Principles and Applications,2nd Edition, McGraw-Hill, 2000.

4) Air Pollution – Stern

5) Environmental Pollution Control Engineering: C. S. Rao

6) Environmental Chemistry : B.K. Sharma, and H. Kaur

7) Air pollution – threat and response: D. A. Lynn

8) Air pollution and Environmental Protection – Legislative policies, Judicial trend and Social perceptions: N. Kumar; Mittal Publication

SEMESTER I

PSEVSP101
ECOLOGY AND ECOSYSTEMS

A. Minor Experiments

1. Determination of diversity indices in plant communities.
2. To construct ecological pyramids of population sizes in ecosystem.
3. Determination of Chlorophyll content from plant species.
4. Determination of Harvest method from plant species.

B. Major Experiments

1. Determination of Importance value index of species in a plant community.
2. To compare two plant communities
3. Quantitative measurement of plankton in fresh and marine water samples.
4. Determination of primary productivity by light and dark bottle method.

PSEVSP102

Biodiversity

A. Minor Experiments

1. Prepare a map of India, showing bio-geographical zones and expanse of territorial waters.
2. Identification and description of plant species.
3. To plot biosphere reserve on a map of India.
4. Prepare a document of endemic and exotic species of plants and animals for a selected PAN.

B. Major Experiments

1. Indicate distribution range of a plant and animal species identified as endangered on an Indian map.
2. Prepare a map of. Maharashtra showing Protected Area Network (PAN) in it.
3. To study qualitative and quantitative characters of a plant community by quadrate method.
4. To study a plant community by using line transect method, using line, belt and profile transects.

PSEVSP103

Environment and Natural Resources

A. Minor Experiments

1. Determination of total organic matter in soil.
2. Determination of pH value of different types of soil.
3. Determination of water holding capacity of soil.
4. To quantify hydrological cycle in different land use types in or around specified premises.

B. Major Experiments

1. Determination of mechanical composition of soil by Pipette method.
2. To study the soil profiles for their height, color, texture and electrical conductivity.
3. Determination of total nitrogen value of the soil by Kjeldahl's method
4. Determination of SAR value of soil.(Sodium Absorption Ratio)

PSEVSP104

Environmental Pollution

A. Minor Experiments

1. Determination of Total Dissolved Solids from the lake water.
2. Determination of Total Hardness of well water.
3. Measurement of photo density flux by Luxmeter.
4. Measurement and classification of noise pollution.

B. Major Experiments

1. Determination of CO_2 in the atmosphere by volumetric method.
2. Determination of physical parameters of (I) Well water (ii) Industrial of given type effluent (iii) River water (iv) Sea water.
3. Determination of Dissolved Oxygen from Sea water by Winkler's method.
4. Determination of Chemical Oxygen Demand value for industrial waste effluent.

Texts/References:

1. Standard methods for examination of water and waste water , American Public Health Association.
2. A comprehensive laboratory manual for Environmental Sciences and Engineering By P.R. Sreemahadevan Pillai. New Age International Publishers.
3. Chemical and biological methods for water pollution studies By R.K. Trivedi
4. Handbook of water and waste water analysis By S.K. Maiti.
5. Soil and air analysis by S.K. Maiti.

SEMESTER-II

PSEVS201
Environmental Monitoring and Assessment: (Credit: 4)

Unit I **(15L)**

Environmental Monitoring: What is environmental quality? Quality of environment for life on earth and man; Advantages of Environmental Monitoring, Deterioration of environmental quality with reference to anthropogenic impact; Methods of assessment of environmental quality; Short term studies/surveys; Rapid assessment; Continuous short and long term monitoring

Unit II **(15L)**

Environmental Impact Assessment (EIA): Need of EIA; Scope and objectives; Types of environmental impacts; Steps involved in conducting the EIA Studies; Environmental Impact Assessment techniques-Ad-hoc method, checklist method, overlay mapping method, network method, simulation and modeling technique, matrix method, and system diagram technique; Merits and Demerits of EIA studies.

Unit III **(15L)**

Remote sensing and its applications in Environmental Monitoring: Principles and Basic concepts of Remote sensing; EMR & its interaction with matter; Aerial Photography and image recognition; Sensors & platforms; IRS satellites & their sensors; Application of remote sensing in environmental studies: land use mapping, forest survey, habitat analysis, water management, drought monitoring and flood studies, wetland survey ; rainfall estimation, pollution studies, soil conservation, watershed management and vegetation mapping.

Unit IV **(15L)**

Geographical Information System (GIS): Basic principles, Techniques Application in Environmental Sciences. Types of Geographical Data; Data Structure; Vector and Raster data: their Advantages and Disadvantages; Input, verification, storage and out put of geographical data; Importance of Geographical

Information System in environmental studies. Global Positioning System (GPS): basic principles, Applications to environmental studies -Point source pollution, hazard monitoring and assessment.

Text/References:

1. D. P. Lawrence (2003) Environmental Impact Assessment: Practical Solutions to Recurrent Problems, John Wiley and Sons, New Delhi.
2. Environmental Impact Analysis Handbook: J. G. Rau and D. C. Wooten; McGraw-Hill Book Co.
3. Environmental Impact Assessment, L. W. Canter, Mc Graw Hill Publication.
4. P. Morris and R. Therivel (2001), Methods of Environmental Impact Assessment, Spoon Press.
5. J. Weston (1997) Planning and EIA in Practice, Longman.
6. Jos Arts and Angus Morrison-Saunders (2004) Assessing Impact - Handbook of EIA and SEA follow-up, Earthscan, London.
7. website of MoEF, GOI, New Delhi
8. Srivastava, D. C. (2005) Readings in Environmental Ethics: Multidisciplinary perspectives, Rawat Publications,Jaipur.

PSEVS202

Pollution Control Technology: (Credit: 4)

Unit I **(15L)**

Water Pollution control technologies: Sewage and waste water treatments systems; Primary, secondary and tertiary treatments; Measurement of treatment efficiencies; Biological treatments - aerobic versus anaerobic treatments; Environmental pollution control- Bioremediation, Bioaugmentation and Biostimulation; Biofilms in treatment of waste water; Bioreactors for waste water treatments; Reactors types and design; Reactors in series; Development and optimization of membrane bioreactor process for use in sanitary and industrial sewage treatment.

Unit II **(15L)**

Air pollution control technologies and devices: Methods to control air pollution in the environment, Limestone injection and fluidized bed combustion, Desulfurization; Catalytic converter and control of vehicular emission, Gravity settling chamber, Centrifugal collectors- cyclone collector and dynamic precipitators; Electrostatic precipitators; Fabric filters.

Unit III **(15L)**

Solid, Toxic, and Hazardous waste management: solid waste disposal methods – open dumps, ocean dumping, Land fills, Incineration; Recycling and reuse. Organic pollutants and Hazardous waste disposal and management. Management of Radiation, noise, thermal, oil and e-wastes: recycling of waste. Biosorption - Biotechnology and heavy metal pollution; Oil field microbiology; Improved oil recovery; Biotechnology and oil spills; Hydrocarbon degradation.

Unit IV **(15L)**

Biotechnological methods to control pollution:

Bioremediation, Biotransformation Biodegradation and Phytoremediation: In situ and Ex situ bioremediation; Evaluating Bioremediation; Bioremediation of VOCs. Factors affecting process of biodegradation; Methods in determining biodegradability; Contaminant availability for biodegradation.; Use of microbes(bacteria and fungi) and plants in biodegradation and Biotransformation; Phytoremediation: Waste water treatment using aquatic plants; Root zone treatment.

Text/References:

1) M.H.Fulekar (2005) Environemtal Biotechnology Oxford IBH Publishing cooperation.

2) M.H.Fulekar (2010) Bioremediation technology recent advances, springer

3) N.P Cheremisinoff (1996) Biotechnology for Waste and Wastewater Treatment, William Andrew Publishing,New York.

4) Bruce Rittman, Perry L. McCarty, Environmental Biotechnology: Principles and Applications,2nd edition, McGraw-Hill, 2000.

5) Christon J. Hurst, Ronald L. Crawford, Guy R. Knudsen, Michael J. McInerney, Manual of Environmental Microbiology, 2nd edition, ASM Press. 2001.

6) Bruce Rittman, Perry L. McCarty. Environmental Biotechnology: Principles and Applications,2nd Edition, McGraw-Hill, 2000.

7) Mizrahi & Wezel, Advances in Biotechnological Process

8) Raina M. Maier, Ian L. Pepper, Charles P. Gerba. Environmental Microbiology, Academic Press, 2000.

9) Gabriel Bitton, Wastewater Microbiology, 2nd Edition. Wiley-Liss; 2nd Edition, 1999

PSEVS203

Green Technology: (Credit: 4)

Unit I **(15L)**

Overview, Principle, concepts and Tools of Green technology: Overview of green chemistry, Chemistry of the atmosphere, principles of sustainable and green chemistry. Basic principles of green technology, concepts of atom economy and carbon trading, tools of green technology. waste minimization and climate change, Zero waste technology, concept of environmentally balanced industrial complexing and industrial ecology, green house effect, climate change, photochemical smog.

Unit II **(15L)**

Green synthetic methods and designs: catalytic methods in green synthesis, safer chemicals - different basic approaches; selection of auxiliary substances (solvents, separation agents), green solvents, solventless processes, immobilized solvents and ionic liquids; energy requirements-use of microwaves, ultrasonic energy; selection of starting materials; use of blocking/protecting groups, catalytic reagents; designing of biodegradable products.

Unit III: **(15L)**

Green Nanotechnology: Introduction to Nanomaterials and green nanotechnology, Fullerene, carbon nanotubes, Nanoparticles; Green nanoparticle production and characterization; Biocompatibility; Nanomedical applications of green nanotechnologies; use of nanotechnologies and materials impact on biodiversity, resource conservation, ecosystems and human.

Unit IV: **(15L)**

Green technology applications: Biocatalysis, green chemistry in industries, fuel cell and electric vehicles, solar energy and hydrogen production, energy from alternate sources; Solar photovoltaic technology, Biofuel production (bio-ethanol and biodiesel), Biomass, prevention/minimization of hazardous/toxic products. Agricultural related practices and food processing, Production of biodegradable materials, concept of green building, Pollution free engineering processes.

Text/References:

1) M. H. Fulekar (2010) Nanotechnology Importance and applications, I K international publishing house Pvt.Ltd.

2) Lynn Goldman, Christine Coussens, Implications of nanotechnology for environmental health research, National Academic Press, Washington, 2007

3) Matlack, A. S. Introduction to Green Chemistry. Marcel Dekker: New York, 2001

4) Anastas, P. T.; Warner, J. C. Green Chemistry: Theory and Practice. Oxford Univ. Press:Oxford, 1998.

5) Lynn E. Foster: Nanotechnology: Science, Innovation, and Opportunity, December 21, 2005, Prentice Hall

6) Fei Wang & Akhlesh Lakhtakia (eds) (2006). Selected Papers on Nanotechnology—Theory & Modeling (Milestone Volume 182). SPIE Press

7) Caye Drapcho, Nhuan Phú Nghiêm, Terry Walker (2008). Biofuels Engineering Process Technology. [McGraw-Hill].

8) Akhlesh Lakhtakia (ed) (2004). The Handbook of Nanotechnology. Nanometer Structures: Theory, Modeling, and Simulation. SPIE Press, Bellingham, WA, USA

PSEVS204

Environmental Policies and Regulations (4 credit)

UNIT-I – Evolution of International Environmental Policy (15L)

- Fundamental principles of environmental protection - sustainable development- Brundtland report 1987.
- Intergenerational and intra-generational Equity, Polluter pays principle, precautionary principle, Public Trust Doctrine.
- Constitutional Perspective: Fundamental right to wholesome environment. Directive principles of state policy. Fundamental duty.
- National Environmental Policy.
- Environmental Regulatory Framework in India.
- Role of International Environmental Agencies -UNEP, GEF, UNFCC and IPCC

UNIT- II – Environmental Movement In India (15L)

- Movements related to Environment Sacredgroves, Bishnoi tradition, Chipko movement, Tehridam, Sardar Sarovar, Narmada dam, Almatti dam, Silent Valley.
- Supreme Court Cases – Ratlam Municipality, Ganga Action Plan, Taj Trapezium, Delhi CNG, Tamil Nadu Tanneries, Doon Valley,Span motels private limited case, Oleum gas case

UNIT-III – International Environmental Treaties and Conventions (15L)

- StockholmConferenceonHumanEnvironment,1972
- Ramsar Convention on Wetlands, 1971
- Montreal Protocol, 1987,
- Basel Convention (1989,1992),
- EarthSummitatRiodeJaneiro,1992
- Kyoto Protocol, 1997
- EarthSummitatJohannesburg,2002.
- Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

- Convention on Desertification 1996
- Convention on Biodiversity & Cartagena Protocol on Bio safety

UNIT-IV - Objectives and Provisions of Acts and Rules (15L)

- Indian Forest Act 1927
- Indian Wildlife (Protection) Act, 1972
- Forest Conservation Act 1980
- Forest Rights Act
- Water (Prevention and Control of Pollution) Act, 1974
- Air (Prevention and Control of Pollution) Act 1981
- Environment (Protection) Act, 1986
- Public Liability InsuranceAct,1991
- Bio-Medical Waste (Management & Handling) Rules,1998
- Recycled Plastics Manufacture and Usage Rules, 1999
- Noise Pollution (Regulation and Control) Rules, 2000
- Municipal Solid Waste (Management and Handling Rules) 2000
- Biodiversity Act 2002
- Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003
- EIA Notification 2006
- The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules,2008
- Wetland Rules 2009
- National Green Tribunal Act 2010
- Coastal Regulation Zones (CRZ) Rules 2011.
- E-waste Management and Handling Rules 2011
- Plastics Manufacture, Sale and Usage Rules, 2011

Text/References:

- Shyam Divan and Armin Rosencranz, 2005, *Environmental Law and Policy in India*, Oxford University Press, New Delhi, 2005
- Leelakrishnan. P, 2008, Environmental Law Case Book ,Lexis Nexis, Butterworths
- Mohanty. S. K., 2011, Environment and Pollution Law, Universal Law Publishing Co.Pvt. Ltd.
- Shastri S C, 2008, Environmental Law, (2nd Edn.), Eastern Book Company, Lucknow
- Singh Gurdip, 2004, Environmental Law in India, Mcmillan& Co.
- Shantakumar S,2005 Introduction to Environmental Law, (2nd Edn.), Wadhwa& Company, Nagpur
- Sahasranaman P B, 2008 Handbook of Environmental Law in India, Oxford University Press (India)

SEMESTER II

PSEVSP201

ENVIRONMENTAL MONITORING AND ASSESSMENT

A. Minor Experiments

1. Interpretation of Aerial photographs and preparing weather report based on it.
2. Determination of relative humidity from the atmosphere.
3. Determination of particulate matter from the industrial area by High Volume Sampler/Settling method.
4. Determination of Salinity of water by volhard's method.

B. Major Experiments

1. Determination of Cation-exchange capacity, moisture content, alkalinity/acidity of soil sample.
2. To prepare the station based wind rose for an area.
3. Determination of Residual Chlorine from drinking water using colorimetric method.
4. Determination of hydrocarbon from fuel gas using Orsat's apparatus.

PSEVSP202

POLLUTION CONTROL TECHNOLOGY

A. Minor Experiments

1. To isolate and study a pure culture of microorganism's from air, water and sewage.
2. Study the effect of pH on microbial growth.
3. Study the effect of heavy metals on the growth of bacteria.
4. Determination of MPN value of the drinking water and mineral water.

B. Major Experiments

1. Determination of K_2O value of soil by flame photometer.
2. Determination of P_2O_5 from soil by Olson's colorimetric method.

3. Determination of SO_2 by spectrophotometry using high volume sampler.
4. Determination of NO_2 from the atmosphere by Colorimetric method using high volume sampler.

PSEVSP203

GREEN CHEMISTRY

A. Minor Experiments

1. To study the Principle and application of Atomic absorption Spectrophotometry for analysis of metal ions from samples.

2. To study the Principle and application of Nephelometry and Turbidimetry: General discussion, Instruments for nephelometry and turbidimetry

3. To Study the chemical reactions involved in green nanotechnology: Nanoparticle production and characterization.

B. Major Experiments

1. Extraction and separation of organic compounds from soil and biological materials
   a. Ammonium sulphate method (Nichols method),
   b. TCA method,
   c. Acid digestion method,
   d. Wet washing for metals,
   e. Steam distillation for volatiles
2. To study different separation Techniques: Principle and process of solvent extraction,; Chromatography – principle and application of thin layer and ion exchange chromatography, Gas Chromatography and High Performance Liquid Chromatography.
3. Biofuel production methods and characterization for biodiesel and bioethanol.

PSEVSP204

ENVIRONMENTAL POLICIES AND REGULATIONS

A. Minor Experiments

1. Legal Case citation (one per student)
2. Reports on various study tours/academic visits.

B. Major Experiments

1. Preparation/drafting of EIA Report (Chemical Industry, Fertilizer Industry, hydropower station).
2. Report on Eco-tourism.

NOTE:-

Students should undertake field work and survey. The Students should visit different places to collect data to make survey and analyze. At least four places may be visited. The Places of visit could be: Lakes, rivers, estuary and marine, nature parks, water/ sewage/ Industrial effluent treatment plant, Solid waste dump, meteorological centre, mangrove vegetation, industries – food, pharmaceutical, petrochemical, fertilizer, paper, sugar, distillery etc. The students should also be encouraged to participate in the public lectures/ seminars/ workshops etc. on environment related issues.

Reports on each of visit/ activity undertaken must be included in the journal.

Texts/References:

1. Standard methods for examination of water and waste water , American Public Health Association.
2. A comprehensive laboratory manual for Environmental Sciences and Engineering By P.R. Sreemahadevan Pillai. New Age International Publishers.
3. Chemical and biological methods for water pollution studies By R.K. Trivedi
4. Handbook of water and waste water analysis By S.K. Maiti.
5. Soil and air analysis by S.K. Maiti.

M.Sc Environmental Sciences Semester I

Course Code No. & Title	Unit No.	Credits	Internal assessment Marks	External Assessment Marks
PSEVS 101Ecology and Ecosystem	I,II,III,IV	4	40	60
PSEVS102 Biodiversity	I,II,III,IV	4	40	60
PSEVS 103 Environment and Natural Resources	I,II,III,IV	4	40	60
PSEVS 104 Environmental Pollution	I,II,III,IV	4	40	60
PSEVSP 101		2	20	30
PSEVSP 102		2	20	30
PSEVSP103		2	20	30
PSEVSP104		2	20	30

M.Sc Environmental Sciences Semester II

Course Code No. & Title	Unit No.	Credits	Internal assessment Marks	External Assessment Marks
PSEVS201Environmental Monitoring and Assessment	I,II,III,IV	4	40	60
PSEVS202 Pollution Control and Technology	I,II,III,IV	4	40	60
PSEVS 203 Green Technology	I,II,III,IV	4	40	60
PSEVS 204 Environmental Policies and Regulations	I,II,III,IV	4	40	60
PSEVSP201		2	20	30
PSEVSP202		2	20	30
PSEVSP203		2	20	30
PSEVSP204		2	20	30

A) Internal Assessment:- 40%

a) Theory

Sr. No.	Evaluation type	Marks
1.	Two Assignments/Case study/Project	20
2.	One Class Test (Multiple questions objective)	10
3.	Active participation in routine class instructional deliveries (case studies/seminars/presentations)	05
4.	Overall Conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through co-curricular, etc.	05

b) Practicals

Sr. No.	Evaluation type	Marks
1.	One Practical	10
2.	Journal	05
3.	Viva	05

B) External Assessment:- 60%

a) Semester end Theory Assessment- 60% 60 Marks

i) Duration – These examinations shall be of two hours duration for each paper.

ii) Theory Question Paper Pattern:-

- There shall be five questions each of 12 Marks. On each unit there will be one question and the first one will be based on entire syllabus.
- All questions shall be compulsory with internal choice within the questions. Each question will be of 18 to 20 Marks with options.
- Questions shall be subdivided into sub-questions a,b,c….. and the allocation of marks depend on the weightage of the topic

b) Practicals 30 Marks (Each Unit)

SEMESTER I

Practical Examination
Four Days Examination (Each 4 Hrs. Per day) **Marks 120**

Day 1: PSEVSP 101 – Ecology and Ecosystem

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Day 2: PSEVSP 102 – Biodiversity

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Day 3: PSEVSP 103 – Environment and Natural Resources

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Day 4: PSEVSP 104 – Environmental Pollution

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Note:

1. Students should undertake field work and survey. The Students should visit different places to collect data to make survey and analyze. At least four places may be visited. The Places of visit could be: Lakes, rivers, estuary and marine, nature parks, water/ sewage/ Industrial effluent treatment plant, Solid waste dump, meteorological centre, mangrove vegetation, industries – food, pharmaceutical, petrochemical, fertilizer, paper, sugar, distillery etc. The students should also be encouraged to participate in the public lectures/ seminars/ workshops etc. on environment related issues.
   Reports on each of visit/ activity undertaken must be included in the journal.
2. A student is expected to submit a journal certified by the head of the Department/ Head of the institution.
3. A student will not be permitted to appear at the practical examination unless he/ she produce a certified journal. If the journal is lost, the students should produce a certificate from the Head of the Department/ Head of the institution stating that he/ she have satisfactory completed the experimental work.

SEMESTER II

Practical Examination
Four Days Examination (Each 4 Hrs. Per day) **Total Marks 120**

Day 1: PSESP 201 –Environmental Monitoring and Assessment

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Day 2: PSESP 202 – Pollution Control and Technology

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Day 3: PSESP 203 – Green Technology

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Day 4: PSESP 204 – Environmental Policies and Regulations

[I] – Major Experiment	20 Marks
[II] – Minor Experiment	10 Marks

Note:

4. Students should undertake field work and survey. The Students should visit different places to collect data to make survey and analyze. At least four places may be visited. The Places of visit could be: Lakes, rivers, estuary and marine, nature parks, water/ sewage/ Industrial effluent treatment plant, Solid waste dump, meteorological centre, mangrove vegetation, industries – food, pharmaceutical, petrochemical, fertilizer, paper, sugar, distillery etc. The students should also be encouraged to participate in the public lectures/ seminars/ workshops etc. on environment related issues.
   Reports on each of visit/ activity undertaken must be included in the journal.
5. A student is expected to submit a journal certified by the head of the Department/ Head of the institution.
6. A student will not be permitted to appear at the practical examination unless he/ she produce a certified journal. If the journal is lost, the students should produce a certificate from the Head of the Department/ Head of the institution stating that he/ she have satisfactory completed the experimental work.

UNIVERSITY OF MUMBAI
M.SC. ENVIRONMENTAL SCIENCES
Semester I/Semester II Examination
2012 – 2013

Course PSES_

Maximum Marks: 60
Duration: 2 Hrs.
Marks Option 90

Question 1: Unit I
Question 2: Unit II
Question 3: Unit III
Question 4: Unit IV
Question 5: Unit I to Unit IV (Mixed questions)

Instructions:

i. All Questions are compulsory
ii. All questions carry equal marks
iii. Draw neat and labeled diagrams wherever necessary

1. Answer any **two** questions from the following **(Based on Unit I)**
- a. 06
- b. 06
- c. 06

2. Answer any **two** questions from the following **(Based on Unit II)**
- a. 06
- b. 06
- c. 06

3. Answer any **two** questions from the following **(Based on Unit III)**
- a. 06
- b. 06
- c. 06

4. Answer any **two** questions from the following **(Based on Unit IV)**
- a. 06
- b. 06
- c. 06

5. Answer any **two** questions from the following **(Based on Unit IV)**
- a. 03
- b. 03
- c. 03
- d. 03
- e. 03
- f. 03

UNIVERSITYOF MUMBAI

M.Sc. ES

Semester I/Semester II

PRACTICAL EXAMINATION PSESP 101/201

(09:00 A.M. – 01:00 P.M.)

Total Marks: 30

1. **Major Experiment:** 20 Marks
2. **Minor Experiment:** 10 Marks

NOTE:

1. Practical examination to be conducted as per the practical Syllabus enlisted.
2. Candidates are required to present certified journal on the day of practical examination.

UNIVERSITYOF MUMBAI

M.Sc. ES

Semester I/Semester II

PRACTICAL EXAMINATION PSESP 102/202

(09:00 A.M. – 01:00 P.M.)

Total Marks: 30

1. **Major Experiment:** 20 Marks
2. **Minor Experiment:** 10 Marks

NOTE:

1. Practical examination to be conducted as per the practical Syllabus enlisted.
2. Candidates are required to present certified journal on the day of practical examination.

UNIVERSITYOF MUMBAI

M.Sc. ES

Semester I/Semester II

PRACTICAL EXAMINATION PSESP 103/203

(09:00 A.M. – 01:00 P.M.)

Total Marks: 30

1. **Major Experiment:** 20 Marks
2. **Minor Experiment:** 10 Marks

NOTE:

1. Practical examination to be conducted as per the practical Syllabus enlisted.
2. Candidates are required to present certified journal on the day of practical examination.

UNIVERSITYOF MUMBAI

M.Sc. ES

Semester I/Semester II

PRACTICAL EXAMINATION PSESP104/204

(09:00 A.M. – 01:00 P.M.)

Total Marks: 30

1. **Major Experiment:** 20 Marks
2. **Minor Experiment:** 10 Marks

NOTE:

1. Practical examination to be conducted as per the practical Syllabus enlisted.
2. Candidates are required to present certified journal on the day of practical examination.

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. (Accounting and Finance)
Programme
Second Year
Semester III and IV

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year 2017-2018)

Board of Studies-in-Accountancy

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

S.Y.B.Com. (Accounting and Finance)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	**Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Information Technology in Accountancy - I	**03**	4	Information Technology in Accountancy - II	**03**
2B	***Skill Enhancement Courses (SEC)***		**2B**	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Law (Business Regulatory Framework) - II	**03**	6	Business Law (Company Law) - III	**03**
7	Business Economics - II	**03**	7	Research Methodology in Accounting and Finance	**03**
	Total Credits	**20**		**Total Credits**	**20**

*List of Skill Enhancement Courses (SEC) for Semester III (Any One)		**List of Skill Enhancement Courses (SEC) for Semester IV (Any One)	
1	Foundation Course in Commerce (Financial Market Operations) - III	1	Foundation Course in Management (Introduction to Management) - IV
2	Foundation Course- Contemporary Issues- III	2	Foundation Course- Contemporary Issues- IV
3	Foundation Course in NSS - III	3	Foundation Course in NSS – IV
4	Foundation Course in NCC - III	4	Foundation Course in NCC – IV
5	Foundation Course in Physical Education - III	5	Foundation Course in Physical Education -IV

*List of Elective Courses (EC) for Semester III (Any Three)		**List of Elective Courses (EC) for Semester IV (Any Three)	
1	Financial Accounting (Special Accounting Areas) - III	1	Financial Accounting (Special Accounting Areas) - IV
2	Cost Accounting (Methods of Costing) - II	2	Management Accounting (Introduction to Management Accounting)
3	Auditing (Techniques of Auditing and Audit Procedures) - II	3	Auditing - III
4	Taxation - II (Direct Taxes Paper- I)	4	Taxation - III (Direct Taxes- II)
5	Principles & Practices of Banking	5	Wealth Management
Note: Course selected in Semester III will continue in Semester IV			

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2017-2018)

Semester III

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)*** ****Any three courses from the following list of the courses***	
1	Financial Accounting (Special Accounting Areas) - III	**03**
2	Cost Accounting (Methods of Costing) - II	**03**
3	Auditing (Techniques of Auditing and Audit Procedures) - II	**03**
4	Taxation - II (Direct Taxes Paper- I)	**03**
5	Principles & Practices of Banking	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Information Technology in Accountancy - I	**03**
2B	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Law (Business Regulatory Framework) II	**03**
7	Business Economics II	**03**
	Total Credits	**20**

****List of Skill Enhancement Courses (SEC) for Semester III (Any One)***	
1	Foundation Course in Commerce (Financial Market Operations) - III
2	Foundation Course- Contemporary Issues- III
3	Foundation Course in NSS - III
4	Foundation Course in NCC - III
5	Foundation Course in Physical Education - III

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Financial Accounting (Special Accounting Areas) - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Partnership Final Accounts based on Adjustment of Admission or Retirement / Death of a Partner during the Year	15
2	Piecemeal Distribution of Cash	10
3	Amalgamation of Firms	15
4	Conversion / Sale of a Partnership Firm into a Ltd. Company	10
5	Accounting of Transactions of Foreign Currency	10
	Total	**60**

Sr. No.	Modules / Units
1	**Partnership Final Accounts based on Adjustment of Admission or Retirement / Death of a Partner during the Year**
	Simple final accounts questions to demonstrate the effect on final Accounts when a partner is admitted during the year or when partner Retires / dies during the year Allocation of gross profit prior to and after admission / retirement / death when stock on the date of admission / retirement is not given and apportionment of other expenses based on time / Sales/other given basis Ascertainment of gross profit prior to and after admission/retirement / death when stock on the date of admission / retirement is given and apportionment of other expenses based on time / Sales / other given basis Excluding Questions where admission / retirement / death takes place in the same year
2	**Piecemeal Distribution of Cash**
	Excess Capital Method only Asset taken over by a partner Treatment of past profits or past losses in the Balance sheet Contingent liabilities / Realization expenses/amount kept aside for expenses and adjustment of actual Treatment of secured liabilities Treatment of preferential liabilities like Govt. dues / labour dues etc Excluding: Insolvency of partner and Maximum Loss Method
3	**Amalgamation of Firms**
	Realization method only Calculation of purchase consideration Journal/ledger accounts of old firms Preparing Balance sheet of new firm Adjustment of goodwill in the new firm Realignment of capitals in the new firm by current accounts / cash or a combination thereof Excluding : Common transactions between the amalgamating firms
4	**Conversion / Sale of a Partnership Firm into a Ltd. Company**
	Realisation method only Calculation of New Purchase consideration, Journal / Ledger Accounts of old firms. Preparing Balance sheet of new company
5	**Accounting of Transactions of Foreign Currency**
	In relation to purchase and sale of goods, services and assets and loan and credit transactions. Computation and treatment of exchange rate differences

Note: *Relevant Law/Statute/Rules in force and relevant Accounting Standards in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Cost Accounting (Methods of Costing) – II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Classification of Costs And Cost Sheets	20
2	Reconciliation of Cost and Financial Accounts	10
3	Contract Costing	15
4	Process Costing	15
	Total	**60**

Sr. No.	Modules / Units
1	**Classification of Costs and Cost Sheet**
	Classification of costs, Cost of Sales, Cost Centre, Cost Unit, Profit Centre and Investment Centre Cost Sheet, Total Costs and Unit Costs, Different Costs for different purpose Problems on preparation of cost sheet & Estimated Cost sheet
2	**Reconciliation of cost and financial accounts**
	Practical problems based on reconciliation of cost and Financial accounts
3	**Contract Costing**
	Progress payments, Retention money, Contract accounts, Accounting for material, Accounting for Tax deducted at source by the contractee, Accounting for plant used in a contract, treatment of profit on incomplete contracts, Contract profit and Balance sheet entries. Escalation clause, practical problems
4	**Process Costing**
	Process loss, Abnormal gains and losses, Joint products and by products. Excluding Equivalent units, Inter-process profit Practical problems Process Costing and joint and by products

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Auditing (Techniques of Auditing and Audit Procedures) - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Vouching	15
2	Verification	15
3	Auditing Standards	15
4	Audit of Companies	15
	Total	**60**

Sr. No.	Modules / Units
1	**Vouching**
1.1	Audit of Income : Revenue from Sales and Services, Rental Income, Interest & Dividends Income, Royalties Income, Recovery of Bad debts written off, Commission Received
1.2	Audit of Expenditure : Purchases, Salaries & Wages, Rent, Insurance Premium, Telephone expense , Petty cash payment, Advertisement, Travelling Salesmen's Commission, Freight Carriage and Custom Duties
2	**Verification**
2.1	Audit of assets : Plant & Machinery, Furniture and fixtures, Accounts Receivable, Investments, Inventory, Goodwill, Patent Rights
2.2	Audit of Liabilities: Outstanding Expenses, Accounts Payable, Secured loans, Unsecured Loans, Contingent Liabilities, Public Deposits
3	**Auditing Standards**
3.1	Meaning Procedure of issuing Auditing Standards in India Brief overview of Auditing Standards in India Scope of SAs Significance of the Auditing Standards Responsibility of auditor for auditing standards
3.2	Understanding of following standards SA 200. SA210, SA230, SA240, SA 250, SA300,SA315, SA320, SA505.
4	**Audit of Companies**
	Qualifications, Disqualifications, Appointments, Reappointment, Removal of auditors. Special auditors Branch auditors Rights and duties of company auditors

Note: *Relevant Law/Statute/Rules in force and relevant Standards in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Taxation - II (Direct Taxes Paper- I)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Definitions u/s – 2 , Basis of Charge and Exclusions from Total Income	15
2	Heads of Income	15
3	Deductions under Chapter VI – A	15
4	Computation of Total Income	15
	Total	**60**

Sr. No.	Modules / Units
1	**Definitions u/s – 2 , Basis of Charge and Exclusions from Total Income**
	Definitions u/s – 2 : Section 2 –Assessee, Assessment Year, Assessment, Annual value, Business, Capital asset, Income, Person, Previous Year, Transfer **Basis of Charge** : Section 3 – 9 – Previous Year, Residential Status, Scope Of Total Income, Deemed Income **Exclusions from Total Income**: Section 10 – restricted to, Agricultural Income, Sums Received From HUF By Member, Share of Profit from Firm, Casual & Non – Recurring Receipts, Scholarships, Income of Minor Child, Allowance to Members of Parliament and Legislative Assembly. **Note -Exemptions related to specific Heads of Income to be covered with Relevant Provisions.**
2	**Heads of Income**
	Various Heads of Income **Salary Income:** Section 15 – 17, Including Section 10 relating to House Rent Allowance, Travel Concession, Special Allowance, Gratuity, Pension – Commutation, Leave Encashment, Compensation, Voluntary Retirement, Payment from Provident Fund **Income From House Property :** Section 22 – 27, Including Section 2 – Annual Value **Profits & Gains From Business & Profession :** Vocation Section 28-32, 36, 37, 40, 40A, 43B, 44AD, 44ADA & 44AE including.: Section 2 – Business **Capital Gains :** Section 45, 48, 49, 50, 54 and 55 **Income from Other Sources:** Section 56 – 59
3	**Deductions under Chapter VI – A**
	80 A- Restriction on claim in Chapter VI- A deductions 80 C – Payment of LIC/PF and other eligible investments 80CCC – Contribution to certain Pension Fund 80D – Medical Insurance Premium 80 DD- Maintenance and medical treatment of handicapped dependent 80E – Interest on Educational Loan 80 TTA- Interest on Saving Bank account 80U – Deduction in the case of totally blind or physically handicapped or mentally retarded resident person
4	**Computation of Total Income**
	Computation of Total Income of Individual and HUF with respect to above heads and deductions

Note: *Relevant Law/Statute/Rules in force and relevant Standards in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

Principles & Practices of Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Financial System	15
2	Functions of Banks and related issues	20
3	Banking Technology	15
4	Marketing & Services of Banking	10
	Total	**60**

Sr. No.	Modules / Units
1	**Indian Financial System**
	Indian Financial system – An overview Banking Regulations Introduction to Retail Banking, wholesale banking and International banking Role of money market Debt market, capital market, Forex market & SEBI Mutual funds & Insurance companies & IRDA Factoring, Forfaiting services and off Balance sheet items Risk Management, Introduction of Basel norms CIBIL, Fair Practices code for Debt collection
2	**Functions of Banks and related issues**
	Banker Customer relationship KYC/AML/CFT norms Bankers special relationship Consumer protection – COPRA, Banking Ombudsman Scheme Payment and collection of cheque and other negotiable instrument Opening Accounts of various types of customers Ancillary services Cash Operations Principles of lending, working capital assessment and credit monitoring Priority sector advances Agricultural finance Micro, Small and Medium Enterprises – MSMED Act, Policy package Government Sponsored schemes –SGSY; SJSRY;PMRY;SLRS Self Help Groups Credit cards, Home loans, Personal Loans & Consumer loans Documentation Different types of charging securities Types of collaterals & their characteristics Non – Performing Assets Financial inclusion
3	**Banking Technology**
	Payments system & Electronic Banking Data communication and EFT Systems Role of Technology & its impact on Banks
4	**Marketing & Services of Banking**
	Marketing, Social Marketing Consumer behaviour and Product Pricing, distribution and channel management

Note: *Relevant Law/Statute/Rules in force and relevant Standards in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

2A. Ability Enhancement Courses (AEC)

Information Technology in Accountancy - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Computers	10
2	Office Productivity Tools	20
3	Web	10
4	Introduction to Internet and other emerging technologies	10
5	Electronic Commerce	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Computers**
	History of Computers Parts of Computers Hardwares: Specifications and Data Storage Management Softwares: Concept of System Software and Applications Networking: Introduction and types of network topologies
2	**Office Productivity Tools**
	MS Word: Creating, Editing, Formatting and Printing of Documents, Using Tools, Mailmerge and Print Review and Set-up **MS Excel:** Creating Worksheet, Creating Various Formulae, Creating Charts, Rename and Copy of Worksheets, Using Tools, Printing Review and Set-up **Power Point**: Create Project Report, Create Slides, Animation, Page Designing, Insert Image, View Page, Print Review and Set-up. Use of Tools In Accounting :– Preparation of vouchers, invoices and reports, Calculation of Interest, Depreciation,TDS, Salary, Taxes, inventory and reconciliation
3	**Web**
	Use of Various Web Browser Information Searching Tools Downloading Create New email ID Sending Data through email Search engine optimisation
4	**Introduction to Internet and other emerging technologies**
	Introduction – Internet components – electronic commerce – e-commerce applications – Electronic Data Exchange – Extranet – Payment systems – Risks and security considerations – Legal issues – Other emerging technologies
5	**Electronic Commerce**
	Meaning, Advantages and Limitations of E Commerce, The role of Strategy in E Commerce, Value chains in E Commerce, Infrastructure for Electronic Commerce Web Based Tools for Electronic Commerce, Electronic Commerce software, Security Threats to electronic Commerce , Implementing Security for Electronic Commerce, Electronic Payment Systems, Strategies for Marketing, Sales & Promotion Strategies for Purchasing Logistics & Support Activities, Electronic Markets & Communities, Business Plans for Implementing Electronic Commerce.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course in Commerce (Financial Market Operations) - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	An Overview of the Financial System	05
2	Financial Markets	15
3	Financial Instruments	10
4	Financial Services	15
	Total	**45**

Sr. No.	Modules / Units
1	**An Overview of the Financial System**
	Saving and Investment Money, Inflation and Interest Banking and Non Banking Financial Intermediaries
2	**Financial Markets**
	Financial Markets: Introduction and meaning, Government Economic Philosophy and Financial Market, Structure of Financial Market in India Capital Market: Introduction and meaning, Concept, Role, Importance, Evolution in India, Primary Market System and Regulations in India, Secondary Market System Bond Market in India Debt Market in India
3	**Financial Instruments**
	Meaning and types of Financial Instruments Characteristics of Financial Instruments: Liquidity, Maturity, Safety and Yield REPO, TBs, Equities, Bonds, Derivatives, others
4	**Financial Services**
	Merchant Banking : Managing of Public Equity / Debenture Issues Mobilizing Fixed Deposits, Arranging Inter-corporate Loans, Raising term Finance and Loan Syndication. Other Financial Services: Consumer Finance, Credit Cards, Mutual Funds and Commercial Paper

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course- Contemporary Issues- III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Human Rights Provisions, Violations and Redressal	12
2	Dealing With Environmental Concerns	11
3	Science and Technology I	11
4	Soft Skills for Effective Interpersonal Communication	11
	Total	**45**

Sr. No.	Modules / Units
1	**Human Rights Violations and Redressal**
	A. Scheduled Castes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **B.** Scheduled tribes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **C.** Women- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **D.** Children- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **E.** People with Disabilities, Minorities, and the Elderly population- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(4 Lectures)**
2	**Dealing With Environmental Concerns**
	A. Concept of Disaster and general effects of Disasters on human life- physical, psychological, economic and social effects. **(3 Lectures)** **B.** Some locally relevant case studies of environmental disasters. **(2 Lectures)** **C.** Dealing with Disasters - Factors to be considered in Prevention, Mitigation (Relief and Rehabilitation) and disaster Preparedness. **(3 Lectures)** **D.** Human Rights issues in addressing disasters- issues related to compensation, equitable and fair distribution of relief and humanitarian approach to resettlement and rehabilitation. **(3 Lectures)**
3	**Science and Technology – I**
	A. Development of Science- the ancient cultures, the Classical era, the Middle Ages, the Renaissance, the Age of Reason and Enlightenment. **(3 Lectures)** **B. Nature of science**- its principles and characteristics; Science as empirical, practical, theoretical, validated knowledge. **(2 Lectures)** **C. Science and Superstition**- the role of science in exploding myths, blind beliefs and prejudices; Science and scientific temper- scientific temper as a fundamental duty of the Indian citizen. **(3 Lectures)** **D. Science in everyday life**- technology, its meaning and role in development; Interrelation and distinction between science and technology. **(3 Lectures)**
4	**Soft Skills for Effective Interpersonal Communication**
	Part A **(4 Lectures)** I) Effective Listening - Importance and Features. II) Verbal and Non-Verbal Communication; Public-Speaking and Presentation Skills. III) Barriers to Effective Communication; Importance of Self-Awareness and Body Language. **Part B** **(4 Lectures)** I) Formal and Informal Communication - Purpose and Types. II) Writing Formal Applications, Statement of Purpose (SOP) and Resume. III) Preparing for Group Discussions, Interviews and Presentations. **Part C** **(3 Lectures)** I) Leadership Skills and Self-Improvement - Characteristics of Effective Leadership. II) Styles of Leadership and Team-Building.

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1. Asthana, D. K., and Asthana, Meera, *Environmental Problems and Solutions*, S. Chand, New Delhi, 2012.
2. Bajpai, Asha, *Child Rights in India*, Oxford University Press, New Delhi, 2010.
3. Bhatnagar Mamta and Bhatnagar Nitin, *Effective Communication and Soft Skills*, Pearson India, New Delhi, 2011.
4. G Subba Rao, *Writing Skills for Civil Services Examination,* Access Publishing, New Delhi, 2014
5. Kaushal, Rachana, *Women and Human Rights in India*, Kaveri Books, New Delhi, 2000.
6. Mohapatra, Gaur Krishna Das, *Environmental Ecology*, Vikas, Noida, 2008.
7. Motilal, Shashi, and Nanda, Bijoy Lakshmi, *Human Rights: Gender and Environment*, Allied Publishers, New Delhi, 2007.
8. Murthy, D. B. N., *Disaster Management: Text and Case Studies*, Deep and Deep Publications, New Delhi, 2013.
9. Parsuraman, S., and Unnikrishnan, ed., *India Disasters Report II*, Oxford, New Delhi, 2013
10. Reza, B. K., *Disaster Management*, Global Publications, New Delhi, 2010.
11. Sathe, Satyaranjan P., *Judicial Activism in India*, Oxford University Press, New Delhi, 2003.
12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.

Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course in NSS - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Value System & Gender sensitivity	12
2	Disaster preparedness & Disaster management	10
3	Health, hygiene & Diseases	13
4	Environment & Energy conservation	10
	Total	**45**

Sr. No.	Modules / Units
1	**Value System & Gender sensitivity**
	UNIT - I – Value System Meaning of value, Types of values- human values and social responsibilities- Indian value system- the concepts and its features **UNIT - II - Gender sensitivity and woman empowerment** Concept of gender- causes behind gender related problems- measures Meaning of woman empowerment- schemes for woman empowerment in India
2	**Disaster preparedness & Disaster management**
	UNIT - I - Basics of Disaster preparedness Disaster- its meaning and types Disaster preparedness- its meaning and methods **UNIT - II - Disaster management** Disaster management- concept- disaster cycle - role of technology in disaster response- role of as first responder – the study of 'Avhan' Model
3	**Health, hygiene & Diseases**
	UNIT - I - Health and hygiene Concept of complete health and maintenance of hygiene **UNIT - II - Diseases and disorders- preventive campaigning** Diseases and disorders- preventive campaigning in Malaria, Tuberculosis, Dengue, Cancer, HIV/AIDS, Diabetes
4	**Environment & Energy conservation**
	UNIT - I Environment and Environment enrichment program Environment- meaning, features , issues, conservation of natural resources and sustainability in environment **UNIT - II Energy and Energy conservation program** Energy- the concept, features- conventional and non- conventional energy Energy conservation- the meaning and importance

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course in NCC - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training and Environment Awareness and Conservation	05
4	Personality Development and Leadership	10
5	Specialized subject (ARMY)	10
	Total	**45**

Sr. No.	Modules / Units
1	**National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. The students shall enrich themselves about the history of our beloved country and will look forward for the solutions based on strengths to the challenges to the country for its development. • Freedom Struggle and nationalist movement in India. • National interests, Objectives, Threats and Opportunities. • Problems/ Challenges of National Integration. • Unity in Diversity
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Side pace, pace forward and to the rear • Turning on the march and whiling • Saluting on the march • Marking time, forward march and halt in quick time • Changing step • Formation of squad and squad drill
3	**Adventure Training, Environment Awareness and Conservation**
3A	**Adventure Training**
	Desired outcome: The students will overcome fear & inculcate within them the sense of adventure, sportsmanship, espirit-d-corp and develop confidence, courage, determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing, Scuba Diving etc.
3B	**Environment Awareness and Conservation**
	Desired outcome: The student will be made aware of the modern techniques of waste management and pollution control. • Waste management • Pollution control, water, Air, Noise and Soil
4	**Personality Development and Leadership**
	Desired outcome: The student will inculcate officer like qualities with desired ability to take right decisions. • Time management • Effect of Leadership with historical examples • Interview Skills • Conflict Motives- Resolution

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** It will acquaint, expose & provide knowledge about Army/ Navy/ Air force and to acquire information about expanse of Armed Forces ,service subjects and important battles **A. Armed Force** • Task and Role of Fighting Arms • Modes of Entry to Army • Honors and Awards **B. Introduction to Infantry and weapons and equipments** • Characteristics of 5.56mm INSAS Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning • Organization of Infantry Battalion. **C. Military history** • Study of battles of Indo-Pak War 1965,1971 and Kargil • War Movies **D. Communication** • Characteristics of Walkie-Talkies • Basic RT Procedure • Latest trends and Development (Multi Media, Video Conferencing, IT) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • Organization of Ship- Introduction on Onboard Organization • Naval Customs and Traditions • Mode of Entry into Indian Navy • Branches of the Navy and their functions • Naval Campaign (Battle of Atlantic, Pearl Harbour, Falkland War/Fleet Review/ PFR/ IFR)s **B. Ship and Boat Modelling** • Types of Models • Introduction of Ship Model- Competition Types of Model Prepare in NSC and RDC • Care and handling of power-tools used- maintenance and purpose of tools

Sr. No.	Modules / Units
	C. Search and Rescue • Role of Indian Coast Guard related to SAR **D. Swimming** • Floating and Breathing Techniques- Precautions while Swimming ***OR*** **AIR** **A. General Service Knowledge** • Organization Of Air Force • Branches of the IAF. **B. Principles of Flight** • Venturi Effect • Aerofoil • Forces on an Aircraft • Lift and Drag **C. Airmanship** • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Types of Engines • Piston Engines • Jet Engines • Turboprop Engines

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course in Physical Education - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Nutrition	10
2	Evaluation of Health, Fitness and Wellness	10
3	Prevention and Care of Exercise Injuries	10
4	Sports Training	15
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Nutrition**
	• Introduction to nutrition & its principles • Role of Nutrition in promotion of health • Dietary Guidelines for Good Health • Regulation of water in body and factors influencing body temperature.
2	**Evaluation of Health, Fitness and Wellness**
	• Meaning & Concept of holistic health • Evaluating Personal health-basic parameters • Evaluating Fitness Activities – Walking & Jogging • Myths & mis-conceptions of Personal fitness
3	**Prevention and Care of Exercise Injuries**
	• Types of Exercise Injuries • First Aid- Importance & application in Exercise Injuries • Management of Soft tissues injuries • Management of bone injuries
4	**Sports Training**
	• Definition, aims & objectives of Sports training • Importance of Sports training • Principles of Sports training • Drug abuse & its effects

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

3. Core Courses (CC)

Business Law (Business Regulatory Framework) - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	The Indian Partnership Act - 1932	30
2	Limited Liability Partnership Act - 2008	10
3	Factories Act - 1948	20
	Total	**60**

Sr. No.	Modules / Units
1	**The Indian Partnership Act - 1932**
	a) Concept of Partnership - Partnership and Company - Test for determination of existence for partnership - Kinds of partnership b) Registration and effects of non-registration of Partnership c) Rights and Duties of Partners d) Authority and Liability of partners e) Admission, Retirement and Expulsion of Partner f) Dissolution of Partnership
2	**Limited Liability Partnership Act – 2008**
	a)Nature of Limited Liability Partnership b)Incorporation of Limited Liability Partnership c)Extent and Limitation of Liability of Limited Liability Partnership and Partners d)Contributions e)Conversion Into Limited Liability Partnership f)Winding Up and Dissolution
3	**Factories Act – 1948**
	a) Definitions • Section 2 (k) – Manufacturing Process, • Section2 (l) –Workers • Section 2 (m)– Factory b) Provisions pertaining to i. Health- Section 11 to Section 20 ii. Safety- Section 21 to Section 41 iii. Welfare- Section 42 to Section 49

Note: *Relevant Law/ Statute/ Rules in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III with Effect from the Academic Year 2017-2018

3. Core Courses (CC)

Business Economics - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Macroeconomics	10
2	Money, prices and Inflation	10
3	Introduction to Public Finance	10
4	Public revenue, Public Expenditure and Debt	20
5	Fiscal Management and Financial Administration	10
	Total	**60**

Sr. No.	Modules / Units
1	**Overview of Macroeconomics**
	Macroeconomics: Meaning, Scope and Importance. **Circular flow of aggregate income and expenditure** and its Importance- closed and open economy models **The Measurement of National Product:** Meaning and Importance of National Income Accounting- conventional and Green GNP and NNP concepts -National Income and Economic Welfare. **Trade Cycles:** Features and Phases **Classical Macro economics : Say's law of Markets** - Features, Implications and Criticism
2	**Money, prices and Inflation**
	Money Supply: Determinants of Money Supply - Factors influencing Velocity of Circulation of Money **Demand for Money :** Classical and Keynesian approaches and Keynes' liquidity preference theory of interest - Friedman's restatement of Demand for money **Money and prices** : Quantity theory of money - Fisher's equation of exchange - Cambridge cash balance approach **Inflation :** Demand Pull Inflation and Cost Push Inflation - Effects of Inflation- Nature of inflation in a developing economy - policy measures to curb inflation- monetary policy and inflation targeting
3	**Introduction to Public Finance**
	Meaning and Scope of Public finance. **Major fiscal functions** : allocation function, distribution function & stabilization function **Principle of Maximum Social Advantage:** Dalton and Musgrave Views - the Principle in Practice, Limitations. **Relation between Efficiency, Markets and Governments** **The concept of Public Goods and the role of Government**
4	**Public revenue, Public Expenditure and Debt**
	Sources of Public Revenue : tax and non-tax revenues Objectives of taxation - Canons of taxation - Types of taxes : direct and indirect - Tax Base and Rates of taxation : proportional, progressive and regressive taxation **Shifting of tax burden:** Impact and incidence of taxation - Processes- factors influencing incidence of taxation **Economic Effects of taxation:** on Income and Wealth, Consumption, Savings, Investments and Production. **Redistributive and Anti – Inflationary nature of taxation** and their implications **Public Expenditure:** Canons - classification - economic effects of public spending - on production, consumption, distribution, employment and stabilization - Theories of Public Expenditure: Wagner's Hypothesis and Wiseman Peacock Hypothesis - Causes for Public Expenditure Growth. **Significance of Public Expenditure:** Social security contributions- Low Income Support and Social Insurance Programmes. **Public Debt :** Classification - Burden of Debt Finance : Internal and External- Public Debt and Fiscal Solvency

5	Fiscal Management and Financial Administration
	Fiscal Policy: Meaning, Objectives, constituents and Limitations. **Contra cyclical Fiscal Policy and Discretionary Fiscal Policy :** Principles of Sound and Functional Finance **Budget-** Meaning objectives and types - Structure of Union budget - Deficit concepts-Fiscal Responsibility and Budget Management Act. **Intergovernmental Fiscal Relations :** fiscal federalism and fiscal decentralization **-** central-state financial relations **-** 14th Finance Commission recommendations

B.Com. (Accounting and Finance) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2017-2018)

Semester IV

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)*** *Any three courses from the following list of the courses	
1	Financial Accounting (Special Accounting Areas) - IV	**03**
2	Management Accounting (Introduction to Management Accounting)	**03**
3	Auditing - III	**03**
4	Taxation - III (Direct Taxes- II)	**03**
5	Wealth Management	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Information Technology in Accountancy - II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Law (Company Law) - III	**03**
7	Research Methodology in Accounting and Finance	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester IV (Any One)***	
1	Foundation Course in Management (Introduction to Management) - IV
2	Foundation Course – Contemporary Issues - IV
3	Foundation Course in NSS - IV
4	Foundation Course in NCC - IV
5	Foundation Course in Physical Education - IV

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Financial Accounting (Special Accounting Areas) - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Preparation of Final Accounts of Companies.	15
2	Redemption of Preference Shares	10
3	Redemption of Debentures	15
4	Ascertainment and Treatment of Profit Prior to Incorporation	10
5	Foreign Branch	10
	Total	**60**

Sr. No.	Modules / Units
1	**Preparation of Final Accounts of Companies**
	Relevant provisions of Companies Act related to preparation of Final Account (excluding cash flow statement) Preparation of financial statements as per Companies Act. (excluding cash flow statement) AS 1 in relation to final accounts of companies (disclosure of accounting policies)
2	**Redemption of Preference Shares**
	Provision of the Companies Act for redemption of Preference Shares (Sec 55 of the Companies Act, 2013), Companies (Share and Debentures) Rules. Methods of Redemption of fully paid up Preference Shares as per Companies Act, 2013: The proceed of a fresh issue of shares, the capitalisation of undistributed profits and a combination of both, calculation of minimum fresh issue to provide the fund for redemption, (Question on entries and/or Balance Sheet) Note: Companies governed by Section 133 of the Companies Act, 2013 and comply with the accounting standards prescribed for them. Hence, the balance in security premium account not to be utilised for premium payable on redemption of preference shares.
3	**Redemption of Debentures**
	Introduction : Provisions of Section 71 (1) and (4) of the Companies Act, 2013, Creation and investment of DRR including The Companies (Share Capital and Debentures) Rules, 2014, the methods of writing-off discount/loss on issue of debentures; Terms of issue of debentures Methods of redemption of debentures: By payment in lumpsum and by payment in instalments (excluding from by purchase in open market), Conversion. (Question on entries. ledgers and/or Balance Sheet and /or redemption of preference shares)
4	**Ascertainment and Treatment of Profit Prior to Incorporation**
	Principles for ascertainment Preparation of separate, combined and columnar Profit and Loss Account including different basis of allocation of expenses/ incomes
5	**Foreign Branch**
	Conversion as per AS 11 and incorporation in HO accounts

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Management Accounting (Introduction to Management Accounting)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Management Accounting	05
2	Analysis and Interpretation of Accounts	10
2	Financial Statement analysis: Ratio analysis	15
3	Cash Flow Analysis	15
4	Working Capital Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Management Accounting**
	Meaning, Features, Scope, Importance, Functions, role of Management Accounting, Management Accounting Framework, Tools, Management Accounting and Financial Accounting
2	**Analysis and Interpretation of Accounts**
	a)Vertical Forms of Balance Sheet and Profit and Loss Account suitable for analysis b) Trend Analysis. c) Comparative Statement. d) Common Size Statement. NOTE: Practical Problems based on the above (a) to (d)
3	**Financial Statement analysis: Ratio analysis**
	Meaning of financial Statement Analysis, steps, Objective and types of Analysis. Ratio analysis: Meaning, classification, Du Point Chart, advantages and Limitations. Balance Sheet Ratios: i) Current Ratio ii) Liquid Ratio iii) Stock Working Capital Ratio iv) Proprietary Ratio v) Debt Equity Ratio vi) Capital Gearing Ratio Revenue Statement Ratios: i) Gross Profit Ratio ii) Expenses Ratio iii) Operating Ratio iv) Net Profit Ratio v) Net Operating Profit Ratio vi) Stock Turnover Ratio Combined Ratio i) Return on Capital employed (Including Long Term Borrowings) ii) Return on proprietor's Fund (Shareholders Fund and Preference Capital) iii) Return on Equity Capital iv) Dividend Payout Ratio v) Debt Service Ratio vi) Debtors Turnover vii) Creditors Turnover
4	**Cash Flow Analysis**
	Preparation of Cash Flow Statement with reference to Accounting Standard No .3. (Indirect method only))
5	**Working Capital Management**
	A. Concept, Nature of Working Capital , Planning of Working Capital B. Estimation / Projection of Working Capital Requirement in case of Trading and Manufacturing Organization C. Operating Cycle Practical Problems

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Auditing - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Audit Report	15
2	Audit under Computerized Information System Environment	15
3	Professional Ethics	15
4	Investigation and Due Diligence	15
	Total	**60**

Sr. No.	Modules / Units
1	**Audit Report**
	Reporting requirement under the Companies Act Qualifications in Audit Report, Disclaimers in Audit Report Adverse Opinion, Disclosures, Reports & Certificate
2	**Audit under Computerized Information System Environment**
	Special aspects of CIS Audit Environment , Need for review of internal control especially procedure controls and facility controls Approach to audit in CIS environment Use of computer for internal and management audit purposes Audit tools, test packs, computerized audit programmes Special aspects in Audit of E-Commerce Transaction.
3	**Professional Ethics**
	Code of Ethics with special reference to the relevant provisions of The Chartered Accountant Act and the Regulations thereunder The Chartered Accountant Act Schedules Members who are deemed to be in Practice Significance of the Certificate of Practice Disabilities for purpose of Membership Disciplinary Procedure Professional Misconduct
4	**Investigation and Due Diligence**
	Introduction Auditing and Investigation Steps in Investigation Special aspects in connection with Business Investigation Types of Investigation (only introduction) Meaning of Due Diligence Purpose of Due Diligence

Note: *Relevant Law/Statute/Rules in force in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Taxation - III (Direct Taxes- II)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Clubbing of Income	05
2	Set Off & Carry Forward of Losses	05
3	Computation of Tax liability of Individual & HUF	05
4	Computation of Income of Partnership Firm in Relation to Sec: 40(b) & Tax Thereon With Applicable Rate of Tax	15
5	Return of Income – Sec 139	05
6	Tax Deduction at Source Advance Tax Interest Payable	15
7	DTAA U/S 90 & 91	05
8	Tax Planning & Ethics in Taxation	05
	Total	**60**

Sr. No.	Modules/ Units
1	**Clubbing of Income - Section 60 to 65**
2	**Set Off & Carry Forward of Losses**
	Sec: 70 – Set off Loss from one Source against Income from another Source under the Same Head of Income Sec: 71 – Set Off Loss from One Head against Income of another Head Sec: 71B – Carry Forward & Set off Losses from House Property Sec: 72 – Carry Forward & Set Off of Losses of Business Losses Sec: 73- Losses in Speculation Business Sec: 74- Loss under the head Capital Gains
3	**Computation of Tax liability of Individual & HUF**
4	**Computation of Income of Partnership Firm in Relation to Sec: 40(b) & Tax Thereon With Applicable Rate of Tax**
5	**Return of Income – Sec 139**
	Excluding u/s 139(4A), 139(4B), 139(4C) & 139 (4D)
6	**Tax Deduction at Source** **Advance Tax U/S 207, 208, 209, 210 & 211** **Interest Payable U/S 234A, 234B, 234C**
	Basic Aspects of Deduction of Taxes at Source Sec: 192 – TDS on Salary Sec: 194A – TDS on Interest Sec: 194C – TDS on Contractor Sec: 194H – TDS on Commission Sec: 194I – TDS on Rent Sec: 194J – TDS on Professional Fees **Advance Tax U/S 207, 208, 209, 210 & 211** Sec: 207 – Income Liable to Advance Tax Sec: 208 – Liability of Advance Tax Sec: 209 – Computation of Advance Tax Sec: 210 – Payment of Advance Tax by Assessee on His Own Account Sec: 211 – Due Dates of Payment of Advance Tax **Interest Payable U/S 234A, 234B, 234C** Sec: 234A – Interest for default in furnishing return of income Sec: 234B – Interest for default in payment of advance tax Sec: 234C – Interest for deferment of advance tax
7	**DTAA U/S 90 & 91**
8	**Tax Planning &Ethics in Taxation – Basic Concepts**

Note:

1. Relevant Law / Statute in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuing examinations after relevant year.
2. The syllabus is restricted to study of particular section/s, specifically mentioned rules and notifications only.

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

1. Elective Courses (EC)

Wealth Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Wealth Management	10
2	Important Numerical Concepts	20
3	Wealth Management Process	15
4	Operational Aspects of Wealth Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Wealth Management**
	Definition Wealth management and its evolution Wealth management process and phases Nature and structure of Primary and Secondary capital market Comparison between various options for investing and Risk & return analysis **Role of Wealth Manager :** Obligation and Responsibilities of wealth manager Qualification , Capital requirement, certification to become investment advisor Code of conduct and ethics in providing financial advice
2	**Important Numerical Concepts**
	Simple interest, Compound interest, Discounted cash flow and installment calculation Correlation, Standard deviation, covariance & Beta of portfolio Share valuation Bond valuation
3	**Wealth Management Process**
	Developing a Wealth Management Plan Essentials of a Comprehensive Wealth Plan Analysis of Different financial Products for investment Risk profiling of the client Portfolio construction Modern Portfolio Theory for constructing a portfolio
4	**Operational Aspects of wealth management**
	Types of investors PAN and KYC process Dematerialization and rematerialization of securities Power of Attorney Account opening Process of Non Resident Documentation of financial advisor

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

2A. Ability Enhancement Courses (AEC)

Information Technology in Accountancy - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business Process	15
2	Computerized accounting system	20
3	Concept of MIS Reports in Computer Environment	15
4	IT and Auditing	10
	Total	**60**

Sr. No.	Modules / Units
1	**Business Process**
	Introduction, Definition and Meaning of business process Flow of business process for accounting, purchase, sales and finance Classification of business processes Introduction, Definition and Meaning of Business Process Management Principles and practices of Business Process Management Business Process Management life cycle Theories of Business Management Process Implementation of Business process Management – need, key factors and importance Automation of business Processes – benefits, risks, challenges Accounting systems automation IT and Business Process Management Information systems – Meaning, Use of IT in accounacy
2	**Computerized accounting system**
	Introduction and meaning Uses and Benefits Role Need and requirements of computerized accounting Basic requirements of computerized accounting system Limitations of computerized accounting system Understand the development and design of a computerized accounting system; determining how the accounting data will be processed, i.e. what accounts and books are needed and what is the desired output i.e. financial reports and other reports. Accounting Software Introduction and meaning Advantages of accounting software Uses of Accounting software Various accounting softwares Accounting software TALLY – Accounting and reports
3	**Concept of MIS Reports in Computer Environment**
	Introduction Concept of MIS Need for MIS Characteristic of MIS Outputs of MIS Role of MIS Guidelines for Developing MIS reports Functional Aspects of the MIS: Problems in MIS Knowledge required for studying MIS MIS and Computer
4	**IT and Auditing**
	Need and importance of IT in auditing Auditing in IT environment

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2B. Skill Enhancement Courses (SEC)

Foundation Course in Management (Introduction to Management) - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Management Concepts	05
2	Planning	10
3	Organising	10
4	Staffing	10
5	Directing and Controlling	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Basic Management Concepts**
	Introduction to Management, Definition of Management Nature of Management Objectives of Management Administration vs Management Levels of Management Principles of Management
2	**Planning**
	Definition and Importance of Planning Process of Planning Limitations of Planning Features of Sound Planning Features and process of decision making
3	**Organising**
	Definition, nature and significance Process of organisation Principles of organisation Formal and Informal organisation - features, advantages and disadvantages Centralisation and decentralisation – factors, merits and demerits Departmentation and Delegation
4	**Staffing**
	Meaning, Importance of Staffing Recruitment and its sources Selection procedure Distinction between Recruitment and Selection Employment tests and types of Interview
5	**Directing and Controlling**
	Meaning and Importance of directing Principles of Directing Leadership trails and Styles Motivation – Importance and Factors Co-ordination – Meaning, features and Importance Meaning and steps in controlling Essentials of a good control system

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course- Contemporary Issues- IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Significant, Contemporary Rights of Citizens	12
2	Approaches to understanding Ecology	11
3	Science and Technology –II	11
4	Introduction to Competitive Exams	11
	Total	**45**

Sr. No.	Modules / Units
1	**Significant, Contemporary Rights of Citizens**
	A. Rights of Consumers-Violations of consumer rights and important provisions of the Consumer Protection Act, 2016; Other important laws to protect consumers; Consumer courts and consumer movements. **(3 Lectures)** **B. Right to Information**- Genesis and relation with transparency and accountability; important provisions of the Right to Information Act, 2005; some success stories. **(3 Lectures)** **C. Protection of Citizens'/Public Interest**-Public Interest Litigation, need and procedure to file a PIL; some landmark cases. **(3 Lectures)** **D. Citizens' Charters, Public Service Guarantee Acts. (3 Lectures)**
2	**Approaches to understanding Ecology**
	A. Understanding approaches to ecology- Anthropocentrism, Biocentrism and Eco centrism, Ecofeminism and Deep Ecology. **(3 Lectures)** **B. Environmental Principles-1**: the sustainability principle; the polluter pays principle; the precautionary principle. **(4 Lectures)** **C. Environmental Principles-2**: the equity principle; human rights principles; the participation principle. **(4 Lectures)**
3	**Science and Technology –II**
	Part A:Some Significant Modern Technologies, Features and Applications (7 Lectures) **i. Laser Technology**- Light Amplification by Stimulated Emission of Radiation; use of laser in remote sensing, GIS/GPS mapping, medical use. **ii. Satellite Technology**- various uses in satellite navigation systems, GPS, and imprecise climate and weather analyses. **iii. Information and Communication Technology**- convergence of various technologies like satellite, computer and digital in the information revolution of today's society. **iv. Biotechnology and Genetic engineering**- applied biology and uses in medicine, pharmaceuticals and agriculture; genetically modified plant, animal and human life. **v. Nanotechnology**- definition: the study, control and application of phenomena and materials at length scales below 100 nm; uses in medicine, military intelligence and consumer products. **Part B:Issues of Control, Access and Misuse of Technology. (4 Lectures)**

Sr. No.	Modules / Units
4	**Introduction to Competitive Exams**
	Part A. Basic information on Competitive Examinations- the pattern, eligibility criteria and local centres: **i.** Examinations conducted for entry into professional courses - Graduate Record Examinations (GRE), Graduate Management Admission Test GMAT), Common Admission Test (CAT) and Scholastic Aptitude Test (SAT). **ii.** Examinations conducted for entry into jobs by Union Public Service Commission, Staff Selection Commission (SSC), State Public Service Commissions, Banking and Insurance sectors, and the National and State Eligibility Tests (NET / SET) for entry into teaching profession. **Part B. Soft skills required for competitive examinations- (7 Lectures)** **i.** Information on areas tested: Quantitative Ability, Data Interpretation, Verbal Ability and Logical Reasoning, Creativity and Lateral Thinking **ii.** Motivation: Concept, Theories and Types of Motivation **iii.** Goal-Setting: Types of Goals, SMART Goals, Stephen Covey's concept of human endowment **iv.** Time Management: Effective Strategies for Time Management **v.** Writing Skills: Paragraph Writing, Report Writing, Filing an application under the RTI Act, Consumer Grievance Letter.

References

1. Asthana, D. K., and Asthana, Meera, *Environmental Problems and Solutions*, S. Chand, New Delhi, 2012.
2. Bajpai, Asha, *Child Rights in India*, Oxford University Press, New Delhi, 2010.
3. Bhatnagar Mamta and Bhatnagar Nitin, *Effective Communication and Soft Skills*, Pearson India, New Delhi, 2011.
4. G Subba Rao, *Writing Skills for Civil Services Examination,* Access Publishing, New Delhi, 2014
5. Kaushal, Rachana, *Women and Human Rights in India*, Kaveri Books, New Delhi, 2000.
6. Mohapatra, Gaur Krishna Das, *Environmental Ecology*, Vikas, Noida, 2008.
7. Motilal, Shashi, and Nanda, Bijoy Lakshmi, *Human Rights: Gender and Environment*, Allied Publishers, New Delhi, 2007.
8. Murthy, D. B. N., *Disaster Management: Text and Case Studies*, Deep and Deep Publications, New Delhi, 2013.
9. Parsuraman, S., and Unnikrishnan, ed., *India Disasters Report II*, Oxford, New Delhi, 2013
10. Reza, B. K., *Disaster Management*, Global Publications, New Delhi, 2010.
11. Sathe, Satyaranjan P., *Judicial Activism in India*, Oxford University Press, New Delhi, 2003.
12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.

Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

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2B. Skill Enhancement Courses (SEC)

Foundation Course in NSS - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Entrepreneurship Development	10
2	Rural Resource Mobilization	10
3	Ideal village & stake of GOS and NGO	13
4	Institutional Social Responsibility and modes of Awareness	12
	Total	**45**

Sr. No.	Modules / Units
1	**Entrepreneurship Development**
	UNIT - I Entrepreneurship development Entrepreneurship development- its meaning and schemes Government and self-employment schemes for Entrepreneurship development **UNIT - II - Cottage Industry** Cottage Industry- its meaning, its role in development process Marketing of cottage products and outlets
2	**Rural Resource Mobilization**
	UNIT - I - Rural resource mobilization- A case study of eco-village, eco-tourism, agro-tourism **UNIT - II - Micro financing with special reference to self-help groups**
3	**Ideal village & stake of GOS and NGO**
	UNIT - I - Ideal village Ideal village- the concept Gandhian Concept of Ideal village Case studies on Ideal village **UNIT - II - Government Organisations(GOs) and Non-Government Organisations (NGOs)** The concept and functioning
4	**Institutional Social Responsibility and modes of Awareness**
	UNIT - I - Institutional Social Responsibilities Concept and functioning- case study of adapted village **UNIT - II - Modes of awareness through fine Arts Skills** Basics of performing Arts as tool for social awareness, street play, creative dance, patriotic song, folk songs and folk dance. Rangoli, posters, flip charts, placards, etc**.**

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2B. Skill Enhancement Courses (SEC)

Foundation Course in NCC - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	05
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	10
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Fire Services & Fire fighting • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils. • NGOs: Role & Contribution • Drug Abuse & Trafficking • Corruption • Social Evil viz. Dowry/ Female Foeticide/Child Abuse & trafficking etc. • Traffic Control Org. & Anti drunken Driving
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Hygiene and Sanitation (Personal and Food Hygiene) • Basics of Home Nursing & First-Aid in common medical emergencies • Wound & Fractures
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, and turnout, and develop the quality of immediate and implicit obedience of orders, with good reflexes. • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • General Salute, Salami Shastra • Squad Drill • Short/Long tail from the order and vice-versa • Examine Arms
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Theory of Group and Snap Shooting • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Setting a Map, finding North and own position • Map to ground, Ground to Map • Point to Point March **B. Field Craft and Battle Craft** • Observation, Camouflage and Concealment • Field Signals • Types of Knots and Lashing **C. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)** ***OR*** **Navy** **A. Naval Communication** • Semaphore ▪ Phonetic Alphabets ▪ Radio Telephony Procedure ▪ Wearing of National Flag, Ensign and Admiral's Flag. **B. Seamanship** • **Anchor work** ▪ Types of Anchor, Purpose and Holding ground • **Boat work** ▪ Demonstrate Rigging a whaler and enterprise boat- Parts of Sail and Sailing Terms ▪ Instructions in Enterprise Class Board including theory of Sailing, Elementary Sailing Tools ▪ Types of Power Boats Used in the Navy and their uses, Knowledge of Anchoring, Securing and Towing a Boat **C. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)**

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Fuselage • Main and Tail Plain **B. Instruments** • Introduction to RADAR **C. Aero modelling** • Flying/ Building of Aero models **D. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)**

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2B. Skill Enhancement Courses (SEC)

Foundation Course in Physical Education - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Stress Management	10
2	Awards, Scholarship & Government Schemes	10
3	Yoga Education	10
4	Exercise Scheduling/Prescription	15
	Total	**45**

Sr. No.	Modules / Units
1	**Stress Management**
	• Meaning & concept of Stress • Causes of Stress • Managing Stress • Coping Strategies
2	**Awards, Scholarship & Government Schemes**
	• State & National level Sports Awards • State Sports Policy & Scholarship Schemes • National Sports Policy & Scholarship Schemes • Prominent Sports Personalities
3	**Yoga Education**
	• Differences between Yogic Exercises & non- Yogic exercises • Contribution of Yoga to Sports • Principles of Asanas & Bandha • Misconceptions about Yoga
4	**Exercise Scheduling/Prescription**
	• Daily Routine Prescription. • Understanding Activity level & Calorie requirement. • Adherence & Motivation for exercise. • Impact of Lifestyle on Health

3. Core Courses (CC)

Business Law (Company Law) - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Definitions	10
2	Incorporation of companies	20
3	Public Offer	10
4	Private Placement	10
5	Share Capital and Debentures	10
	Total	**60**

Sr. No.	Modules / Units
1	**Definitions**
	Section 2 Clause (2) – Accounting Standard Clause (7) – Auditing Standard Clause (13) – Books of Accounts Clause (31) – Deposit Clause (41) – Financial Year Clause (42) – Foreign Company Clause (47) – Independent Director Clause (48) – Indian Depository Receipts Clause (62) – One Person Company Clause (85) – Small Company
2	**Incorporation of companies**
	Section 3 to Section 20
3	**Public Offer**
	Sections 23, 25 to 28, 33, 35, 39
4	**Private Placement**
	Section 42
5	**Share Capital and Debentures**
	Sections 43, 46, 47, 52 to 56, 61 to 72

Note: *Relevant Law/Statute/Rules in force in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year.*

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3. Core Courses (CC)

Research Methodology in Accounting and Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Research	15
2	Research Design in Accounting and Finance	15
3	Data Collection and Processing	15
4	Interpretation and Report Writing	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Research**
	Introduction and meaning of research, Objectives of research, Features and Importance of research in Accounting and Finance, Objectives and Types of research - Basic, Applied, Descriptive, Analytical and Empirical Research. Formulation of research problem : Meaning and Selection Review of Literature
2	**Research Design in Accounting and Finance**
	Meaning of Introduction, Need, and Good research design. Hypothesis: Formulation, Sources, Importance and Types Different Research designs
3	**Data Collection and Processing**
	Data Collection: Introduction and meaning, types of data Primary data: Observation, Experimentation, Interview, Schedules, Survey, Questionnaires, Limitations of Primary data Secondary data: Sources and Limitations Factors affecting the choice of method of data collection. Sampling: Significance, Methods, Factors determining sample size Data Presentation: Significance in Research, Stages in Data Processing: Editing, Coding, Classification, Tabulation, Graphic Presentation Statistical Analysis: Tools and Techniques, Measures of Central Tendency, Measures of Dispersion, Correlation Analysis and Regression Analysis. Use of computer and internet in data collection and processing
4	**Interpretation and Report Writing**
	Meaning and techniques of interpretation, Research Report Writing: Importance, Essentials, Structure/ layout, Types

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Reference Books

Reference Books
Financial Accounting (Special Accounting Areas) III
• *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai* • *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi* • *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida* • *Compendium of Statement and Standard of Accounting, ICAI* • *Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi* • *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi* • *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi* • *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi* • *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
Cost Accounting (Methods of Costing) II
• *Lectures on Costing by Swaminathan: S. Chand and Company (P) Ltd., New Delhi* • *Cost Accounting by C.S. Rayudu, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting by Jawahar Lal and Seema Srivastava, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting by Ravi M. Kishore, Taxmann Ltd., New Delhi* • *Principles and Practices of Cost Accounting by N.K. Prasad, Book Syndicate Pvt. Ltd., Calcutta* • *Cost Accounting Theory and Practice by B.K. Bhar, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Cost Accounting Principles and Practice by M.N. Arora, Vikas Publishing House Pvt. Ltd., New Delhi* • *Advanced Cost and Management Accounting: Problems and Solutions by V.K. Saxena and C.D. Vashist, S. Chand and Company (P) Ltd., New Delhi* • *Cost Accounting by S.P. Jain and K.L. Narang, Kalyani Publishers, Ludhiana* • *Modern Cost and Management Accounting by M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
Auditing (Techniques of Auditing and Audit Procedures)- II
• *Contemporary Auditing by Kamal Gupta published by Tata McGraw Hills* • *A Handbook of Practical Auditing by B N Tandon published by S Chand & Co. New Delhi* • *Fundamentals of auditing by Kamal Gupta and Ashok Arora published by Tata McGraw Hills* • *Textbook of Auditing by Batra and Bagradia published by Tata McGraw Hills* • *Practical Auditing by S V Ghatalia published by Spicer & Pegler*

Reference Books

Taxation II (Direct Taxes – I)

- *Direct Taxes Law & Practice by V.K. Singhania - Taxman*
- *Systematic Approach to Direct Tax by Ahuja & Gupta - Bharat Law House*
- *Income Tax Ready Recknoner by Dr .V.K. Singhania - Taxman*
- *Direct Tax Laws by T.N. Manoharan - Snow White*

Principles and Practices of Banking

- *Bank Financial Management Paperback – 2010 by IIBF (Indian Institute of Banking and Finance)*
- *Money Banking And Finance Paperback – 2009 by N K Sinha*
- *Principles and Practices of Banking Paperback – 2015 by IIBF (Indian Institute of Banking and Finance)*
- *Principles and Practices of Banking 11 edition Paperback – 2015 by N S Toor, Arun Deep Toor*
- *Principles Of Banking (With Case Studies) Hardcover – 2009 by Rakesh Kumar*
- *Modern Banking In India , Gupta*

Foundation Course - III

- *Social and Economic Problems in India, Naseem Azad, R Gupta Pub (2011)*
- *Indian Society and Culture, Vinita Padey, Rawat Pub (2016)*
- *Social Problems in India, Ram Ahuja, Rawat Pub (2014)*
- *Faces of Feminine in Ancient , medivial and Modern India, Mandakranta Bose Oxford University Press*
- *National Humana rights commission- disability Manual*
- *Rural, Urban Migration : Trends, challenges & Strategies, S Rajagopalan, ICFAI- 2012*
- *Regional Inequilities in India Bhat L SSSRD- New Delhi*
- *Urbanisation in India: Challenges, Opportunities & the way forward, I J Ahluwalia, Ravi Kanbur, P K Mohanty, SAGE Pub (2014)*
- *The Constitution of India, P M Bakshi 2011*
- *The Problems of Linguistic States in India, Krishna Kodesia Sterling Pub*
- *Politics in India: structure, Process and Policy Subrata Mitra, Rouutlege Pub*
- *Politics in India, Rajani Kothari, Orient Blackswan*
- *Problems of Communilism in india, Ravindra Kumar Mittal Pub*
- *Combating communalism in India: Key to National Integration, Kawal Kishor Bhardwaj, Mittal Pub*

Foundation Course in NSS III

- *National Service Scheme Manual (Revised) 2006, Government of India, Ministry of Youth Affairs and Sports, New Delhi.*
- *University of Mumbai National Service Scheme Manual 2009.*
- *Avhan Chancellor's Brigade - NSS Wing, Training camp on Disaster Preparedness Guidelines, March 2012*
- *Rashtriya Seva Yojana Sankalpana - Prof. Dr. Sankay Chakane, Dr. Pramod\Pabrekar, Diamond Publication, Pune*
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- *Cadet's Hand book – Specialised Subjects, Army, Navy, Air-force, BY DG NCC, New Delhi.*
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Information Technology in Accountancy - I

- *Fundamentals of Computers – Rajaram V – Prentice Hall*
- *Computer today (3rd edition) – Sanders, Donald H – McGraw Hill*
- *Computers and Common sense – Hunt, Roger and Shelly John – Prentice Hall*
- *Computers – Subramaniam N – Wheeler*
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- *Computers and Information Management – S C Bhatnagar & V Ramant – Prentice Hall*
- *Internet for Business – Brummer, Lavrej – Cambridge*
- *E-mail for Everyone – Leon Alexis & leon – Methews*

Basic Computer Programmes for Business – Sternberg C – New Jersey Hayden

Business Law (Business Regulatory Framework) -II

- *An introductory guide to Central Labour Legislation – W A Dawson*
- *Industrial Law – P L Malik*
- *Personnel Management and Industrial relations – Kapur S , Punia B – Gurgaon SK*
- *Labour participation in Management – Mhetras V Manaklals*
- *Law of Partnership, by J P Singhal (Author)*
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- *Ackley.G (1976), Macro Economic Theory and Policy, Macmillan Publishing Co. New York*
- *Ahuja. H.L., Modern Economics — S.Chand Company Ltd. New Delhi.*
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Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester IV with effect from the Academic Year 2016-2017

Reference Books

Reference Books
Financial Accounting (Special Accounting Areas) IV
• *Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai* • *Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi* • *Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida* • *Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai* • *Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi* • *Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi* • *Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi* • *Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi*
Management Accounting (introduction to Management Accounting)
• *Cost Management by Saxena & Vashist* • *Cost & Management Accounting by Ravi N.Kishor ,Publication Taxmonth* • *Essential of Management Accounting by P.N.Reddy,Himalaye* • *Advanced Management Accounting by Robert S Kailar,Holl* • *Financial Of Management Accounting by S.R.Varshney,Wisdom* • *Introduction Of Management Accounting by Charbs T Horngram, PHI Learnng* • *Management Accounting by I.m.Pandey, Vikas* • *Cost & Management Accounting by D.K.Mattal,Galgotia* • *Management Accounting by Khan & Jain,Tata Megaw* • *Management Accounting by R.P.Resstogi*
Auditing III
• *Contemporary Auditing by Kamal Gupta, Tata Mc-Graw Hill, New Delhi* • *A Hand-Book of Practical Auditing by B.N. Tandon, S. Chand and Company, New Delhi* • *Fundamentals of Auditing by Kamal Gupta and Ashok Arora, Tata McGraw Hill, New Delhi* • *Auditing: Principles and Practice by Ravinder Kumar, Virender Sharma, PHI Learning Pvt. Ltd., New Delhi* • *Auditing and Assurance for CA IPCC by Sanjib Kumar Basu, Pearson Education, New Delhi* • *Contemporary Auditing by Kamal Gupta, McGrow Hill Education Pvt. Ltd., New Delhi* • *Fundamentals of Auditing by Kamal Arora and Ashok Gupta, Tata McGraw Hill, New Delhi*
Taxation III (Direct Taxes II)
• *Direct Taxes Law & Practice by V.K. Singhania - Taxman* • *Systematic Approach to Direct Tax by Ahuja & Gupta - Bharat Law House* • *Income Tax Ready Recknoner by Dr .V.K. Singhania - Taxman* • *Direct Tax Laws by T.N. Manoharan - Snow White*

Wealth Management

- *Wealth Engine: Indian Financial Planning and Wealth Management Handbook by Sankaran S*
- *WEALTH MANAGEMENT, by N/A Dun & Bradstreet*

Information Technology in Accountancy II

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- *E-mail for Everyone – Leon Alexis & leon – Methews*
- *Basic Computer Programmes for Business – Sternberg C – New Jersey Hayden*

Foundation Course in Management (Introduction to Management) - IV

- *Essentials of Management by Koontz H & W published by McGraw Hill*
- *Principles of Management by Ramaswamy published by Himalaya*
- *Management Concept and Practice by Hannagain T published by McMillan*
- *Basic Managerial Skills for All by McGrath E.H published by Prentice Hall of India*
- *Management – Text and Cases by VSP Rao published by Excel Books*
- *Essentials of Management by Massie Joseph published by Prentice Hall of India*
- *Management: Principles and Guidelines by Thomas Duening & John Ivancevich published by Biztantra*
- *Management Concepts and Strategies by J S Chandran published by Vikas Publishing House*
- *Principles of Management by Tripathy P C published by Tata McGraw Hill*
- *Principles of Management: Theory and Practice by Sarangi S K published by V M P Publishers*

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Business Law (Company Law) IV

- *Companies Act 2013 by Ravi Puliani, Bharat Publication*
- *Companies Act 2013 by Taxmann*

Reference Books
Research Methodology in Accounting and Finance
• *Research Methods in Accounting, Malcolm Smith* • *Research Methods and Methodology in Finance and Accounting, by Viv Beattie and Bob Ryan*

Revised Syllabus of Courses of B.Com. (Accounting and Finance) Programme at Semester III and IV with effect from the Academic Year 2017-2018

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: **25 %**

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

University of Mumbai

Revised Syllabus of Courses
of
Master of Commerce (M.Com)
Programme
at
Second Year
Semester III and IV

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year 2017-2018)

Faculty of Commerce

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

M.Com II

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2 and 3	*Any one group of courses from the following list of the courses (Group – A/B/C/D/E)	**18**	1,2 and 3	**Any one group of courses from the following list of the courses (Group – A/B/C/D/E)	**18**
2	✓ ***Project Work***		***2***	✓ ***Project Work***	
4	Project Work - I	**06**	4	Project Work - II	**06**
	Total Credits	**24**		**Total Credits**	**24**

✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/ analyzing/ exploring a real life situation/ difficult problem. Project work would be of 06 credits. A project work may be undertaken in any area of Elective Courses*

1	**List of group of Elective Courses (EC) for Semester III (Any Three out of Five)*		*1*	*** List of group of Elective Courses (EC) for Semester IV (Any Three out of Five)*	
Group A: Advanced Accounting, Corporate Accounting and Financial Management					
1	Advanced Financial Accounting	**06**	1	Corporate Financial Accounting	**06**
2	Direct Tax	**06**	2	Indirect Tax- Introduction of Goods and Service Tax	**06**
3	Advanced Cost Accounting	**06**	3	Financial Management	**06**
4	Advanced Auditing	**06**	4	International Financial Reporting Standards	**06**
5	Financial Services	**06**	5	Personal Financial Planning	**06**
Group B: Business Studies (Management)					
1	Human Resource Management	**06**	1	Supply chain management and logistics	**06**
2	Rural Marketing	**06**	2	Advertising and sales Management	**06**
3	Entrepreneurial Management	**06**	3	Retail Management	**06**
4	Marketing Strategies and practices	**06**	4	Tourism Management	**06**
5	Organizational Behaviour	**06**	5	Management of Business Relations	**06**
Group C : Banking & Finance					
1	Banking Law and Practices	**06**	1	Cooperative Banking System	**06**
2	(Skill based) Legal framework of banking	**06**	2	Financial Institutions and Markets	**06**
3	Commercial Bank Management	**06**	3	Accounting and Auditing of Banking	**06**
4	Investment Management Analysis	**06**	4	International Finance	**06**
5	Financial Risk Management	**06**	5	Financial Services	**06**
Group D : E-Commerce					
1	Database Management System	**06**	1	E-Commerce Security and Law	**06**
2	Internet & Web-Designing (skill based)	**06**	2	Advance technology for E-Commerce	**06**
3	Network Infrastructure and Payment System	**06**	3	Management Information System	**06**
4	Logistic & supply chain Management in E-Commerce	**06**	4	Digital Marketing	**06**
5	Business Models in E-Commerce & ICT Applications	**06**	5	International Business, Law and Taxation	**06**

1	**List of group of Elective Courses (EC) for Semester III (Any Three out of Five)*		*1*	*** List of group of Elective Courses (EC) for Semester IV (Any Three out of Five)*	
Group E : Business Economics					
1	Economics of Growth and Development	**06**	1	Urban Economics	**06**
2	Applied Econometrics	**06**	2	Entrepreneurship and family business	**06**
3	Agriculture Economics	**06**	3	Indian Financial system	**06**
4	Monetary Economics	**06**	4	International Economics	**06**
5	Industrial Economics	**06**	5	Economics of Services	**06**
Note: Group selected in Semester III will continue in Semester IV					

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester III

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)***	
Group A: Advanced Accounting, Corporate Accounting and Financial Management (Any Three out of Five)		
1	Advanced Financial Accounting	**06**
2	Direct Tax	**06**
3	Advanced Cost Accounting	**06**
4	Advanced Auditing	**06**
5	Financial Services	**06**
	Total Credits	**18**

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group A: Advanced Accounting, Corporate Accounting and Financial Management

1. Advanced Financial Accounting

Modules at a Glance

SN	Modules	No. of Lectures
1	Foreign Currency Conversion (As per Accounting Standard/s applicable)	15
2	Final Accounts & Statutory Requirements for Banking Companies	15
3	Accounting & Statutory Requirements of (Insurance Companies	15
4	Accounting & Statutory Requirements of Co-operative Societies	15
	Total	**60**

SN	Modules/ Units
1	**Foreign Currency Conversion (As per Accounting Standard/s applicable)**
	Requirements as per Accounting standard/s Foreign Branches
2	**Final Accounts & Statutory Requirements for Banking Companies**
	Final Accounts of Banking Companies Provisioning of Non- Performing Assets Form & Requirements of Final Accounts
3	**Accounting & Statutory Requirements of (Insurance Companies**
	• Accounting Provision for insurance Act and InsuranceRegulation and Development Authorities for 1) Life Insurance Business 2) General Insurance Business • Forms and Requirements of Final Accounts for 1) Life Insurance Business 2) General Insurance Business
4	**Accounting & Statutory Requirements of Co-operative Societies**
	• Accounting Provision of Maharashtra State Co-operative Societies Act and Rules • Forms and Requirements of Final Accounts

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group A: Advanced Accounting, Corporate Accounting and Financial Management

2. Direct Tax

Modules at a Glance

SN	Modules	No. of Lectures
1	Definitions and Basis of Charge	15
2	Heads of Income	15
3	Deductions u/s 80 and Exclusions from the Total Income	15
4	Computation of Income and Tax of Individual, Firm and Company (Excluding MAT) and Provisions for Filing Return of Income - Sec 139(1) and Sec 139(5)	15
	Total	**60**

SN	Modules/ Units
1	**Definitions and Basis of Charge**
	• Definitions: Person, Assessee, Income • Basis of Charge: Previous Year, Assessment Year, Residential Status, Scope of Total Income, Deemed Income
2	**Heads of Income**
	• Income from Salary • Income from House Property • Profits and Gains from Business and Profession • Income from Capital Gains • Income from Other Sources
3	**Deductions u/s 80 and Exclusions from the Total Income**
	• Deductions: 80C, 80CCF, 80D, 80DD, 80DDB, 80E, 80U • Exclusions: Exemptions related to Specific Heads of Income to be Covered with Relevant Provisions, Agricultural Income, Sums Received from HUF by a Member, Share of Profit from Firm, Income from Minor Child, Dividend
4	**Computation of Income and Tax of Individual, Firm and Company (Excluding MAT) and Provisions for Filing Return of Income - Sec 139(1) and Sec 139(5)**
	• Computation of Income & Tax of Individual and Partnership Firm

Note:

1. ***The Syllabus is restricted to study of particular sections, specifically mentioned rules and notifications only***
2. ***All modules/units include computational problems/ Case study***
3. ***The Law in force on 1st April immediately preceding the commencement of Academic year will be applicable for ensuing Examinations***

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group A: Advanced Accounting, Corporate Accounting and Financial Management

3. Advanced Cost Accounting

Modules at a Glance

SN	Modules	No. of Lectures
1	Process Costing	15
2	Cost Allocation and Activity Based Costing Systems	15
3	Responsibility Accounting	15
4	Strategic Cost Management	15
	Total	**60**

SN	Modules/ Units
1	**Process Costing**
	A) Introduction - Features of process, Concept of Process Loss, Abnormal Loss, Normal Loss, Abnormal Gain. **B)** Computation of Inter Process Profit – Advantages and Disadvantages **C)** Computation of Equivalent Production – Weighted Average and FIFO.
2	**Cost Allocation and Activity Based Costing Systems**
	A) Cost Allocation – Meaning and its Types, Relationship between resources, activities, Cost and Cost drivers, Methods of allocating central costs - cost allocation using Direct Method, Step Down Method and Reciprocal Method. **B)** Activity Based Costing – Introduction, Advantages, Limitations, Identification of cost drivers, Practical Problems on Traditional V/s Activity Based Costing System.
3	**Responsibility Accounting**
	A) Responsibility Accounting – Meaning, Features, Objective, Assumptions, Problems, Responsibility Centre's – Cost, Profit, Revenue and Investment. **B)** Concept of Controllability – Introduction, Measuring Managerial Performance (ROI and Residual Income Approach) **C)** Preparation of Managerial Reports using Segmented Costs and Controllable costs approach.
4	**Strategic Cost Management**
	A) Transfer Pricing – Introduction, Advantages and Disadvantages, Setting Transfer Pricing – Negotiated transfer pricing, Cost Based transfer pricing. **B)** Target Costing – Introduction, Concept, Objectives, Comparison between Target Costing and Cost Plus Pricing. **C)** Inflation Accounting – Meaning, Features, Conversion of Income Statement, Balance Sheet, Stocks and Net Assets Block using Current Purchasing Power Method.

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group A: Advanced Accounting, Corporate Accounting and Financial Management

4. Advanced Auditing

Modules at a Glance

SN	Modules	No. of Lectures
1	Company audit	15
2	Special Audits	15
3	Audit under other laws	15
4	Auditing in Computerised environment	15
	Total	**60**

SN	Modules/ Units
	Audit of Ledgers General Considerations Scrutiny of Ledgers of Assets, Personal, Revenue Accounts
1	**Company Audit**
	• Company Audit - Audit of Shares, Qualifications and Disqualifications of Auditors, Appointment of auditors, Removal of auditors, Powers and duties of auditors, Branch audit, Joint audit, Special audit, Reporting requirements under the Companies Act, 2013. • Concepts of true and fair and materiality and audit risk in the context of audit of companies. • Audit reports; qualifications, notes on accounts, distinction between notes and qualifications, detailed observations by the statutory auditor to the management vis-a-vis obligations of reporting to the members
2	**Special Audits**
	• Special points in audit of different types of undertakings, i.e., Educational institutions, Hotels, Clubs, Hospitals
3	**Audit under other Laws**
	• Cost audit, Environmental Audit, Energy Audit., Audit under different statutes, viz; income tax, other direct tax laws and indirect taxes
4	**Auditing in Computerized Environment**
	• Audit under computerised environment: Computer auditing; specific problems of EDP audit, need for review of internal control especially procedure controls and facility controls; techniques of audit of EDP output; use of computers for internal and management audit purposes; test packs, computerised audit programmes; involvement of the auditor at the time of setting up the computer system

5. Financial Services

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to financial services and Merchant Banking	15
2	Venture Capital and Securitisation	15
3	Hire Purchase Finance & Housing Finance	15
4	Stock Broking & Depository Services	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Financial Services, Leasing and Hire Purchase**
	Overview of Financial Services in India, Growth, Structure and Types of financial services **Merchant Banking** • Merchant Banking – Meaning, nature and functions; merchant banking in India, role in issue management; classification and regulation of merchant bankers by SEBI
2	**Factoring and Credit Rating**
	Venture Capital: Meaning and Definition of Venture Capital, Characteristics of Venture Capital, Forms/Types of Venture Capital Assistances, Venture Capital Process, Modes of Venture Capital Assistance • **Securitisation:** Introduction, Definition, Concept, Need, Players Involved in Securitisation, Securitisation Structure, Instruments of Securitisation, Differentiate between Pass Through Certificate and Pay Through Securities, Process of Securitisation
3	**Venture Capital and Securitization**
	• Hire Purchase Finance - meaning, concepts of hire purchase finance, installment credit and consumer credit; sources of finance in India Housing Finance – need, nature of housing finance, fixed and floating rate home loans; sources of housing finance in India, growth of housing finance in India; Role of National Housing Bank; concept of mortgage and reverse mortgage; housing loans and mortgage loans, types of mortgage loans
4	**Depository and Depository Core Services**
	• Stock Broking – meaning, types of stockbrokers, sub-brokers; stock broking in India e-broking – meaning, Indian experience Depository Services – meaning, role of depositories and their services, Advantages of depository system; Functioning of depository system; Depositories in India – NSDL & CSDL; Depository participants (DPs) and their role Custodial services - meaning; obligations and responsibilities of custodians; code of conduct

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System
Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester III

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)***	
Group B: Business Studies (Management) (Any Three out of Five)		
1	Human Resource Management	**06**
2	Rural Marketing	**06**
3	Entrepreneurial Management	**06**
4	Marketing Strategies and practices	**06**
5	Organizational Behaviour	**06**
	Total Credits	**18**

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group B: Business Studies (Management)

1. Human Resource Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Human Resource Management	15
2	Human Resource Development	15
3	Latest Development in H.R.M. and Labour Legislation	15
4	Emerging Issues In H.R.M	15
	Total	**60**

SN	Modules/ Units
1	**Human Resource Management**
	• **Human Resource Management (HRM).** – Concept, Traditional HRM v/s Strategic HRM , Objectives of HRM, Organisation Structure of HRM Department – Changing Role of H.R. Manager. • **Human Resource Planning-** Concept, Factors affecting HRP**,** Information Management in HRP – HRIS (Human Resource Information System)**,** Job Analysis, Psychological and Behavioural Issues in HRP. • **Recruitment and Selection of managerial personnel** - Factors affecting recruitment process, Role of Recruitment agencies, Online process of selection.
2	**Human Resource Development**
	• **Training and Development -** Designing of the effective training programme Evaluation of the effective training programme, Challenges before trainers, Management Development Programme – Techniques. • **Performance Appraisal**- Process, Guidelines for conducting appraisal Interviews, Ethical aspects in performance appraisal. • **Career Advancement and Succession Planning-** Self-Development Mechanism and Knowledge enrichment, Managing Promotion and Transfers, Managing dismissal, Succession Planning- Problems and Issues, Culture as a factor in Succession Planning..
3	**Latest Development in H.R.M. And Labour Legislation**
	• **Industrial Relation Act** – Prominent features and recent changes in Trade Union Act 2016, Factories Act 1961, Industrial Disputes Act 1950. • **Prominent features and recent changes** to Child and Women Labour Act 1986, Social Security Act 2016, Prevention of Sexual harassment Act, 2013. • **Prominent features and recent changes** to Employees Acts like payment of Gratuity Act 2015, Provident Fund Act 1952, Minimum Wages Act 2016 and Payment of Wages Act 1991, Workmen Compensation Act 2014/ESI Scheme.
4	**Emerging Issues In H.R.M**
	• **Health and Safety** – Safety measures and safety programmes, Stress and its Impact on Job Performance, Role of organization in ensuring mental and physical health of employees • **Work life balance** – Need and Importance, Employee Engagement, Managing Millennials (Gen Y) • **Talent Management** – Concept , Importance, Process, Talent Management and VUCA Environment(Volatility, Uncertainty, Complexity, Ambiguity), H.R. Practices at Global level

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group B: Business Studies (Management)

2. Rural Marketing

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Rural Marketing	15
2	Consumer Behaviour and Rural Marketing	15
3	Agricultural Marketing	15
4	Recent Trends in Rural Marketing	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Rural Marketing**
	• **Rural Marketing:** Concept, Scope, Nature and Evolution of Rural Marketing, Rural Marketing Strategies-4P's, Rural Infrastructural Facilities – Warehousing, Cold Storage, Logistics. • **Indian Rural Market:** Profile, Rural Vs Urban Market, Importance of Branding, Scope and Importance of Transportation Networking in rural markets. • **Problems of Rural Consumer**: Adulteration, Short Weight and Measures, Unfair Warranties and Guarantees, Unreasonable Pricing, Challenges and Future of Rural Marketing
2	**Consumer Behaviour and Rural Marketing**
	• **Consumer Behaviour:** Characteristics of Buying Behaviour- Awareness, Understanding, Consumer Purchase Decision, Importance of Rural Marketing Communication, Salesmen Influence. • **Government Schemes:** Rural Development Programmes and Schemes of Government, Entreprenuership Development Programme, Role of Food Corporation of India (FCI), Role of Khadi and Village Industries Commission (KVIC). • **Role of Banks in Rural Marketing:** Role of Agricultural Cooperative Banks, Commercial Banking for Rural Marketing
3	**Agricultural Marketing**
	• **Agricultural Marketing**- Importance, Prospects and Issues, Role of Cooperatives and Self Help Groups (SHG) in Rural Marketing • **Commodity Boards:** Role and Contribution of Commodity Boards in generating revenue to government and employment in rural India. • **Agricultural Exports:** Composition and Contribution of Agricultural Exports in generating revenue for India- Food Grains, Organic products, Marine Products, Role of Agricultural & Processed Food Products Export Development Authority (APEDA)
4	**Recent Trends in Rural Marketing**
	• **E- Commerce:** Importance of E-Commerce and Impact of E- Marketing on rural consumers, Concept of Digital Village, Role of Social Media in rural marketing. • **Information Technology:** Impact of IT in Agricultural Marketing, E-Chaupal, Project Shakti, Web-casting-online training and guidance to farmers. • **Online Marketers**: Role of Online Marketers, Growth and Challenges

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group B: Business Studies (Management)

3. Entrepreneurial Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Entrepreneurship Development Perspective	15
2	Creating Entrepreneurial Venture	15
3	Project Management	15
4	Assistance and Incentives for Promotion and Development of Entrepreneurship	15
	Total	**60**

SN	Modules/ Units
1	**Entrepreneurship Development Perspective**
	• **Entrepreneurship** – Concept, Factors affecting growth of Entrepreneurship, Types of Entrepreneurs, Requirements of Entrepreneurial structure. • **Entrepreneurial Culture** -Elements of culture, Steps to change Entrepreneurial culture, Entrepreneurial v/s Administrative culture. • **Theories of Entrepreneurship**- Schumpeter Dynamic Entrepreneurship Innovation Theory, Theory of High Achievement by McClelland, Theory of Personnel Resourcefulness
2	**Creating Entrepreneurial Venture**
	• **Entrepreneurial Environment**- Significance, SWOC Analysis, Problems of Entrepreneurship • **Financial Analysis of Entrepreneurial Venture**- Significance, Tools of Financial Analysis, Sources of development finance • **Social Entrepreneurship**- Features, Importance, Arguments (for and against) Social Entrepreneurship, Women Entrepreneurs – concept and special Government schemes for women entrepreneurs in India.
3	**Project Management**
	• **Project** - Concepts and Classification of Project, Search of Business Idea, Project Cycle. • **Project formulation**-----Steps for project formulation, Project Design and network analysis – concept and network analysis techniques: PERT/ CPM. • **Project Management** – Concept, Phases, Project Identification and Project Feasibility Analysis.
4	**Assistance and Incentives for Promotion and Development of Entrepreneurship**
	• **Incentives** – Need, Promotion and development Entrepreneurship-Types of Assistance and incentives -Fiscal, Financial, Promotional, Marketing, and Organisational. • **NPSD** - National Policy for Skill Development and Entrepreneurship 2015. • **Institutions in aid of Entrepreneurship Development** - The National institute for Entrepreneurship and small business development, District Industry Centre (DIC), National Alliance of young Entrepreneurs

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group B: Business Studies (Management)

4. Marketing Strategies and practices

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Marketing Strategies	15
2	Developing Marketing Strategies & Plans	15
3	Market Environmental Trends & Building Customer Value	15
4	Recent Trends in Marketing Strategies	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Marketing Strategies**
	• **Introduction:** Marketing Strategies – Concept, Evolution, Role/ Importance, Types, Formulation of Marketing Strategies- Steps • **Marketing Opportunities and Plan:**Analysing Marketing Opportunities, Future of Marketing, Effective Marketing Plan. • **New Marketing Strategies:** Holistic, New Brand, Service, Green and Guerrilla Marketing Strategies
2	**Developing Marketing Strategies & Plans**
	• **Marketing Mix:** Marketing Strategy Implementation - Steps, Marketing Mix 4 P's – Importance, Alternative Marketing Mix Prepositions- Profit, People, and Planet. • **Marketing Plans:** Marketing Planning- Importance, Types and Content, Strategic Business Unit - Structure, SWOT Analysis. • **Defensive Marketing Strategies:** Importance, Types, Offensive V/S Defensive Marketing Strategies, Position Defense Strategies.
3	**Market Environmental Trends & Building Customer Value**
	• **Environmental Analysis:**Analysing the Macro Environment, Theories of Marketing- PESTLE Analysis, VRIO Analysis, Porter's Competency Model, and Customer Perceived Value (CPV). • **Customer Value:** Applying Customer Value and Satisfaction, Customer Relationship Management (CRM)- Concepts and Techniques • **Customer Loyalty:** Importance, Consumer Behaviour – Impact of Personal, Cultural, Social and Psychological Factors.
4	**Recent Trends in Marketing Strategies**
	• **Emerging Strategies:** 21st Century Marketing Strategies, Global Marketing Strategies, and Strategies for Entering Emerging Market**.** • **E-Marketing:** Concept, Pros and Cons, Digital Marketing – Concept and features, Experiential Marketing – Concept and features, Hospitality Marketing Management. • **Social Marketing:** Social Marketing - Importance, Barriers, Trends in Marketing Practices in India and across Globe.

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group B: Business Studies (Management)

5. Organizational Behaviour

Modules at a Glance

SN	Modules	No. of Lectures
1	Organisational Setting	15
2	Foundation of Individual Behaviour	15
3	Group Dynamics and Behaviour	15
4	Emerging Challenges	15
	Total	**60**

SN	Modules/ Units
1	**Organisational Setting**
	• **Introduction to Organisational Behaviour (OB)** – Concept, Nature, Foundation, Disciplines and Scope of OB. • **Evolution of OB**–Evolution – Stages, Human Relations Approach – Hawthorne Experiments, Models of OB. • **Organisation Design** – Key factors,Steps in Organisation Structure, Organisations for future - Types.
2	**Foundation of Individual Behaviour**
	• **Factors affecting Individual behaviour**- Personal, Psychological, Organisation System, Environmental. • **Personality& Perception** – Nature of personality, Determinants of personality, Personality Traits., Factors Influencing Perception, Managing perception Process, Perception and OB • **Attitude** – Nature , components , work related attitudes , Barriers to attitudinal Change, Measures to attitudinal change.
3	**Group Dynamics and Behaviour**
	• **Group** – Types of groups, Stages of Group Development, Group Decision making – Advantages and Problems. • **Work place behaviour** – Determinants of Group Behaviour, Power and Politics –Sources of Power, Types of Organisational politics. • **Conflict** – Levels of Conflict, Strategies for resolving Conflict, Guidelines for effective negotiation.
4	**Emerging Challenges**
	• **Stress Management** – Sources, Effects, Strategies, Stress and Performance. • **Organisation culture** – Cultural Dimensions, Creating Organisational Culture, Maintaining Organisational Culture. • **Workforce Diversity** – Concept, Managing Diversity effectively, Ethical Behaviour in workplace, Managing Ethics at work place.

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester III

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)***	
Group C: Banking and Finance (Any Three out of Five)		
1	Commercial Bank Management	**06**
2	Financial Markets	**06**
3	Accounting of Banking Sector	**06**
4	Treasury Management	**06**
5	Debt Market	**06**
	Total Credits	**18**

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group C: Banking and Finance

Commercial Bank Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Overview of Commercial Banking in India	15
2	Credit Management in Banks	18
3	Human Resource Management in Banks	12
4	Evolving Trends in Modern Banking	15
	Total	**60**

SN	Modules/ Units
1	**Overview of Commercial Banking in India**
	A) Overview of Commercial Banking in India - Role and Functions of Commercial Banks, Introduction to Bank Management, Management of Banks in Rural Areas. **B) Customer Relationship Management in Banks** - Meaning and objectives of CRM in banks, Strategies for Expanding Customer Base, Banking Ombudsman Scheme , Customer Retention , Handling Customer Grievances **C) Services to Different Categories of Customers** - Retail, Corporate, International, Rural.
2	**Credit Management in Banks**
	A) Credit Management in Banks – Principles of Sound Bank Lending, Loan Policy, Compliance with RBI guidelines, Credit Appraisal and Credit Decision Making, Monitoring and Review of Loan Portfolio, Management of Non-Performing Assets (NPAs), Classification of NPAs, Debt Restructuring- SARFAESI Act, 2002. **B) Bank's Investment Policy** – SLR Requirements & Non-SLR Investments – Nature and Significance of Investment Management in Commercial Banks, Fundamental Principles of Security Investment, Management of Security Investment, Reviewing Investment Portfolio and Organization of Investment Function in Bank.
3	**Human Resource Management in Banks**
	A) Human Resource Management in Banks – Importance of HRM in Banks, Policies relating to Human Resource Development in India, Selection, Training, Pay Structure in Public Sector Banks and Private Sector Banks Workers Participation in Management - Motivations and Morals, Performance Evaluation, Promotion, Transfer Policy, VRS schemes in Public Sector Banks
4	**Evolving Trends in Modern Banking**
	A) Evolving Trends in Modern Banking – Internet Banking, Mobile Banking, EFT services, Outsourcing of Non-core Services, Mergers and Acquisitions in Banking sector. **B) Financial Inclusion** – Need and Importance of Financial Inclusion, Micro Credit SHGs, RBI Guidelines for Micro Credit. Portfolio Securitization, SHG-2, NRLM and SRLM, Priority Sector and its Classification.

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group C: Banking and Finance

Financial Markets

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Financial system	15
2	Overview of Capital Market	20
3	Overview of Money Market	10
4	Overview of Derivatives Market	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Financial system**
	A) An overview of Financial System - Structure of Indian financial system, the nature and role of financial system, Relationship between financial and economic development Constituents of Financial System – Primary and Secondary , Development of Financial Markets in India, Components of financial system. **B) Theories** –Prior savings theory, Credit creation theory, Theory of post savings, Financial regulation theory, Financial liberalization theory.
2	**Overview of Capital Market**
	A) Introduction to Capital Market - Structure and Growth of the Indian Capital Market, Indian Capital Market Forms - Industrial Securities , New Issue markets and Old Issue markets-Introduction, Features, Types and Government Securities (Gilt-edged market)- Introduction, Features, and Types **B) Ownership Securities** – Equity Shares, Preference Shares, No-par stock, - Introduction, Features, and Types **C) Creditorship Securities** – Debentures -Introduction, Features, and Types
3	**Overview of Money Market**
	A) Money market- Meaning, features, structure of money market, regulatory framework,- RBI/FIMMDA/FEDAI, Disadvantages of Money market, characteristics and features of developed money market, Recent development in money markets-DFHI, STCI **B) Money Market Instruments**-T Bills, Money at short and call notice, commercial bills, promissory notes, commercial paper, Certificate of deposits Commercial-papers, Banker's Acceptance CBLO, IBPC, MMMF and LAF
4	**Overview of Derivatives Market**
	A) Derivatives Market - Meaning, Importance and Need for Derivatives Market, Kinds of Financial derivatives and financial derivatives in India. **B) Globalization of Financial Market** - Indigenous Bond markets, Foreign Currency Bond Markets, Euro market, FDI- Inflows- Outflows, Emerging Trends and Challenges in Global Financial Markets and Impact of globalization on financial markets.

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Group C: Banking and Finance

Accounting of Banking Sector

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction of Banking Companies	10
2	Accounting systems & Provisions in Banks	15
3	Calculation of Interest and Annuities	15
4	Preparation of Final accounts and Reporting	20
	Total	**60**

SN	Modules/ Units
1	**Introduction of Banking Companies**
	• Definition and features of banking companies • Types of banks • Different types of accounts maintained by banks • Bank products & services • Cash Management Services and its Importance
2	**Accounting systems & Provisions in Banking Companies**
	• Significant Features of Accounting Systems of Banking Companies • Books required to be maintained by banks • Income recognition, Classification of assets and advances, Provisions, Classification of investments • Provisions of Banking Regulation Act- 1949 applicable to banking companies:- Business, Capital and Reserve, Reserve funds, Dividend, Cash reserves, Loans and advances, Unclaimed deposits, Accounts and auditing
3	**Calculation of Interest and Annuities**
	• Calculation of Simple Interest & Compound Interest; Calculation of Equated Monthly • Instalments; Fixed and Floating Interest Rates; Calculation of Annuities, • Interest Calculation using Products/Balances; Amortisation of a Debt; Sinking Funds
4	**Preparation of Final accounts and Reporting**
	• Disclosure Requirements of Banks and Additional Disclosures prescribed by RBI • Disclosures required under BASEL norms. • Preparation of Financial Statements of Banking Companies as per regulatory requirements

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Group C: Banking and Finance

Treasury Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Treasury Management	15
2	Treasury Operations	15
3	Risk Analysis & Control	15
4	Regulatory, Supervising & Compliance Framework	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Treasury Management**
	• Concept & Evolution of Treasury [Including other important terminology in treasury:- Arbitrage; Bank Rate; Options; Capital Adequacy; Capital Fund; CRR; CDSL; Clearing House; DP; Hedging; LAF; OMOs; RTGS; Refinance; SLR; SWIFT; T-Bills; Tier-I & II Capital] • Objectives & Role of Treasury • Structure of Treasury & Functions of Treasurer • Scope & Functions of Treasury Management • Internal Treasury Control System • Role of Information Technology in Treasury Management [Negotiated Dealing System(NDS); Straight-Through-Processing(STP)]
2	**Treasury Operations**
	• Liquidity Management [Objectives-CRR-SLR-RTGS-CCIL] • Treasury Management in Commercial Banks [NPA & Capital Adequacy Norms (CRAR); Investment Policy Statement; Back office support & Accounting] • FOREX Market Operations [International Financial System & FOREX Market; Instrument traded; Exchange Rate mechanism; Indian FOREX market; RBI & Exchange Market] • Risk Management in Market Operations [Gilt-edged Markets; Exchange Rate & Currency Risk; Interest Risk Management] • Impact of Treasury Operations [Structural & Statutory changes; Need for Regulation; Development in Markets] • Practical Problems on FOREX Valuation [FEDAI Guidelines & Valuation]
3	**Risk Analysis & Control**
	• Interest Rate risk: Investment /Trading Book • Value at Risk [VaR] • FOREX (Market) Risk • Risk Management in banks [RBI Guidelines] • Treasury & Asset-Liability Management(ALM) [Meaning & Objectives of ALM; Market Risk-Liquidity & Interest Risk; Role of Treasury in ALM; Use of Derivatives in ALM; Policy Environment]
4	**Regulatory, Supervising & Compliance Framework**
	• Ethics, Morals & Code of Conduct- The Dealing Room [General Principles from FIMMDA] • RBI guidelines & Policy [Organizational set up; Industrial Sickness; NPAs in Scheduled Commercial banks] • Tax Environment in treasury [Corporate Taxation; Need for Tax Planning; Tax changes during 2004 to 2007 & at Present; Tax on Investments; Tax Compliance] • MIS for Treasury Operations [Current Monetary & Credit Policies; Fiscal & Budgetary Policies; Foreign Trade & Exchange Policies; Financial Market Trends; International Developments] • Global framework in Treasury Operations

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Group C: Banking and Finance

Debt Market

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Indian Debt Market	10
2	Central Government Securities and State Government Bonds	15
3	Corporate Bond Market	15
4	Valuation of bonds	20
	Total	**60**

SN	Modules/ Units
1	**Debt Instruments and Indian Debt Markets**
	A) Indian Debt Markets: A Profile of Products and Participants, Market Segments, Participants in the Debt Markets, Secondary Market for Debt Instruments **B) Debt Instruments:** Instrument Features, Modifying the coupon of the bond, Modifying the term to maturity of a bond, Modifying the principal repayment of a bond, Asset backed securities
2	**Central Government Securities and State Government Bonds**
	A) Central Government Securities Bonds-Introduction, Developments Expected, G-Secs: Trends in Volumes, Tenor and Yields, Primary Issuance Process, Participants in Government Bond Markets, Constituent SGL Accounts, Primary Dealers, Satellite Dealers, Secondary Markets for Government Bonds, Settlement of Trades in G-Secs, Clearing Corporation, Negotiated Dealing System, Liquidity Adjustment Facility (LAF). **B) Central Government Securities:** Treasury Bill Issuance Process, Cut-Off Yields, Investors in T-Bills, Secondary Market Activity in T-bills. **C) State Government Bonds-** Gross Fiscal Deficit of State Governments and its financing, Volume and Coupon rates on State Government Bonds, Ownership Pattern of State Government Bonds, and State Government Guaranteed Bonds.
3	**Corporate Bond Market**
	A) Corporate Bonds- Market Segments, Issue Process, Issue Management and Book Building, Terms of a debenture issue, Credit Rating. **B) Bond Market Indices and Benchmarks** I-Bex : Sovereign Bond Index, NSE – MIBOR
4	**Valuation of Bonds**
	A) Valuation of Bonds - Bond Valuation: First principles, Time path of a bond, Valuing a bond at any point on the time scale, Accrued Interest, Yield, Weighted Yield, YTM of a Portfolio, Realised Yield, Yield–Price relationships of bonds **B) Yield Curve and Term Structure of Interest Rate -** Yield Curve: The Simple Approach, Bootstrapping, Alternate Methodologies to Estimate the Yield Curve, Theories of the Term Structure of Interest Rates **C) Duration -** Introduction and Definition, Calculating Duration of a Coupon Paying Bond, Computing duration on dates other than coupon dates, Modified Duration, Rupee Duration, Price Value of a Basis Point, Portfolio Duration, Limitations of Duration

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester III

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)***	
Group D: E-Commerce (Any Three out of Five)		
1	Database Management System	**06**
2	Internet & Web-Designing (skill based)	**06**
3	Network Infrastructure and Payment System	**06**
4	Logistic & supply chain Management in E-Commerce	**06**
5	Business Models in E-Commerce & ICT Applications	**06**
	Total Credits	**18**

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Master of Commerce (M.Com) Programme at Semester III
(To be implemented from Academic Year- 2017-2018)

Group D: E-Commerce

1. Database Management System

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Database Management System (DBMS)	15
2	Relational Database Design	15
3	Transaction Management and Recovery System	15
4	SQL Concept	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Database Management System (DBMS)**
	• Concept of Database, Database Management System: Concept,features, Importance and Evolution • Environment, Classifications, Advantages and Issues of using DBMS, Functional component • Three Level of Architecture, Implications of the Database Approach , Database Languages and Interfaces, The Database System Environment
2	**Relational Database Design**
	• Codd's rule, Entity relationship model, Entity Types, Attributes, Keys , • Roles and Structural Constraints, Constraints on Relationship Types, Basic Relational Algebra Operations • Additional Relational Operations • Roles and functional Dependencies, Normalization, Mapping the ER model to Relational DB
3	**Transaction Management and Recovery System**
	• Transaction Management: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Implementation of Isolation - Testing for serializability. • Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity - Log - Based Recovery - Recovery with Concurrent Transactions • Buffer Management - Failure with loss of non-volatile storage, Advance Recovery systems, Remote Backup systems.
4	**SQL Concept**
	• Basics of SQL: Form of Basic SQL Query - Examples of Basic SQL Queries, Multi table Queries, • Introduction to Nested Queries, Correlated Nested Queries • NULL values - Comparison using Null values - Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

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Group D: E-Commerce

2. Internet & Web-Designing (skill based)

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Internet	15
2	Internet Security Management	15
3	Web designing	15
4	New trends	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Internet**
	• Concept, Evolution of internet, Significance, Limitations, Types of Network • Internet Network Services and functions of internet, current trends on internet, • Internet Technology and Protocol, Internet Connectivity, TCP/IP, Router, Internet Addressing Scheme
2	**Internet Security Management**
	• Management Concepts and Information Privacy and Copyright Issues, Network etiquettes • Overview of Internet Security, Firewalls, Internet Security, basics of asymmetric cryptosystems. • Governance on internet, impact of internet on society, Internet Applications,
3	**Web designing**
	• WWW- Concept, Web technology, Functioning of websites, Creating a Basic Web Page, Web Page Layout Techniques, • Type of websites, Hypertext Markup Language (HTML)-Essential HTML for content, Cascading Style Sheets (CSS)-Selector Type, Common Properties, PhotoshopElements and Principles of Design • Interactivity tools, Difference between web designer and web developers, web graphics
4	**New trends**
	• Multimedia and Graphics, JavaScript, Adobe Dreamweaver, Facebook Page Designing, You Tube Videos • Utilities: Gif Animation, On-Page Search Engine Optimization, Google Webmasters Tools, Mobile website development • Email Network and server, Email Protocol,

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Group D: E-Commerce

3. Network Infrastructure and Payment System

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Network infrastructure for e-commerce	15
2	Internet Protocol, Security and Protection	15
3	E-payment System	15
4	Security Protocol, Threats and Measures	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Network infrastructure for E-Commerce**
	• Requirements for Network infrastructure for e-commerce, Market forces influencing I-way, Component of I-way, Global Information distribution Network, • Network Access equipment, Strategic Alliances and I-Way Infrastructure, Public policy issues shaping I-way • Telephone based infrastructure, Cable/ TV based infrastructure, Wireless infrastructure, Commercial online infrastructure, Narrow band V/S Broad band Network,
2	**Internet Protocol, Security and Protection**
	• TCP/IP Internet protocol for Network Infrastructure, Wireless Access Protocol (WAP), Mobile Network Infrastructure • Internet, Intranet and extranet as E-commerce infrastructure, Network Infrastructure Security- External and Internal Attack • Integrated Services Digital Network (ISDN), Protecting Network infrastructure - Steps in hacking Network Infrastructure, A new model to protect Network infrastructure
3	**E-payment System**
	• E-Payment System- Concept, Online Payment System – prepaid e-payment service, postpaid e-payment system;, Advantages and Limitations of Payment System, Role of E-payments, • Classification of Payment System, Scope of Payment system, Payment meditation services V/S Payment system • Payment processing Network, Payment Processing Settlement, Payment Gateway
4	**Security Protocol, Threats and Measures**
	• Security Protocol, Digital certificates, Security threats in E-com environment, Credit & legal risk of e-payment system. • Credit Card based Payment System, Electronic Payment security- Encryption, Digital signatures, Digital Certificate, Public Key Infrastructure (PKI) • Secure Socket Layer (SSL), 3D SET and Secure, Case studies in E- payment system.

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Group D: E-Commerce

4. Logistic & supply chain Management in E-Commerce

Modules at a Glance

SN	Modules	No. of Lectures
1	Logistic in E-Commerce	15
2	Warehouse and E-logistics	15
3	Introduction to Supply Chain Management (SCM)	15
4	Logistics/Supply Chain Management in the Global Environment-	15
	Total	**60**

SN	Modules/ Units
1	**Logistic in E-Commerce**
	• Logistic in E-commerce – Features, Significance, Evolution, E-Commerce logistics in developed market, • ICT infrastructure for future logistics, E- logistics for transport modes and nodes, Airfreight, Rail-freight, Road-freight, Sheep-Freight • Automating E-logistics- B2C E-commerce fulfillment, E-fulfillment dimension, Inventory Management
2	**Warehouse and E-logistics**
	• Warehouse Management System (WMS)- Functions, Connectivity of WMS solution into ERP, Warehousing challenges of e-commerce, • Radio Frequency Identification (RFID)- Cost and benefits, RFID to enhance data capture processes in warehouse environment • GS1 keys used in logistics and E-procurement, The Global Data Synchronization Network (GDSN), Electronic Product Code Information System (EPCIS)
3	**Introduction to Supply Chain Management (SCM)**
	• SCM- Concept, Significance, IT applications, Evolution of global SCM • Value Chain Management- Concepts and features, Challenges, Sustainability • E-Supply Chain planning(Component); E-Supply chain fusion; Channel Management and Channel Integration
4	**Logistics/Supply Chain Management in the Global Environment**-
	• Managing the Global Supply Chain, Impact of Globalization on Logistics and Supply Chain Management, • Global Logistics Trends, Global Issues and Challenges in Logistics and Supply Chain Management. • New trends in logistics and SCM- Technology in SCM, Artificial intelligence, Single window system for Global SCM

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Group D: E-Commerce

5. Business Models in E-Commerce & ICT Applications

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to E-enterprise and Business Models	15
2	E-commerce Business Models	15
3	Introduction to Information Communication Technology(ICT)	15
4	Vital ICT Applications	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to E-enterprise and Business Models**
	• E-Commerce and E-enterprise- Concepts, Features, types of Business models, Difference between E-commerce and E-business, • Eight key elements of a business model, E-tailing Business Models, Primary revenue Models in e- commerce. • e-Commerce Process Models: E-business Models Based on the Relationship of Transaction Parties, e-commerce Sales Life Cycle (ESLC) Model, selection of E-commerce business model
2	**E-commerce Business Models**
	• E-commerce Business Models: Business models in emerging E-commerce areas, Business to Consumer (B2C)- Characteristics, Process. • Business to Business (B2B)- Characteristics, Importance, Alternative models of B2B, Features of C2C and C2B • Marketing and Business strategies: B2C and B2B E-commerce, Role of Websites in B2C
3	**Introduction to Information Communication Technology(ICT)**
	• Evolution of computers – Features and design – Managing Hardware, Software, Computer Languages . Operating Systems – DOS • Information Communication Technology(ICT)- Concept, Importance, Components, Use of ICT in E-commerce, • Role of ICT in driving E-commerce business, ICT and E-commerce relationship, ICT Infrastructure and E-commerce
4	**Vital ICT Applications**
	• E-Governance: Models – G2G, G2B, G2C, Benefits and risks of E-Governance, ICT in manufacturing – overview of CAD in conjunction with CAM, • E-environment- Geographical Information System (GIS) weather forecasting, E-education- statistical packages (SPSS), Computer aided learning/e-learning in schools and over the Internet. • E-health –Stress, Repetitive Strain Injury (RSI), Eyestrain, Extremely Low Frequency (ELF) radiation. Computers, health and the law.

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester IV

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***	
Group A: Advanced Accounting, Corporate Accounting and Financial Management (Any Three out of Five)		
1	Corporate Financial Accounting	**06**
2	Indirect Tax- Introduction of Goods and Service Tax	**06**
3	Financial Management	**06**
4	International Financial Reporting Standards	**06**
5	Personal Financial Planning	**06**
	Total Credits	**18**

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Master of Commerce (M.Com) Programme at Semester IV
(To be implemented from Academic Year- 2017-2018)

Group A: Advanced Accounting, Corporate Accounting and Financial Management

1. Corporate Financial Accounting

Modules at a Glance

SN	Modules	No. of Lectures
1	Corporate Financial Reporting	15
2	International Financial Reporting Standards (IFRS) & Ind - AS	15
3	Valuation of Business for Amalgamation & Merger	15
4	Consolidated Financial Statement	15
	Total	**60**

SN	Modules/ Units
1	**Corporate Financial Reporting**
	• Introduction of Financial Reporting • Need for reporting • Contents of Financial Report • Recent trends in Financial reporting
2	**International Financial Reporting Standards (IFRS) & Ind - AS**
	• Accounting Standards (AS) – applicability, interpretation, scope and compliance in India • Introduction to I.F.R.S • Ind – AS • Specific Ind AS: Borrowing Costs Operating Segments Earning per share Income Taxes Accounting for fixed assets
3	**Valuation of Business for Amalgamation & Merger**
	Meaning, Need & Approach Methods of valuation
4	**Consolidated Financial Statement**
	Meaning, Stand Alone Financial Statements Consolidated Financial statements – Applicability, Advantages & Disadvantages Procedure of consolidation of Balance-sheet & Profit & Loss Account (Excluding cross holding, Chain Holding & Foreign Subsidiary)

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Group A: Advanced Accounting, Corporate Accounting and Financial Management

2. Indirect Tax- Introduction of Goods and Service Tax

Modules at a Glance

SN	Modules	No. of Lectures
1	Overview of Goods and Service Tax	15
2	Registration under GST	15
3	Collection of Tax under Integrated Goods and Services Tax Act, 2017	10
4	Place of supply of goods or services or both under Integrated Goods and Services Tax Act, 2017	10
5	Payment of GST	10
	Total	**60**

SN	Modules/ Units
1	**Overview of Goods and Service Tax**
	Introduction and Meaning of GST and IGST Scope of GST Present/old Tax Structure v/s GST GST in Other Countries Existing taxes proposed to be subsumed under GST Principles adopted for subsuming the taxes Dual GST Benefits of GST GST Council GST Network (GSTN) and GST regime Integrated Goods and Services Tax Act, 2017: title and definitions, administration.
2	**Registration Under GST**
	Rules and Procedure of registration Special provisions relating to casual taxable person and non-resident taxable person Amendment of registration Cancellation of registration Revocation of cancellation of registration
3	**Collection of Tax under Integrated Goods and Services Tax Act, 2017**
	Sec 5 and Sec 6
4	**Place of supply of goods or services or both under Integrated Goods and Services Tax Act, 2017**
	Sec 10 and Sec 12
5	**Payment of GST**
	• Introduction • Time of GST Payment • How to make payment • Challan Generation & CPIN • TDS & TCS

Note: Relevant Law/Statute/Rules in force and relevant Standards in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuring examination after relevant year

Group A: Advanced Accounting, Corporate Accounting and Financial Management

3. Financial Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Types of Financing	12
2	Investment Decisions : Capital Budgeting	12
3	Management of Working Capital	12
4	Financial Planning	12
5	Financial Policy and Corporate Strategy	12
	Total	**60**

SN	Modules/ Units
1	**Types of Financing**
	Introduction Needs of Finance and Sources: Long Term, Medium Term, Short Term Long Term Sources of Finance Owners Capital / Equity Capital Preference share capital Retained Earning Debentures or Bonds Loans from Financial Institutions / Banks Short Term Sources of Finance Trade Credit Accrued Expenses and Deferred Income Advances From Customers Commercial Papers Bank Advances:Loans, O/D, Clean O/Ds, Cash Credit, Advances against goods, Bills Purchased, Discounted, Advances against documents of title of goods, Advances against supply of bills, Term Loans Inter Corporate Deposits Certificate of Deposits Public Deposits
2	**Investment Decisions : Capital Budgeting**
	• Introduction • Nature of Capital Budgeting • Purpose of Capital Budgeting • Capital Budgeting Process • Types of Capital Investment • Decisions Project Cash Flows and Net profit Approval • Basic Principle of Measuring Project Cash Flows • Increment principle, Long Term Funds Principle, Exclusion of Financial Cost Principle, Post Tax Principle • Probability technique for measurement of cash flow • Capital Budgeting Techniques : Net Return Value; Internal Rate of Return; Profitability Index Methods • A Comparison; Project Selection Under Capital Rationing • (Note: Problems on computation of cash flow, ranking of projects on various techniques, selection and analysis with / without capital rationing. Comparison of IRR with Required rate of return i.e. cut off rate, IRR and mutually exclusive projects with unequal lives, multiple IRR)

SN	Modules/ Units
3	**Management of Working Capital**
	Meanings, Concepts and policies of working capital Management of working capital Issues in working capital Estimating working capital needs (only Theory) Operating or working capital cycle (only Theory) **Management of components of working capital** • **Management of Cash and Marketable Securities**: Motives for Holding Cash; Objectives of Cash Management; Factors Determining Cash Needs; Basic Strategies of Cash Management; Cash Management Techniques / Processes; Marketable Securities; and Cash Management Practices in India. • **Receivable Management**: Objectives; Credit Policies; Credit Terms; and Collection Policies. • **Inventory Management**: Objectives; and Techniques.
4	**Financial Planning**
	• Introduction • Meaning of Budget • Essentials of a budget, • Types of Budgets • Advantages of Budgeting • Zero Based Budget • (Note: Practical Questions on Sales Budget, Production Budget, Material Budget, Cash Budget and Master Budget)
5	**Financial Policy and Corporate Strategy**
	• Meaning of strategic financial management • Strategic financial decision making framework • Functions of Strategic Financial Management • Financial Planning

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Group A: Advanced Accounting, Corporate Accounting and Financial Management

4. International Financial Reporting Standards

Modules at a Glance

SN	Modules	No. of Lectures
1	Conceptual Foundations of Financial Statements	15
2	Presentation of financial statements	15
3	Indian Accounting Standards for Assets, Liabilities and Revenue	15
4	Presentation of Single Entity Financial Statements Covered by IFRS Convergence	15
	Total	**60**

SN	Modules/ Units
1	**Conceptual Foundations of Financial Statements**
	• The objective of financial reporting; • The main assumptions; • Qualitative characteristics of financial reporting; • Elements of Financial Statements: recognition and measurement
2	**Presentation of financial statements**
	Presentation of financial statements Accounting standards: Role/objectives of accounting standards, Development of accounting standards in India - Requirements of international accounting standards - International organizations engaged in accounting harmonization - IASB - FASB - Role of IASB in developing IFRS IFRS :- Introduction, scope Indian Accounting standards (Ind AS) : Introduction Road map Comparison of Ind AS, IFRS and AS Conceptual framework Definition of financial elements Principles of recognition, measurements, presentation and disclosure. **(Theory and Practical)**
3	**Indian Accounting Standards for Assets, Liabilities and Revenue**
	Valuation of Inventories Cash flow statement Accounting for tangible non-current assets Accounting for intangible assets Accounting for impairment of assets Accounting for borrowing costs Investment property Revenue from contracts with customers Income tax Employee benefits Provisions, contingent liabilities and contingent assets **(Theory and Practical)**
4	**Presentation of Single Entity Financial Statements Covered by IFRS Convergence**
	Ind AS 1): Accounting policies, accounting estimates (IAS 8 and Ind AS 8) - Events after reporting date (IAS 10 and Ind AS 10) - Structure and contents of financial statements - Preparation of financial statements: Statement of Financial Position (SOFP) - Statement of Profit or Loss (SOPL) - Statement of Changes in Equity (SOCE) - Cash Flow Statement (SOCF) (IAS 7 and Ind AS 7). • **(Theory and Practical)**

Group A: Advanced Accounting, Corporate Accounting and Financial Management

5. Personal Financial Planning

Modules at a Glance

SN	Modules	No. of Lectures
1	Understanding Personal Finance	15
2	Risk Analysis & Insurance Planning	15
3	Retirement Planning & Employees Benefits	15
4	Investment Planning	15
	Total	**60**

SN	Modules/ Units
1	**Understanding Personal Finance**
	Introduction • Time value of money applications • Personal financial statements, Cash flow and debt management, tools and budgets Money Management • Tax planning • Managing Checking and Savings Accounts • Maintaining Good Credit • Credit Cards and Consumer Loans • Vehicle and Other Major Purchases • Obtaining Affordable Housing Income and Asset Protection • Managing Property and Liability Risk • Managing Health Expenses
2	**Risk Analysis & Insurance Planning**
	Risk management and insurance decision in personal financial planning, Various Insurance Policies and Strategies for General Insurance, Life Insurance, Motor Insurance, Medical Insurance.
3	**Retirement Planning & Employees Benefits**
	Retirement need analysis techniques, Development of retirement plan, Various retirement schemes such as Employees Provident Fund (EPF), Public Provident Fund (PPF), Superannuation Fund, Gratuity, Other Pension Plan and Post- retirement counselling.
4	**Investment Planning**
	Risk Return Analysis Investing in Stocks and Bonds ,Mutual Fund, Derivatives, Investing in Real Estate, Asset Allocation, Investment strategies and Portfolio construction and management.

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester IV

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***	
Group B: Business Studies (Management) (Any Three out of Five)		
1	Supply chain management and logistics	**06**
2	Advertising and sales Management	**06**
3	Retail Management	**06**
4	Tourism Management	**06**
5	Management of Business Relations	**06**
	Total Credits	**18**

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Group B: Business Studies (Management)

1. Supply chain management and logistics

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Supply Chain Management	15
2	Perspectives of SCM	15
3	Introduction to Logistics	15
4	Design of SCM, Logistics and Use of Internet	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Supply Chain Management (SCM)**
	• **Supply Chain Management:** Concept, Features, Evolution, Importance, Process and Barriers of Supply Chain Management. • **Principles and Strategies:** Principles, Supply Chain Strategies – Organizations, Coordination, Innovation and Forecasting. • **Participants in SCM:** Supply chain intermediaries- Concept and Types, Channels of Distribution for Industrial Goods and Consumer Goods, Channel of Distribution at Services Level, Factors for selection of suitable channels.
2	**Perspectives of Supply Chain Management**
	• **Global perspectives:** Measuring and analyzing the value and efficiency of global Supply Chain Networks, Global market forces, Types of global supply chain. • **Indian Perspectives:** Measuring and Analyzing the value and efficiency of domestic Supply Chain Networks, Economic effects of supply chains. • **Customer Perspectives:** Customer values, Role of customers and Ways of improving customer services in SCM.
3	**Introduction to Logistics**
	• **Logistics Management**: Concept and Process, Competitive Advantages and Three C's, Changing Logistics Environment, Reverse Logistics, Importance ofInventory Control**,** Bull-whip effect • **Transportation and Warehousing:** Transport Functions and Participants in Transportation Decisions, Transport Infrastructure- Forms, Warehouse Functions and Operations • **Packaging and Materials Management-** Consumer and Industrial Goods Packaging - Importance, Factors influencing Materials Planning, Preservation Safety and Measures of Materials Handling
4	**Design of SCM, Logistics and Use of Internet**
	• **SCM Plan**- Demand Planning, Source of Procurement, Production or Assembly Steps, Sales return of defective or excess goods • **Use of Internet in SCM**- E-market places, E-procurement, E-logistics, E-fulfilment, • **Operative Systems in SCM**: Enterprise Resource Planning (ERP), Performance Modelling of supply chains using Markov chains, Inventory Control-Importance, Pareto's Law

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Group B: Business Studies (Management)

2. Advertising and sales Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Advertising Fundamentals and Media	15
2	Creativity, Social and Regulatory Framework of Advertising	15
3	Sales Management	15
4	Sales Planning and Controlling	15
	Total	**60**

SN	Modules/ Units
1	**Advertising Fundamentals and Media**
	▪ **Basics of Advertising :** Concept and Features, Significance, Classification of Advertising, Integrated Marketing Communication (IMC) - Elements, Behavioural Model (E.K. Strong AIDA), DAGMAR Model (Russell Colley), Heirarchy of Effects (Lavidge and Steiners) ▪ **Ad Agency :** Various Functional Department, Types, Measures for gaining and reasons for loosing clients, Evaluation Criteria for Selecting an Advertising Agency, ▪ **Media :** New Media Options, Forms of Digital Media, Media Objectives, Criteria for Selecting Suitable Media, Methods of Setting Advertising Budget
2	**Creativity, Social and Regulatory Framework of Advertising**
	▪ **Creativity &Research:**Developing advertising copy - print, broadcast and digital media, Pre-test and post-test methods. ▪ **Society:** Socio-economic contribution and criticisms of advertising, professional courses and careers in the field of advertising ▪ **Regulatory framework of advertising**: Legal Framework of Advertising, Role of Information and Broadcasting Ministry (IBM), Self-Regulatory Bodies – Advertising Standards Council of India(ASCI) and Indian Broadcasting Foundation(IBF)
3	**Sales Management**
	▪ **Introduction** : Sales Management - Features, Functions and Importance, Art of Selling – Types, Process, Qualities of an Effective Salesman. ▪ **Sales force management** : Selection Procedure, Training Methods, Motivational Factors and Compensation methods of sales personnel ▪ **Sales organistion** : Concept, Objectives, Structure and Steps in Developing a Sales Organisation
4	**Sales Planning and Controlling**
	▪ **Sales planning** : Concept, Process, Sales Forecasting - Methods and Limitations ▪ **Sales controlling** : Concept of Sales Budget and Sales Audit, Sales Quota - Methods and Types, Objectives and Factors Determining and Designing Sales Territory ▪ **Recent trends** - Importance of Customer Feedback, Sales Management - Data Mining, Role of IT

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Group B: Business Studies (Management)

3. Retail Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Retail Management	15
2	Retail Management Strategy	15
3	Retail Location, Layoutand Merchandising	15
4	Use of Technology and Career options	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Retail Management**
	• **Retailing:**Concept, Scope and Importance of Retailing and Retail Management, Retail Formats, Theories of Retail change, Retail Environment- Economic, Legal, Technological & Competitive • **Retail sector in India:** Size, and Drives of Retail changes, FDI in Retailing in Indian Context • **Recent Trends in Retailing:** Modern Retail Formats, Mall System, Challenges Faced by the Retail Sector, Ethics in Retailing.
2	**Retail Management Strategy**
	• **Retail Strategies:** Promotional Strategies, Retail Planning Process, Retail - Market Segmentation - Concept and Significance • **Relationship Marketing Strategies:** CRM in Retailing, Retail Value Chain, Retail life Cycle, HRM in retailing- Growing importance of HR and Challenges faced by HR in retailing • **Consumer Strategies:** Consumer Behaviour in Retail Context, Buying Decision Process, Customer Service as a Part of Retail Strategy.
3	**Retail Location, Layoutand Merchandising**
	• **Retail Location& Merchandising:** Importance, Types, Steps involved in choosing a Retail Location. • **Merchandising:** Concept and Merchandising Planning Process, Retail Branding, Merchandising Buying, Visual Merchandising • **Store Design and Layout:** Store Design - Elements, Store Layout - Importance, Steps for Designing
4	**Use of Technology and Career options**
	• **Technologies:** Use of Technologies in retailing - Electronic Data Interchange (EDI), Radio Frequency Identification (RFI), Data Base Management system • **E-Retailing:** Formats, Challenges, Green Retailing - Concept and Importance • **Retail as a Career:** Various Career Options, Responsibilities of Store Manager, Functions of Merchandising Manager

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Group B: Business Studies (Management)

4. Tourism Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Tourism Management	15
2	Tourism Marketing	15
3	Tourism Practices	15
4	Tourism Development	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Tourism Management**
	• **Tourism –** Concept, Characteristics Importance and Types of Tourism • **Tourism Industry:** Concept, Nature, Structure and Components, Career options in Tourism. • **Tourism Destination**: Concept, Elements, Tourism Destination Planning – Process and Importance.
2	**Tourism Marketing**
	• **Tourism Product**: Concept, Characteristics, Types, Tourism Product Planning- Need and Importance. • **Tourism Pricing:** Influencing factors, Pricing objectives, Tourism Pricing Policies • **Tourism Promotion:** Importance, Elements of Tourism Promotion, Role of Advertising, Promotional Plan – Implementation Procedure
3	**Tourism Practices**
	• **Travel Intermediaries:** Travel Agency and Tour operators – Definition and Differentiation, Types, Importance and Functions. • **Setting up of Travel Agency and Tour Operations and their Approval:** Business setting Procedure and process, Types of organization to be set up- Proprietorship, Partnership, Franchise, Approval from Ministry of Tourism and IATA • **International Tourism:** Concept, Importance, Role of Institutions and organizations in promoting International Tourism -WTTC , IATO, TAAI, ITDC.
4	**Tourism Development**
	• **Sustainable Tourism Development:** Concept, Principles, Approaches to Sustainable Tourism, Code of Conduct for safe and sustainable Tourism in India • **Government Policies:** National Action Plan, National Tourism Policy, Government incentives for Tourism Development and Promotion. • **Future Growth and Development of Indian Tourism -** Factors influencing growth of Tourism Industry in India, Major Tourism schemes of Government of India- Visa on Arrival (VoA), PRASAD Scheme, HRIDAY Scheme, Travel Circuits; Incredible India Campaign.

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Group B: Business Studies (Management)

5. Management of Business Relations

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Management of Business Relations	15
2	Customer and Channel Relationship Management	15
3	Employee Relationship Management	15
4	Supplier, Investors and Community Relationship Management	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Management of Business Relations**
	• **Business Relations** - Need , Importance of Business relations, Business Relationship Management (BRM) Competencies. • **Business Relation Manager**- Role, qualities, Skills. • **Business Relations**- Principles, Steps , Trends, Impact of Communication on Business Relations.
2	**Customer and Channel Relationship Management**
	• **Customer Relations Management**: Concept, Characteristics of an empowered customer, Approaches &Types, Role of Customer Relations Manager. • **Designing and developing customer Value**- Turning customers to loyal clients, Strategic Framework for CRM, E-CRM: Concept and Benefits, Steps, Successful CRM implementation. • **Channel Relationship** - Concept, importance , Challenges, Elements contributing to effective channel relationships.
3	**Employee Relationship Management**
	• **Employee Relationship Management** - Concept, Objectives of Employee Relations , Approaches to Employee Relations, • **Role of Employee Relations Manager**, Prospects & Importance of Industrial Relations, Problems & Challenges of Employee Relations, Key Drivers for shifting from Industrial Relations to Employee Relations, • **Strategic Framework for ERM**,Factors influencing ERM, Essentials of an effective ERM, ERM strategy.
4	**Supplier, Investors and Community Relationship Management**
	• **Supplier Relations** – Concept, Supplier Segmentation Pyramid, Supplier Improvement Process for better relations, Challenges. • **Investors Relations** –Concept, Focus, Keys to successful investors relations, Enhancing shareholders loyalty and retention. • **Stakeholder relations**- Types of stakeholders, Role of business in social development, strategies to improve community relations, impact of community relations on business.

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester IV

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***	
Group C:	***Banking and Finance (Any Three out of Five)***	
1	International Finance	**06**
2	Financial Services	**06**
3	Auditing of Banking Sector	**06**
4	Investment Management	**06**
5	Currency Derivatives	**06**
	Total Credits	**18**

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Master of Commerce (M.Com) Programme at Semester IV
(To be implemented from Academic Year- 2017-2018)

Group C: Banking and Finance

International Finance

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to International Finance	15
2	International Monetary System and Foreign Exchange Market	15
3	Currency Futures and Options	15
4	Global Financial Market	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to International Finance**
	A) Introduction to International Finance – Meaning, Scope of International Financial Management, Factors contributing to growth in International Finance– Recent Changes in Global Financial Markets. **B) Balance Of Payments –** Meaning, Components, Factors- Deficit and Surplus in BOP , Capital Account Convertibility and Current Account
2	**International Monetary System and Foreign Exchange Market**
	A) International Monetary System – Introduction to Exchange rate regime, The International Monetary Fund - Objectives and Funding Facilities, International Liquidity and Special Drawing Rights and Introduction to The European Monetary System **B) Foreign Exchange Market** - Major Participants in Spot market and Forward market, Exchange Rate Quotation, Determination of exchange rates in spot and forward market, Factors influencing exchange rates, Types of Foreign Exchange Rates and Interest rate
3	**Currency Futures and Options**
	A) Currency Futures - Futures Contracts, Features, Trading Process- Hedging in currency futures market, and Speculation in currency futures market, Determination of Futures prices, Forward prices and expected spot prices on delivery. **B) Currency Options:** Features, Terminology, Types of options, options pricing, hedging with currency options and Speculation with currency options.
4	**Global Financial Market**
	A) International Instruments – Introduction, Gains from International Market International Equities and Bonds Market, Short term and Medium term Instruments and Types of risks and tools. **B) Multilateral Development Banks** - The World Bank, International Finance Corporation, Asian Development Bank – Introduction, Characteristics and Functions.

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Group C: Banking and Finance

Financial Services

Modules at a Glance

SN	Modules	No. of Lectures
1	Evolution of Financial Services	15
2	Marketing of Financial Services	15
3	Mutual Funds	15
4	Portfolio Management Services	15
	Total	**60**

SN	Modules/ Units
1	**Evolution of Financial Services**
	A) Evolution of Financial Service - Meaning of Financial Services, Types of Financial Services, Fund based and Non-fund based , Significance of Financial Services , Growth of Financial Services in India , Emerging Trends in Financial Services and constraints in growth of financial services. **B) Regulatory Framework for Financial Services** – Role of RBI, Role of SEBI , Provisions of Companies Act , Role of FEMA and Ethical issues in the Marketing of Financial services.
2	**Marketing of Financial Services**
	A) Categories of Financial Products – Insurance, Banks, Stocks, Mutual Funds, Pension Plans, other Savings Products, Financial Services Marketing Environment –Micro and Macro Environmental Forces , Marketing Mix for Financial Services, Promotional Strategies, Customer Relations and Servicing. **B) Treasury Management** – Structure and Organization , Functions and Responsibilities of a Treasurer, Cost centre, Profit Centre , Integrated Treasury, Treasury and Asset Liability Management, Liquidity Management: CRR/CCIL/RTGS , Types of Exposure and Elimination of Exposure
3	**Mutual Funds**
	A) Mutual Funds Concept – History of Mutual fund Industry in India , Advantages Different Scheme, Fund Accounting and Valuation (Practical Problems on Mutual Fund) **B) UTI:** Objective, Functions, Regulation, Performance Measurement and Evaluation of Mutual Fund Schemes, Unit holder's Protection. **C) Merchant Banking** – Facets of Merchant Banking, Functions, Legal and Regulatory Frameworks, Relevant Provisions of Companies Act , SEBI Guidelines , Role in Issue Management, Appraisal of Projects, Designing Capital Structure and Instruments and Issue Pricing
4	**Portfolio Management Services**
	A) Portfolio Management Services - Meaning, Importance, Objectives, Strategies, Types of Strategies – Passive & Active Strategies, Role of Portfolio Managers. **B) Other Financial Services** – Leasing and Hire Purchase, Factoring and Forfaiting, Consumer Finance, Securitization, Venture Capital, Loan Syndication, Custodial and Depository Services, Credit rating

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Group C: Banking and Finance

Auditing of Banking Sector

Modules at a Glance

SN	Modules	No. of Lectures
1	Auditing Concepts	15
2	Auditing of Banks	15
3	Verification of Assets and Balances of Banking Companies	15
4	Introduction to Concurrent Audit	15
	Total	**60**

SN	Modules/ Units
1	**Auditing Concepts**
	• Nature, Scope and Significance of Auditing • Audit Engagement, Audit Program, Audit Working Papers, Audit Note Book, Audit Evidence
2	**Auditing of Banks**
	• Meaning and Appointment of Bank Auditors • Internal control system in Banks • Categories of Bank Audit: Concurrent audit, Internal Audit/ Information Systems Audit and Statutory audit • Banking Regulation Act in pursuant to accounts and auditing of banking companies - Sec 29 to Sec 34A • Guidance Note on Audit of Banks by ICAI
3	**Verification of Assets and Balances of Banking Companies**
	• Cash, bank balances, money at call and short notice • Investments • Advances • Fixed assets • Other assets • Capital • Reserves and surplus • Deposits • Borrowings • Other liabilities and provisions
4	**Introduction to Concurrent audit**
	• Concurrent audit system : Meaning, scope, coverage, Types of activities, Appointment of auditors and reporting • Internal Audit/ Information Systems Audit – Meaning, Scope • Statutory audit of banks/bank branches • Audit of bank branch and reporting

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Group C: Banking and Finance

Investment Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Portfolio Management – An Introduction	10
2	Portfolio Revision and Evaluation	15
3	Fundamental and Technical Analysis	20
4	Efficient Market Theory and CAPM	15
	Total	**60**

SN	Modules/ Units
1	**Portfolio Management – An Introduction**
	A) Portfolio Management – An Introduction Investment - Meaning, Characteristics, Objectives, Investment V/s Speculation, Investment V/s Gambling and Types of Investors Portfolio Management – Meaning, Evolution, Phases, Role of Portfolio Managers, Advantages of Portfolio Management. Investment Environment in India and factors conducive for investment in India. **B) Portfolio Analysis and Selection** Portfolio Analysis – Meaning and its Components, Calculation of Expected Return and Risk, Calculation of Covariance, Risk – Return Trade off. Portfolio Selection – Meaning, Feasible Set of Portfolios, Efficient Set of Portfolios, Selection of Optimal Portfolio, Markowitz Model, Limitations of Markowitz Model, Measuring Security Return and Portfolio Return and Risk under Single Index Model and Multi Index Model.
2	**Portfolio Revision and Evaluation and Bond Evaluation**
	A) Portfolio Revision and Evaluation - Portfolio Revision – Meaning, Need, Constraints and Strategies. Portfolio Evaluation – Meaning, Need, Measuring Returns (Sharpe, Treynor and Jensen Ratios) and Decomposition of Performance. **B) Bond Valuation**– Meaning, Measuring Bond Returns – Yield to Maturity, Yield to call and Bond Pricing. Bond Pricing Theorems, Bond Risks and Bond Duration. (Practical Problems on YTM and Bond Duration)
3	**Fundamental and Technical Analysis**
	A) Fundamental Analysis - Economy Analysis – Meaning, Framework of Economic Analysis, Forecasting, Barometric or Indicator Approach, Econometric Model Building and Opportunistic Model Building. Industry Analysis – Concept of Analysis, Industry Life Cycle, Industry Characteristics. Company Analysis – Financial Statements, Analysis of Financial Statements, (Practical questions on Debt equity ratios, total debt ratio, proprietary ratios, interest coverage ratio, Profitability ratios related to sales, investment, equity shares and Efficiency or Activity Ratios) and Assessment of risk (Leverages) **B) Technical Analysis -** Dow Theory , Meaning and Principles of Technical Analysis, Price Chart, Line Chart, Bar Chart, Japanese Candlestick Chart, Trends and Trends and Trend Reversals, Chart Patterns, Support and Resistance, Reversal Patterns, Continuation Patterns and Elliot Wave Theory, Mathematical Indicators – Calculation of Moving Averages (Simple and Exponential Moving Average), Oscillators and Relative strength Index, Market Indicators and Fundamental Analysis V/s Technical Analysis
4	**Efficient Market Theory and CAPM**
	A) Efficient Market Theory - Random Walk Theory, The Efficient Market Hypothesis , Forms of Market Efficiency , Competitive Market Hypothesis **B) CAPM-** Fundamental Notions of Portfolio Theory, Assumption of CAPM, Efficient Frontier with Riskless Lending and Borrowing, Capital Market Line, Security Market Line and Pricing of Securities with CAPM. Arbitrage Pricing Theory (APT) – The Return Generating Model, Factors Affecting Stock Return, Expected Return on Stock, APT V/s CAPM.

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Group C: Banking and Finance

Currency Derivatives

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Currency Markets	15
2	Regulatory Framework for Currency Derivatives	15
3	Strategies using Currency Derivatives	15
4	Clearing and Settlement System of Currency Futures	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Currency Markets**
	A) **Introduction to Currency Markets** – Brief history of foreign exchange markets, Major Currency pairs, Overview of international currency markets, Basics of currency markets and peculiarities in India, Settlement date or value date, OTC forward rate, Exchange Rate arithmetic cross rate, Impact of market economics on currency prices and economic indicators B) **Foreign Exchange Derivatives –** Definition, Products , Growth drivers of derivatives, Market Players, Key economic function of derivatives, Financial Market stability: Exchange traded V/s OTC derivatives.
2	**Regulatory Framework for Currency Derivatives**
	A) **Regulatory Framework for Currency Derivatives** – Applicability of Securities Regulation Act, 1956, RBI-SEBI standing technical committee on exchange traded currency and interest rate derivatives, Foreign Exchange Management Act, 1999 – Provisions, Regulatory framework for exchanges, Regulatory framework for clearing corporations, Governing council of the exchange and clearing corporation and Eligibility criteria for members. B) **Code of Conduct and Investor Protection** - Adherence to SEBI codes of conduct for brokers/ sub-brokers, Adherence to codes of conduct specific to currency derivatives segment, Grievance redressal mechanism for investors.
3	**Strategies using Currency Derivatives**
	A) **Strategies using Currency Derivatives** – Market Participants – Hedgers, Speculators, Arbitrageurs, Computing pay offs from a portfolio of futures and trade remittances, Using foreign currency futures for hedging various kinds of foreign exchange exposures, Use of currency futures by speculators and arbitrageurs, trading spreads using currency futures, limitations of currency futures for hedgers. B) **Trading in Currency Futures** - Currency futures contract specification, Other terminologies with respect to contract specifications, Trader workstation screen (TWS), Entities in the trading system, Types of orders, Price Limit Circuit Filter and Rules, regulations and bye laws of Exchange.
4	**Clearing and Settlement of Currency Futures**
	A) **Clearing and Settlement in Currency Futures**- Clearing vs. Settlement, Clearing entities, Clearing mechanism, Regulatory guidelines on open position limits and Settlement mechanism. B) **Risk Management in Currency Futures** - Risk management measures, Margin requirements, Mark-to-Market, Settlement, Margin collection and enforcement, Periodic Risk Evaluation Report, Surveillance and Unique Client Code (UCC).

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Course Structure

(To be implemented from Academic Year 2017-2018)

Semester IV

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***	
Group D: E-Commerce (Any Three out of Five)		
1	E-Commerce Security and Law	**06**
2	Advance technology for E-Commerce	**06**
3	Management Information System	**06**
4	Digital Marketing	**06**
5	International Business, Law and Taxation	**06**
	Total Credits	**18**

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Group D: E-Commerce

1. E-Commerce Security and Law

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to E-Commerce Security	15
2	Security Threats and Measures	15
3	Introduction to Cyber Law	15
4	Cyberspace Laws	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to E-Commerce Security**
	• E-commerce security: Concept, Need/Importance, Security Issues in E-Commerce- Security risks of e-commerce, • Threats and Risk Management: Type of threats, Sources of threats, Security tools & Risk – Types of security, management approach • Network Security: Encryption, Protecting Web server with a Firewall, Firewall and the Security Policy, Network Firewalls and Application Firewalls, Proxy Server
2	**Security Threats and Measures**
	• Current threats, Cryptography, public key certificates and infrastructures, authentication and authorization certificates, • Mobile code security, security of agent-based systems, secure electronic transactions, electronic payment systems, intellectual property protection, • Symmetric and Asymmetric Cryptosystem, Role of electronic signature, EDI Security
3	**Introduction to Cyber Law**
	• Introduction to Cyber Laws-World Scenario, Cyber-crime& Laws in India and their limitations, • Threats in Computer Systems: Virus, Cyber Crime, Hacking, Web Vandals, E-mail Abuse, Software Piracy and Patents. • The problems of internet jurisdictions, Law relating to Electronic records, Importance of Electronic Records as Evidence.
4	**Cyberspace Laws**
	• Cyberspace and Internet in India- Penalties, Offences and Compensation • Protection of Cyber Consumers in India and CPA 1986, International efforts related to cyberspace laws, Trace an IP address, • Security Tools, Client server network security, Encryption and concepts of public and private key infrastructure

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Group D: E-Commerce

2. Advance technology for E-Commerce

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Advanced technology for E-commerce	15
2	Information Publishing Technology	15
3	E-commerce Success with Contain Marketing	15
4	New Trends	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Advanced technology for E-commerce**
	• Advanced technology for E-commerce: Concept of E-commerce, Internet & WWW, Functions, • Types of technology, Electronic Data Interchange (EDI)- Benefits, Transaction and examples, Multimedia technology – desktop Video Conferencing • Securing Network Transaction: Cryptology, Digital Signature, E-mail security
2	**TCP/IP and Information Publishing Technology**
	• Internet Protocols – OSI Model, TCP/IP, FTP; LAN, WAN • Information Publishing Technology - HTML, URL, HTTP, HTML FORM, CGI SERVICES, • eXtensible Markup Language (XML) – Application and Architecture, Data Mining and Web Mining
3	**Mobile Agents& WAP**
	• Mobile Agents- Concept, Mobility and security issues, Client Server Approach v/s Mobile Agent based approach, • Mobile computing, Mobile users in Global E-commerce, Coalition Formation • Wireless Application Protocol (WAP) - Benefits and Architecture, Web Server and client (Web Browser).
4	**New Trends**
	• New E-commerce Technology Trends, Broadband technologies, Affiliate Marketing, Content marketing - challenges, • Key performance indicators (KPIs),Complex Server and Network Infrastructure, transitioning to Virtualization & Cloud Computing, use of fully or partially outsourced IT support • Supercharged Kiosks, Role of Instant Messaging (IM), Digital literacy and multimedia design

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Group D: E-Commerce

3. Management Information System

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Management Information System (MIS)	15
2	Business & Designing Information System	15
3	Information and System Concept	15
4	Decision Support System & Development of MIS	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Management Information System (MIS)**
	• MIS: Concept, Characteristics, Components, Strategic uses, Challenges of Global information system • Information System Resources: Selection of Business Software and Hardware, Business Network and Data Warehouses • Business Intelligence, Knowledge Management, System Planning and Development
2	**Business &Designing Information System**
	• Classification of MIS: Transaction Process System (TPS), Process Control System (PCS), Enterprise Collaboration System (ECS), Business information system, • System Design: Conceptual Design, Objectives, Methods • Structuring Data of MIS: Pyramid structure, Querying, Aggregating and Visualizing Data
3	**Information and System Concept**
	• Information: Concept, Types, Dimensions of Information, Information Quality • System: Kinds, Elements of system, Human as information processing system • Need of IT Industry, Scope of Infrastructure Management, Attributes of Computing System
4	**Decision Support System& Development of MIS**
	• Decision Making: Concept, Types, Simon's Model, Decision Making and MIS • Supporting Management Decision: Key Performance Indicators (KPI), Planning and Implementation. • Development of MIS: Steps in developing a right MIS, System Development Approaches, System analysis and design- Determinants and requirement

Group D: E-Commerce

4. Digital Marketing

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Digital Marketing & SEO	15
2	Google analytics and SMO	15
3	SEM and Social Media	15
4	Email and Mobile Marketing	15
	Total	**60**

SN	Modules/ Units
1	**Introduction to Digital Marketing & SEO**
	• Digital Marketing - Introduction, Features, Strategies, Types, Aligning Internet with Business Objectives, • User Behaviour & Navigation, Branding & User Experience, Customer Insights • Search Engine Optimization(SEO) – Search Engines Basics, Functioning of Search Engines, On&off-page Optimization,
2	**Google analytics and SMO**
	• Google Analytics–Concepts, steps, Accounts-profiles and users navigation, Basic metrics, • The main sections of Google Analytics reports-Traffic Sources, Direct referring and search traffic; • Social Media Optimization (SMO) - Concepts, Pros & Cons, bookmarking & aggregating, content, content sharing, knowledge sharing; connecting to social networking
3	**SEM and Social Media**
	• Search Engine Marketing (SEM) - Concept, Understanding Google search - Organic & Paid, Overview of Google Adwords, Google Adsense, Microsoft AdCenter and Yahoo Search Marketing, • Campaign Management, Pay Per Click (PPC) Management, Conversion Tracking, Targeting & Analytics, Keyword Selection, • Conversion Metrics- CPA, CTR, Campaigns - Google PPC Campaigns, LinkedIn Campaigns, Facebook Campaign, YouTube Advertising
4	**Email and Mobile Marketing**
	• E-mail Marketing - User Behaviour, Segmentation, Key Metrics, Best Practice Case Studies, E-marketing strategies, • Tracking landing pages, Choosing your metrics, A/B and Multivariate testing, Analyzing test results, Setting your budgets; • Mobile Marketing - Concept, SMS Strategy, Mobile Advertising, Mobile Optimized Websites, Mobile Apps, Proximity Marketing,

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Group D: E-Commerce

5. International Business, Law and Taxation

Modules at a Glance

SN	Modules	No. of Lectures
1	Use of Internet in the International Business	15
2	International Outsourcing and Ethics	15
3	International Law and Taxation	15
4	Government Intervention in International Business	15
	Total	**60**

SN	Modules/ Units
1	**Use of Internet in the International Business**
	• International Business: Concept, Features, External and Internal Factors of International business • Internet and International business: Significance, Use of Internet, Impact of E-commerce and Barriers • International E-commerce business: Concept of E-business, Features, Evolution,
2	**International Outsourcing and Ethics**
	• Global outsourcing: Concept, Forms, Drivers, Development in IT-BPO Sector • International Outsourcing in India: Benefits,Growth Drivers of India, Limitations • Ethics in International e-Business, Constraint in e-Business in India, International e-Commerce Benchmarking,
3	**International Law and Taxation**
	• International Legal environment in E-commerce, European Community Law, Intellectual Property Law, Pillaging Patent • United States Taxation of International e-Commerce, Law and Policy of Organisation for Economic Co-operation and Development (OECD) • International Taxation and e-Commerce: Direct and Indirect taxation, Relevance of E-commerce, Effect of E-commerce on consumption taxes, Emerging Tax Policy,
4	**Government Intervention in International Business**
	• Instruments of Government Intervention: Tariff and Non- Tariff Barriers, Investment Barriers, • Policies regarding e-commerce: FDI Policy, Foreign Trade Policy, Export-Import Policy- Methods of E-payment, e-Documentations • Rationale for Government Intervention: Defensive and offensive rationale, Economic Freedom and Government Support

Scheme of Examination:

The performance of the learners will be evaluated in two components. One component will be the Internal Assessment component carrying 40% marks and the second component will be the Semester End Examination component carrying 60% marks.

Internal Assessment:

The Internal Assessment will consist of one class test of 40 marks for each course excluding projects. The question paper pattern will be shown as below:

Question Paper Pattern

(Internal Assessment)

Maximum Marks: 40 marks

Questions to be set: 03

Duration: 1½ hours

Question No	Particular	Marks
Q-1	Objective Questions Students to answer 10 sub questions out of 15 sub questions. *(*Multiple choice/ True or False/ Match the columns/ Fill in the blanks)* ***OR*** Objective Questions A) Sub Questions to be asked 08 and to be answered any 05 B) Sub Questions to be asked 08 and to be answered any 05 *(*Multiple choice/ True or False/ Match the columns/ Fill in the blanks)*	10 Marks
Q-2	Concept based short questions Students to answer 5 sub questions out of 8 sub questions.	10 Marks
Q-3	Practical problems or short questions Students to answer 02 sub questions out of 03 sub questions	20 Marks

Question Paper Pattern

(Practical Courses)

Maximum Marks: 60

Questions to be set: 04

Duration: 2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Practical Question	15 Marks
	OR	
Q-1	Practical Question	15 Marks
Q-2	Practical Question	15 Marks
	OR	
Q-2	Practical Question	15 Marks
Q-3	Practical Question	15 Marks
	OR	
Q-3	Practical Question	15 Marks
Q-4	Objective Question *(Multiple Choice/ True or False/ Fill in the Blanks/ Match the Columns/ Short Questions.)*	15 Marks
	OR	
Q-4	Short Notes *(Any three out of five)*	15 Marks

Note:

Full length question of 15 marks may be divided into two sub questions of 08 and 07 marks.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 60

Questions to be set: 04

Duration: 2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Full length Question	15 Marks
	OR	
Q-1	Full length Question	15 Marks
Q-2	Full length Question	15 Marks
	OR	
Q-2	Full length Question	15 Marks
Q-3	Full length Question	15 Marks
	OR	
Q-3	Full length Question	15 Marks
Q-4	Objective Question *(Multiple Choice/ True or False/ Fill in the Blanks/ Match the Columns/ Short Questions.)*	15 Marks
	OR	
Q-4	Short Notes *(Any three out of five)*	15 Marks

Note:

Full length question of 15 marks may be divided into two sub questions of 08 and 07 marks.

M.Com II
Project work

Work Load:

Work load for Project Work is 1 hour per batch of 15 students per week for the teacher. The student shall do field work and library work in the remaining 3 hours per week.

Guidelines:

- The project topic may be undertaken in any area of Elective Courses.
- Each of the students has to undertake a Project individually under the supervision of a teacher-guide.
- The student shall decide the topic in consultation with the teacher-guide concerned.
- University/college should allot P G Teacher for guidance to the students based on her / his specialization.
- There shall be double valuation of project by the teacher- guide concerned and an external examiner appointed by the University/College with equal weightage.
- The teacher-guide along with the external examiner appointed by the University/College for the valuation of project shall conduct viva voce examination with equal weightage.
- The date of viva voce shall be intimated to the students by the Department well in advance.
- The project report shall be prepared as per the broad guidelines given below:
  a. Project Report shall be typed in Times New Roman with one and half line spacing in 12 Font Size and 1.5 spacing.
  b. The size of the Project Report shall be with a minimum of 25,000 words and a maximum of 40,000 words. (
  c. Project Report shall be printed on both sides of the paper.
  d. The Project Report shall be bounded.

Evaluation:

The Project Report evaluation is for 60 Marks and the Viva –Voce examination is for 40 Marks (without presentation).

No marks will be allotted on the Project Report unless a candidate appears at the Viva-Voce Examination. Similarly, no marks will be allotted on Viva-Voce Examination unless a candidate submits his/her Project Report.

Project Report (60 marks):

Introduction and other areas covered	– 20 marks
Presentation, Analysis & Findings	-- 30 marks
Conclusion & Recommendations	-- 10 marks

Viva-Voce (40 marks):

In course of Viva-Voce Examination, the question may be asked in the following areas:

Importance / relevance of the Study, Objective of the Study, Methodology of the Study/ Mode of Enquiry	-- 10 marks
Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	-- 20 marks
Overall Impression (including Communication Skill)	-- 10 marks

Passing:

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Semester 1 - B.Sc.(Hospitality Studies)

		Class Room Instruction Face to Face									Notional				Credits			
Course Code	Subject	Per Week			Per Sem			Per Sem Hrs										
		L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
USHO101	Food Production & Patisserie I	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO102	Food & Beverage Service I	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO103	Front Office I (pg 19)	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO104	Housekeeping I	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO105	Rooms Division Mgt (Practicals)-I (pg 27	-	4	-		60	-	-	60			10		70	-	2	-	2
USHO106	Communication Skill I (English & French)	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO107	Information Technology	1	2	-	15	30	-	15	30	-	20	5	-	70	2		-	2
USHO108	Food Safety & Nutrition	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
	Total	19	14	-	285	210	-	285	210	-	170	35	-	700	14	6	-	20
	L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial																	
	Notional includes time spent in library / home / other institutions for preparation and writing of assignments, quizes, open book test, journal, case studies, project, practical, field work, excursion, etc.																	
	Information Technology will be single head of passing.																	

FOOD PRODUCTION & PATISSERIE–I (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food Production & Patisserie-I(USHO 101)
Course Code	Title	Credits	
USHO101	Food Production & Patisserie-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	2					
Credit	2	2					

Class Room Instruction Face to Face									Notional				Credits			
Per Week			Per Sem			Per Sem Hrs										
L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4

OBJECTIVES:

- To inculcate a right attitude and the required basic knowledge and technical skills in the art of culinary and the food production department.
- To introduce the various equipments and utensils used in the kitchen.

Contents of syllabus for USHO 101

UNIT NO.	Ch.No.	TOPIC	Hrs.
01	1	Introduction to the Food Production Department 1.1 Levels of Skills and Experience 1.2 Attitude and Behaviour in the Kitchen 1.3 Kitchen Uniforms 1.4 Personal Hygiene 1.5 Safety Procedures for Handling Equipment	01
	2	Culinary History and Culinary Terms (Explanation with Examples) Origins of Modern Cookery Modern Development in Equipment and Technology	02
	3	Equipment and Hand Tools used in Kitchen & Different Types of Fuels used in Kitchen 3.1 Hand tools and utensils used in Kitchen 3.2 Various Fuels used in the Kitchen 3.3 Advantages & Disadvantages of Various Fuels 3.4 Various Equipment used in the Kitchen	04
	4	Introduction to Cooking 4.1 Aims and Objectives of Cooking 4.2 Classification of Various Raw Materials according to Functions 4.3 Various Textures and Consistencies 4.4 Methods and Techniques of Preparation	04
	5	Stocks 5.1 Definition of Stock 5.2 Types of Stocks 5.3 Preparation (Recipe), Storage, Care and Precautions in Preparation	02
	6	Culinary Terms	02
UNIT NO.	Ch.No.	TOPIC	Hrs.
02	7	Methods of Cooking 7.1 Various Methods of Cooking Foods (Roasting, Grilling, Frying, Baking, Boiling, Poaching, Microwave) 7.2 Principles of each Method and Precaution to be taken	04

	8	Hierarchy and Kitchen Staffing 8.1 Classical Kitchen Brigade 8.2 Modern Staffing in Various Category Hotels 8.3 Duties and Responsibilities of Various Chefs 8.4 Role and Duties of the Executive Chef 8.5 Inter-Departmental Co-operation and Co-ordination	03
	9	Egg 9.1 Selection of Eggs 9.2 Structure of Eggs 9.3 Uses of Eggs 9.4 Nutritive Value of Eggs	02
	10	Vegetables & Fruits 10.1 Classification of Vegetables 10.2 Colour Pigments in Vegetables and Effects of Heat, Acid and Alkali on each of them 10.3 Cuts of Vegetables 10.4 Classification of Fruits 10.5 Uses of Fruits 10.6 Salad & Salad Dressing	04
	11	Bakery & Pastry Sugar 11.1 Importance of Sugar 11.2 Types of Sugar 11.3 Cooking Stages and Temperature of Various Stages 11.4 Uses of Sugar	02
UNIT NO.	Ch.No.	TOPIC	Hrs.
03	12	Sauces 12.1 Classification of Sauces / Composition 12.2 Mother Sauces and its Recipes (1 Litre) 12.3 Derivatives	04

Bechamel Sauce	Veloute Sauce	Espagnole Sauce
Mornay	Allemande	Demi-glaze
Cream	Supreme	Madeira
Parsley	Mushroom	Nancy
Mustard	Hongroise	Chasseur
Onion	Ivory	Robert
Soubise	Aurore	Bordelaise
Cardinal	Caper	Devil
Tomato Sauce	Hollandaise Sauce	Mayonnaise
Barbecue	Bearnaise	Tartare
Italienne	Maltaise	Thousand Island
Portugaise	Choron	Cocktail
Provencal	Foyot	Chantilly
Bretonne	Mustard	Gribiche

	Milanaise	Mousseline	Vincent	
	Chaudfroid	Noisette	Andalouse	
13	Bakery & Pastry			
	13.1 Bread Making			03
	Principles of Bread Making			
	Role of Each Ingredient			
	Simple Yeast Bread			
	Baking Temperature & its Importance			
	13.2 Cookies			
	Types of Cookies			02
	Methods of Preparation			
	13.3 Flour – Structure of Wheat			
	Types of Wheat			04
	Types of Flour			
	Milling of Flour			
	Nutritive Value			
	13.4 Raising Agents			
	Classification and Role of Raising Agents			02

Culinary Terms (Explanation of the following Culinary Terms with examples)

Au gratin	Bake	Barbeque
Baste	Batter	Béarnaise
Beat	Béchamel	Beurre Noir
Beurre Manie	Blanch	Blend
Bouquet garni	Broil	Brunoise
Brush	Bouillon	Caramel
Consommé	Court Bouillon	Croutes
Croutons	Custard	Dough
Mince	Estouffade	Espagnole
Fume	Garnish	Glaze
Hollandaise	Infusion	Liason
Beurre Maître d' Hotel	Marinate	Mire Poix
Mis-en-place	Par boil	Pare
Poach	Roux	Sabayon
Sauté	Stock	

REFERENCE BOOKS

Thangam Philip – Modern Cookery I & II – Orient Longman – 2001
Auguste Escoffier – Ma Cuisine – Hamlyn – 2000
Digvijay Singh – Cooking Delight of the Maharajas – Vakils, Feffer & Son's Ltd. – 1982
Philip Dowell & Adrian Barley – The Book of Ingredients – Mermaid Books – 1987
Wayne Gisslen – Professional Baking – John Wiley & Sons – 1994
Martha Day – Baking – Lorenz Books – 1999
M. J. Leto & Bode – The Larder Chef – Heinemann Publishing House – 1989
Parvinder S. Bali - Food Production Operations
Thangam E. Philip - Modern Cookery for Teaching and Trade - 4th Vol. - 1996

Krishna Arora - Theory of Cookery – 2nd – 1992
Wayne Gisselen - Professional Cooking – 4th – 1992
Wayne Gisselen - Professional Baking – 2nd – 1994
J. C. Dubey - Basic Bakery - 1st – 1992
Kinton Ceserani - Theory of Catering – 7th – 1996
Bernard Davis - Food Commodities - 4th – 1998
Daniel R. Stevenson - Basic Cookery The Process Approach - 5th – 1997

(Practical - Bakery)

Sr.	Topic
1	Breads Bread Rolls Bread Loaf Chelsea Buns
2	Pastries Jam Tarts Lemon Curd / Chocolate Tarts Bakewell Tarts
3	Cakes Chocolate Chip Muffins Ribbon Cake Madeleines Swiss Roll Genoese Sponge
4	Cookies Butter Cookies Melting Moments Peanuts Macaroons
5	Doughnuts

(Food Production Practical)

Sr.	Topic
1	Identification of Tools & Equipments (Familiarization of Kitchens BTK, QTK, ATK, Bakery, Pot Wash & Utility Area) Introduction to Basic Commodities used in the Kitchen
2	Methods of Cooking Roasting, Grilling, Frying, Baking, Boiling, Poaching, Microwave. Principles of each method of cooking & precautions to be taken. Cuts of Vegetables and Egg Preparation
3	Suggested Menu Patterns Indian Menus Continental Menus

PRACTICAL MENU

I	Cuts of Vegetables		
	Slicing	Chopping	Mincing
	Shredding (Chiffonade)	Fardinier (Batons)	Allumettes
	Julienne	Dices	Brunoise
	Lozenge	Paysanne	
	Eggs		
	Boiled Eggs (Soft and hard) Friend Eggs Fried Eggs [sunny Sideup, Double Fried (Over Easy, Flipped)] Scrambled Eggs Omelet – Cheese, Spanish and Masala		
II	Salads		
	Veg Kachumber Mixed Veg Raita Cole Slaw with Vinegrette Dressing Cole Slaw with Mayonnaise Russian Salad		
III	Soups		
	Crème of Tomate / Épinard / Champignon Consommé Julienne / Brunoise / Royale Puree Dubarry Potage Minestrone Cabbage Chowder Bisque (Crab, Prawn)		
IV	Poisson		
	Fillet de Pomfret Colbert au beurre maître d' hotel Fillet de Pomfret Bonne Femme Fillet de Pomfret Belle Meuniere Fillet de Pomfret Orly Masala Fried Fish		
V	Poulet		
	Poulet sauté a la king Poulet Saute Chasseur Poulet Saute Champignon Methi Murg Murg Masala		
VI	Entrees		
	Irish Stew Shepherds Pie Boeuf Stroganoff Palak Ghosht Mutton Masala Pork Vindaloo		
VII	Legumes (Vegetables)		
	Glazed Carrots / Beans Petite Pos a la Flamande Chouox fleux au Gratin Ratatouille Legumes aux fine herbs Épinard a la Crème		

	Palak Paneer Cabbage Foogath Batata Bhujia Vegetable Rogout
VIII	Pommes de terre
	French Fries Pommes Persilles Mashed Potato Pommes de terre Lyonnaise Duchees Potatoes Pommes de terre anna Hash Brown Potato Roast Potatoes
IX	Cereals & Pulses
	Boiled Rice Jeera Rice Mixed Veg Pulao Tadka Dal Masala Dal Moong Dal with Palak
X	Rotis
	Phulkas Chappatis Pooris
XI	Hot Desserts
	Doodhi Halwa Seviyan Kheer Caramel Custard Bread and Butter Pudding Crème Brulee Albert Pudding
XII	Cold Desserts
	Coffee Mousse Fruit Salad with Crème Anglaise Lemon Souffle Soufflé au Caramel Bavarois a la Crème

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination
(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
4	**Internal assessment**	**20**

(b) Semester end assessment - 30 marks

- Candidate will be given a menu comprising of 4 dishes.
- Indent sheet and plan of work sheet to be filled by the candidate of the menu he gets.
- He / she supposed to collect indents, prepare and present the dishes in the menu within stipulated time.
- Cleaning and securing equipments and working area is also to be done within stipulated time.

Assessment will be done as follows –

Journal	Indent Sheet & plan of work	Colour	Consistency	Taste	Texture	Viva-voce	Personal Grooming, Cleaning
10	10	10	10	10	10	10	10

Marks obtained out of 80 shall be converted to out of 30 to the next integer for final calculation.

FOOD AND BEVERAGE SERVICE - I

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food & Beverage Service-I I(USHO 102)
Course Code	Title	Credits	
USHO102	Food & Beverage Service-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Semester I – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture + Practical
03	45	25	02		04	60	10	02		04

OBJECTIVES:

At the end of semester I the student will be able to:-

- Identify the role of the Food and Beverage Service department and explain its organization structure and importance.
- Explain how "moments of truth" affect guests, staff members, and managers, and describe the value of guests and staff members to a food service operation.
- Describe the duties and responsibilities of beverage service staff members, and summarize techniques and procedures for responsibly selling and serving cocktails, beer, and wine.
- Identify the operational and Auxiliary areas as well as equipments used in the Food and Beverage department.
- Understand the various service methods and procedures followed in the department.

Contents of syllabus for USHO 102

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. INTRODUCTION TO HOTEL AND CATERING INDUSTRY** 1.1 Role of catering establishment in travel / tourism industry 1.2 Types of F& B operation (Classification). Commercial (residential / Non Residential) • Welfare • Institutional • Transport (Roads, Railways, Airlines, Marine) 1.3 Structure of hospitality industry and career opportunities	06
	2. DEPARTMENTAL ORGANISATION AND STAFFING 2.1 Organisation of F & B Department of a Hotel (English & French) 2.2 Etiquette & Attributes of an F & B Personnel. 2.3 Duties and responsibilities of F & B Staff. a) F & B Manager. b) Banquet manager. c) Outlet Manager (All day dining/ Bar/ In Room Dining/ Specialty Restaurant, etc) d) Senior captain/ Captain/ Supervisor. e) Steward. f) Sommelier. g) Hostess. h) Cashier. 2.4 Departmental Relationship of F& B with other Departments.	09
II.	**1. OPERATIONAL & AUXILLARY AREAS OF FOOD AND BEVERAGE DEPARTMENT : IMPORTANCE & LAYOUTS** a) Coffee shop b) Snack bar/ counter service c) Kiosks d) Specialty restaurant/ theme restaurant e) Banquet operations/ outdoor catering f) In-Room Dining g) Dispense Bar / Discotheque/ night club/ pub h) Pantry/Still room i) Kitchen stewarding j) Silver room k) Linen room l) Vending machine	06
	2. FOOD AND BEVERAGE SERVICE EQUIPMENT 2.1 Classification of equipment. (Familiarization of equipment). 2.3 Criteria for selection and requirements.	09

	• Tableware/ silverware (cutlery/ hollowware/flatware) • Glassware • Crockery • Bar equipment (For all of the above Brands, Measures & Quality suppliers) • Special equipment with their uses. • Furniture (Tables/Chairs/Trolleys/Dumb Waiter) • Linen. • Light and décor • Care and maintenance of equipment. • Napkin folds. 2.4 Table d 'hote ,ala c"arte Mis-en –place, Mis -en –Scene	

III.	**1. DINING SERVICES METHOD AND PROCEDURES** 1.1 Different methods of services a. Table service • Silver service/ English service • American/ Plated • Family • Russian • French/ butler • Gueridon b.Bar Counter c.Assisted Service • Carvery • Buffets d.Self Service •Cafeteria : a).Counter b).free-flow c).Echelon d).Supermarket e)Single point service •Take-away •Drive through •Fast food •Vending •Kiosk •Food court •Bar f). Specialised (in-situ) •Tray •Trolley •Home delivery •Lounge	09

	•Room •Drive in	
	1.2 Special Service • Formal Service • Wave service • Carlton club service 1.3 a. Rules to be observed while laying the table. b. Rules to be observed while waiting at the table. c. Dos & don'ts in a restaurant	06
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

1. Food & Beverage Service – R. Singaravelavan-Oxford University Press
2. Dennis Lillicrap, John Cousins and Robert Smith
3. Vijay Dhawan- Food and Beverage Service
4. Peter Dias- The Steward
5. John Fuller & A.J. Currie
6. Sudhir Andrews- Food and Beverage Service
7. Bobby George-Food & Beverage Service

FOOD AND BEVERAGE SERVICE SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Design and Layout of a operational areas of Food and Beverage department.	
2.	Organizational Chart of a Small, Medium & Large Hotel.	
3.	Comparative analysis of at least two quotations from any supplier to understand rates and quality of crockery.	
4.	Comparative analysis of at least two quotations from any supplier to understand rates and quality of glassware.	
5.	Design and Layout of Air catering or Marine catering.	

FOOD & BEVERAGE SERVICE SEMESTER – 1
(PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	**INTRODUCTION TO HOTEL AND CATERING INDUSTRY**.	08

	Visit to various catering outlets a. Coffee shop b. specialty restaurant c. Bar d. Room Service e. Banquets f. Snack bar (any fast food or QSR) g. Kiosk After visiting the above mentioned outlets the student is required to submit report.	
2	Emerging trends in the hospitality industry – Guest lecture from the Industry After the lecture the student is required to submit a report	02
3	**DEPARTMENTAL ORGANISATION & STAFFING** Role play on the attributes, attitude & etiquette of a food service personnel	04
4	**DEPARTMENTAL ORGANISATION & STAFFING** Standard phrases used in food & beverage service outlets (Role play)	04
5	**OPERATIONAL & AUXILLARY AREAS OF FOOD & BEVERAGE DEPARTMENT : IMPORTANCE & LAYOUTS** Practical: Drawing Layouts of operational & auxiliary areas. a. Coffee shop b. specialty restaurant c. Bar d. Room Service e. Banquets f. Snack bar (any fast food or QSR) g. Kiosk	08
6	**FOOD AND BEVERAGE SERVICE EQUIPMENT**. 1. Familiarization of equipment a. Silverware b. Glassware c. Crockery d. Linen e. Furniture	08
7	**FOOD AND BEVERAGE SERVICE EQUIPMENT** 2. Napkin fold: 15 napkin folds Book fold, Fan fold, Sunrise, Candle & fan, Bishop's mitre, Cocks comb, Ta dome, Cinderella shoe, Pinwheel, Rose, Sydney opera, Arum's Lily, Lover's k Triple wave & Cone.	08

8	3. Stacking of side station	02
9	. Polishing of silver ware (Polivit, Silver dip and Burnishing methods)	02
10	Cleaning& Wiping of glassware and wiping of crockery	02
11	**DINING SERVICES METHOD AND PROCEDURES** PRACTICE: 1. Carrying and balancing the salver/tray. 2. Laying and relaying of tablecloth. 3. Water service 4. carrying, placing and clearance of plates 5. Handling and using service fork/spoon 6. Laying of a la carte cover 7. Clearance of ashtray& crumbing at the table 8. Role play on do's and dont's in a restaurant.	01 02 01 02 02 01 01 02
	TOTAL PRACTICAL HOURS	**60**

FOOD AND BEVERAGE SERVICE SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments on the following:

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Presentation to be done on visits conducted to restaurants.	
2.	Presentation to be done on any one - Emerging trends in Bar / Restaurants / Pubs / Banquets .	

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks

Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

- Question no. 1 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.
- Question 2, 3 & 4 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a menu to compile and laying table for it.
- Assessment will be done as follows

Journal	Grooming	Identification of cutlery, crockery, glass ware and hollow ware	Menu Planning	Cover laying	Viva - voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

FRONT OFFICE SEMESTER – I (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	FRONT OFFICE I(USHO 103)
Course Code	Title	Credits	
USHO103	FRONT OFFICE-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02	--	--	--	--	--	--

OBJECTIVES:

At the end of semester I:-

- Introduce the students to the Hotel & Tourism Industry
- Understand the appropriate organization structures and duties in the Front Office and related departments.
- Develop, prepare guest relations and evaluate practical aspect with guests.
- Understand the role of public relations with hotel industry.
- Develop skills required as an efficient and effective receptionist in any hotel (large or Small) and to handle situations and types of guest in the job.
- Understanding the functioning of the Telecommunication department.

Contents of syllabus for USHO 103

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**Introduction to the Hotel and Tourism Industry** • An account of development and growth of hotel and tourism industry in the world • Development and Growth of Hotel and Tourism industry in India. **Classification of Hotels by** • Location • Architectural design • Number of Rooms • Ownership • Pricing Plan • Type of Clientele • Duration of Guest stay • Facilities offered • Star rating criteria in India (HRACC) Supplementary accommodation	**15**

II	**Tariff Structure** **1. Types of Rooms** Single, Double, Twin, Hollywood twin, Interconnecting, Adjacent, Adjoining, Lanai, Penthouse, Duplex, Efficiency, Physically Challenged, Studio, Parlour, Hospitality Room, Suite (Types) **2. Tariff Fixation** Check-in and Check-out basis, 24 hour basis, on the basis of competitor's rate, Night basis, Day rate. **3. Types of Meal Plans** European, Continental, Bermuda Plan, Modified American Plan (Half-Board, Demi- Pension), and American Plan (Full-Board: En Pension). **4. Packages and Special Rates** Rack rate, Group rate, Volume rate, Government rate, FIT, Wholesale net rate, discounted rates, Seasonal rate, Crib Rate, Extra bed rate, Family rate, Crew rate, Week day/Weekend rates, Membership rates, Executives of the other units of the same chian, Corporate rate, Commercial rate, Advance purchase rate Package rate, Ad-hoc rate **5. Taxation** • Luxury tax, Expenditure tax, Sales tax, Value added tax and other statutory taxes. • Service Charges. **Organisation of the Front Office Department** 1. Organisation charts of • Small Hotel • Medium Hotel • Large Hotel 2. Sections of the Front Office Department 3. Inter and Intra departmental Co-ordination 4. Job Specifications and Job Description • Front Office Manager • Duty Manager • Guest Relations Executive	**15**
III.	**Telecommunications** • Introduction • Types of Exchange- PBX, PABX, EPABX • Other Communication Equipment- Walkie- Talkies, Pagers, Mobile Phones, Telephone Instruments, Pay Phones, Facsimile. • Organisation of the Telecommunications department • Job descriptions of the Telecommunications department supervisor & Operator • Skills and Competencies of the Telephone Operator • General duties of a Telephone Operator • Internet Access- Introduction, Dial up access, High speed with wired access, High speed with wireless access • Future of Hotel telephones- Voice-over-internet-protocol (VOIP) • AYS – at your service	**15**
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

Name of the book	Author	Publisher	Place of Publication
Jatashankar Tiwari	Front Office Management	Oxford University Press	New Delhi
Andrews, Sudhir	Hotel Front Office Training Manual	The Tata M'cGraw Hill	New Delhi
Kasavana, Michael & Brooks, Richard	Managing Front Office Operations	AHMA	USA
Baker & Bradley	Principles of Hotel front Office Operations	Cassell	London
Deveau, insley & deveav, Patricia	Front Office Management and Operations (2)	Prentice Hall	NEW JERSEY
Bullied, An Ritchie, Caroline	Reception	Stanley Thornes	london
Chakravarti, B.K.	Front Office Management In Hotel	BNS Publishers	New Delhi
Braham, Bruce	Hotel Front Office	Hutchinson	London
Ford, Robert & Heaton, Cherrill	Managing the guest Experience	Delmar Publishers	London
Bardi,James	Hotel Front office Management	John wiley & sons	new Jersey
Aggarwal.Ravi	Hotel front Office	sublime Publications	jaipur
Huyton Jeremy & Baker Sue	Case Studies in Rooms Operations and Management	Hospitality Press P Ltd.	Melbourne
Bhatnagar S.K.	Front office Management	Frank Bros & Co.	New delhi
Andrews, Sudhir	Hotel Front Office Training Manual(latest ed)	The Tata M'cGraw Hill	New delhi
Chakravarti B.K.	Front Office Management in Hotel	CBS Publisher	New Delhi
Chakravarti B.K.	Concept of Front Office Management	APH Publishing	New Delhi
	India(Tourist Guide)	Lonely Planet	

FRONT OFFICE SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1	Countries, Capitals, Currencies	
2	Airlines and Airline codes (National Carrier and Domestic)	
3	Names of Airports : National and International	

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

HOUSEKEEPING SEMESTER – I (THEORY)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Housekeeping I(USHO 104)
Course Code	Title	Credits	
USHO104	Housekeeping-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:
At the end of semester I:-

- The student will be able to identify the role of the housekeeping department and explain its organization structure and importance.
- The student will be able to list the basic cleaning equipments, cleaning agents and explain their use.
- Will be able to perform basic cleaning procedures of various surfaces.

Contents of syllabus for USHO 104

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. INTRODUCTION TO HOUSE KEEPING DEPARTMENT** 1.1 Types of Hotel & services offered 1.2 Types of Room 1.3 Role of Housekeeping department in a Hotel 1.4 Personality Traits of Housekeeping Personnel 1.5 Daily routine in Housekeeping 1.6 Glossary	15
II.	**1. ORGANIZATION OF HOUSEKEEPING DEPARTMENT** 1.1 Organization Chart of a Small, Medium & Large Hotel 1.2 Duties & Responsibilities of House Keeping Personnel	09

	1.3 Inter departmental coordination 1.4 Control Desk Operations	
	2. CLEANING EQUIPMENT 2.1 Classification of Cleaning Equipment 2.2 Use & Care of Equipment 2.3 Glossary	06
III.	**1. CLEANING AGENTS** 1.1 Classification 1.2 Use, care & Storage 1.3 Distribution & Control 1.4 Glossary	08
	2**. CLEANING & POLISHING OF DIFFERENT SURFACES** 2.1 Metals 2.2 Glass 2.3 Plastic 2.4 Ceramics 2.5 Wood 2.6 Leather 2.7 Rexene	07
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

1. Hotel Housekeeping Operations and Management – G. Raghubalan & Smritee Raghubalan – Oxford University Press.
2. Housekeeping Operations, Design and Management – Malini Singh & Jaya B. George – Jaico Publications.
3. Housekeeping Management – Margaret Kappa, Aleta Nitschken, Patricia B. Schappert – A.H. & L.A.
4. Hotel Hostel and Hospital Housekeeping – Joan Branson & Margaret Lennox –
5. Hotel Housekeeping Management & Operations – Sudhir Andrew – McGraw Hill Companies.

HOUSEKEEPING SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Design and Layout of a Room Maids Trolley (Front View & Top View)	10
2.	Organizational Chart of a Small, Medium & Large Hotel.	10
3.	Layout of the Housekeeping Department of a Small, Medium & Large Hotel.	10
4.	Layout and design of a Floor Pantry.	10
5.	Cleaning Agents from one manufacturer	10

Scheme of Examination (Theory)

(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

ROOMS DIVISION MANAGEMENT –I (PRACTICAL)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	RDM-I Practical-USHO105
Course Code	Title	Credits	
USHO105	RDM-Practical-I	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	--	4					
Credit	--	2					

Semester I – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture
--	--	--	--	--	4	60	10	02	--	02

Contents of syllabus for USHO 105

Front Office – I (Practical)

Sr.	Topic	Hr
1	• Grooming Standards- For Boys and Girls • Social Etiquettes- Soft Skills	6
2	**TELEPHONE HANDLING** • Transferring calls • Call on hold Procedure • Voice modulation	12
3	**KNOW YOUR CITY- MUMBAI/ NAVI MUMBAI ETC** Shopping, Tourist attractions, Beaches, Historical and Archaeological monuments, Religious sites, Hotels and Restaurants, Live Theatres, Cinema Halls and Multiplexes, Handicrafts, Hospitals, Consulates and Embassies etc.	12

HOUSEKEEPING - I (PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	Introduction to Housekeeping practical, grooming and journal	02
2	Introduction to all cleaning equipments, agents and surfaces & Orientation of the different areas	02
3	Dusting (high & low)	04
4	Floor cleaning- Sweeping & mopping – Dry and Wet Mopping	02
5	Floor cleaning – Scrubbing – Manual and with Machines	02
6	Cleaning and Polishing of Brass (Functional & Decorative) – Demo &	02

	Practical	
7	Cleaning and polishing of Silver (Functional & Decorative) – Demo & Practical	02
8	Cleaning and polishing of steel/chrome – Demo & Practical	02
9	Cleaning of Glass – Demo & Practical	02
10	Cleaning of Tiles – Demo & Practical	02
11	Cleaning and polishing of Wood Surfaces – Demo & Practical	02
12	Cleaning and polishing of Laminated Wood – Demo & Practical	02
13	Cleaning and polishing of Marble/ Granite – Demo & Practical	04
	TOTAL PRACTICAL HOURS	**30**

REFERENCES:

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a 2 activities bed making and polishing or special cleaning of any surface or area
- Assessment will be done as follows

Journal	Grooming	Work sheet	Activity One	Activity Two	Viva-Voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

COMMUNICATION SKILLS (ENGLISH & FRENCH)

LANGUAGE SKILLS – 45 Hours

Semester - I

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Communication Skills USHO106
Course Code	Title	Credits	
USHO 106	Communication Skills (English and French)	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:

- Developing and adapting speaking and achieve listening skills and strategies.
- Generating, planning and drafting ideas
- Improving vocabulary for precision and impact
- Using grammar (French & English) accurately and appropriately.
- Structuring, organising and presenting texts in variety of formats.
- To be able to understand and speak basic French.

Contents of syllabus for USHO 108

Unit 1		
I	• 1.1 The sentence – Kinds of sentences – Subjects & Predicate • 1.2 The Phrase and the Clause • 1.3 Parts of speech – Noun, Adjective, Pronoun, Verb, Adverb, Preposition, Conjunction, Interjection	3 Hours

	2.1 Noun- Kinds of Noun- i.e Common, Proper, Collective, Abstract	6 Hours
	2.2 The Noun: Gender – Masculine, Feminine, Common and Neuter gender	
	2.3 The Adjective – Kinds of Adjectives, Comparison of Adjectives – Positive, Compartitive and Superlative Degrees. The correct use of some Adjectives Viz little, a little etc	
	2.4 Articles – Use of Definite Article and Indefinite Article	
	2.5 Personal Pronouns – Forms of the Personal Pronouns - i.e First Person etc.	
	(French)	
	1. Translate the Dialogue into English	
	2.Culinary Terms. Translate to French using match the columns/crosswords	
UNIT 1-15 TEACHING HOURS		
Unit2		
II	1.1 The Verb – Transitive and Intransitive Verbs, Person & Number' Active and Passive Voice' Direct and Indirect Speech;	6 Hours
	1.2 Tense: Present Tense; Past Tense; Future Tense;	
	1.3 Adverb: Kinds of Adverbs	
	1.4 The Preposition – Kinds of Prepositions – Using appropriate prepositions	
	1.5 The Conjunction – use of appropriate Conjunctions – Classes of Conjunctions The Interjection – Meaning of & some example	
	2.1 Punctuation	4 Hours
	2.2 Commonly confused words / Common Errors / Antonyms / synonyms	
	(French)	
1	Days , Months, Numbers, Seasons	5 Hours
2	Plan a five course menu in French	
	UNIT 2-15 TEACHING HOURS	

	Unit3	
III	1.1 Newspaper Reading – current affairs	6 Hours
	1.2 Comprehension , Precis writing, Paragraph writing	
	2.1 Conversation / Role Play	5 Hours
	2.2 Public Speaking	
	(French)	
1	Make Negative, make plurals, conjugate in the present tense: avoir etre,Faire, Manger,Boire,mettre	4 Hours
	UNIT 3-15 TEACHING HOURS	
	Total Theory Hours	45

REFERENCE (English)

- Business Communication – Meenakshi Raman and Prakash Singh
- Business Correspondence and Report writing – R.K.Sharma and Krishna Mohan
- Business Communication – Chaturvedi
- High School English – Wren and Martin
- Understanding Human Communication – Ronald B Adler and George Rodman (with CD)
- Skills Development for Business and Management Students - Kevin Gallagher
- Personality and Skills Development – Barun Mitra (with CD)
- Technical Communication , 2nd Edition – Meenakshi Raman (with CD)
- Corporate Communication – Jaishri Jethwaney
- Understanding Human Communication-Ronald B. Adler / George Rooman - Oxford

REFERENCES (French)

- E. J. Neather - Mastering of French I & II - Macmillan - 1982
- Bridget Anfossy - Speak French Today - Augo - 1991
- R. Diez La Cortina - Cortina's French Method - Grosset & Dunlop - 1988
- Mathuram Bondo - Modern French Course - D. C. Heath & Co. -.1983.
- Course de langue et civilizaiion Franchises. G. Mauger.
- Oxford French Dictionary

SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Paragraph writing on myself (100 words) & Presentation on it.	10
2.	Essay on hospitality industry (500 words)	10
3.	Group Discussion, news paper reporting, letter writing (formal & informal)	10
4.	Speaking skills – conversation skills in French	10
5.	Presentation on any given topic	10

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments / projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ group discussion/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities & teamwork demonstrated through organizing co-curricular activities, etc.	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

INFORMATION TECHNOLOGY (THEORY)
(SEMESTER – I) – 15 Weeks

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	INFORMATION TECHNOLOGY(USHO 107)
Course Code	Title	Credits	
USHO107	INFORMATION TECHNOLOGY	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	1	2					
Credit	2						

Semester I – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture
01	15	20	02	--	02	30	05	02	--	02

Objective: To equip the student with the theory inputs with respect to understanding the fundamentals of computers and necessary skills to operate the generic applications and standard operating systems

Contents of syllabus for USHO 107

(Theory – 15 Hrs)

Unit I

Sr. Topic Hr

A Introduction to Computer Fundamentals **15 Hours**

- 5 Parts of Computer
- Difference between Hardware & Software
- Difference Between Data and Information
- Types of Computers – Server (Types), Clients (Types of Portable Computer)
- Application Software
- System Software
- Software Copyright – Freeware, Shareware, Licensed

B Software

- Application Software – Word Processor, Spreadsheet, Database Management, Presentation, Media, Outlook, Browser and Utility Software like Acrobat Reader
- System Software – Operating System (Windows, Linux, Android)
- Device Driver
- Utility Software – VLC Player, File Converter

C Hardware

- Introduction of Central Processing Unit
- Processor – Intel, AMD, Clock Speed
- Input Devices – Keyboard, Mouse, Mic, Scanner, Barcode Reader, RFID, Touch Screen
- Output Devices – Displays (CRT, TFT, LCD, Plasma, LED, Projector)
- Display Resolution
- Printers – Inkjet, Laser, Thermal
- Storage Devices – Primary (RAM & ROM), Secondary (HDD, Flash Drive, USB, CD/DVD, Blue Ray, Media Players)

D Networking

- Types of Network (LAN, WAN, MAN)
- Topology (Bus, Star, Ring, Mesh & Tree)
- Network Hardware – (Cables – RJ45, RJ11, MTRJ, Switch, Routers, Access Point, Modem)
- IP and MAC Address, Subnet, Gateway, DNS
- Understanding Network Address & Node Address
- Network Security – Firewalls (Hardware & Software)
- Bandwidth

E Internet

- Intranet, Internet & Extranet
- WWW, HTTP, Domains
- VPN & VoIP
- Search Engines
- ISP & Bandwidth

(Practical 30 Hrs)

Sr.	Topic	Hr
1	**Computer Architecture (DEMO)** • Motherboard, RAM, PCI Slots, SMPS & different Ports	**02**
2	**Operating System** • DOS Commands (CMD, IP, IPCONFIG, DIR, CLS, PING etc.) • Introduction to Desktop • Control Panel • Configuring Printers (Standalone & Network) • Sharing & Security	**06**
3	**Word 2007** **Microsoft word** File, Edit, View, Insert, Format, Tools, Table Commands Page Setup, Print Options, Setting Page Margins Clip Arts, Inserting Pictures/Charts/Files Correcting Text, Cut, Paste, Undo, Redo, Deleting Blank Lines, Inserting A Page, Typing Over Text, Replacing Text, Moving And Copying Text. Menu Method, Key Board Method, Tool Bar Method, Drag & Drop Method, Checking Text, The Spell Checker, Auto Correct Check Up, The Sanrus, The Grammar Checker, Formatting A Text, Changing Type Style, Character Highlighting, Alignment Of Text, Left, Right, Center, Justifying Text-Types & Tab Setting, Setting Tab Using Ruler, Indenting Paragraphs, Increasing And Decreasing Indents, Using Ruler To Set Indents, Spacing Paragraph Line Spacing, Spacing Between Paragraphs, Page Views, Normal Views,	**06**

Page Layout View, Outline View, Print Preview, "Full Screen View, Master Document View, Magnification, 200 M Control In Any View, Page Formatting, Setting Margins, Paper Size, Printing In Landscape Or Portrait Orientation, Page Numbering, Adjoining Page Numbering, Deleting Page Numbering, Header & Footer, Creating And Editing, Inserting And Deleting Pages In A Document, Saving The Text, Saving The File To Disk, Closing A File, Opening A Non-Work Document, Printing The Text.

4 EXCEL **06**

Processing With Ms Excel, Starting Excel, Starting New Work Book, Entering And Editing Data, Formatting Work Sheet, Sorting The Data, The Worksheet Selecting Cells And Ranges, Selecting With Mouse, Data Entry, Entering Numbers, Text, Date 4 Time Entries, Entering Series, Filing A Text Series With Auto Fill, Filing A Number Series, Editing Data, Clearance And Replacing Contents Of A Cell, Deleting The Contents Of A Range Of Cell, Rearranging Work Sheet Data, Copying, Auto Correct, Spell Checking, File dose, Formatting Data, Font Selection, Aligning Data, Format Style, Formatting Work Book, Arranging, Hiding, Un hiding, Inserting Columns And Rows, Adjusting Width, Copying And Moving, Inserting And Deleting Sheets From Work Book, Mathematical Operator, Exponentiation And Percentage Operators, Logical Or Comparison Operators, Using Mouse To Create A Formula.

Inserting A Chart, Chart Types, Modifying Chart, Adding Drawing To The Chart, Printing In Excel, Print Parameters, Default And Changing Default Settings, Sorting, Printing Etc.

5 POWERPOINT **08**

Power Point Terminology-Getting Into Power Point-Creating, Opening And Saving Presentations- The Easy Way-Using Auto Content Wizard-Working With Blank Presentation-Using The Templates-Using The Slide Master-Working With Color Schemes-Working With Slides-Making A New Slide -Move, Copy Or Duplicate Slides-Delete A Slide-Copy A Slide From One Presentation To Another-Go To Specific Slide-Change The Lay Out Of A Slide-Zoom In Or Out Of Slide-Working With Text In Power Point-Cutting, Copying and Pasting-Formatting Text, Change Font & Size, Shadowing, Embossing-Alignment The Text-Left, Center, Right And Justify-Power Of Graphics In Power Point-Working With Clipart Picture-Using Microsoft Excel-Chart-Using Organization Charts-Power Point Drawings-Ways To Draw-Adding Lines-Connecting Lines-Borders And Adding Curves-Creating Word Tables-Making Great Looking Presentations(Putting On A Show)-Arranging, Creating Animated Slides- Manually Advancing Slides-Adding And Removing Transitions-Running A Presentation Continuously-Printing The Presentation Elements.

6 Outlook **02**

- Configuration

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will asked to carry out skill based practical in the Computer lab.
- Assessment will be done as follows

File	Grooming	Skill Set-I	Skill Set-II	Viva -voce
10	10	10	10	10

- Marks obtained out of 50 shall be converted to out of 30 to the next integer for final calculation.

FOOD SAFETY AND NUTRITION

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food Safety & Nutrition(USHO 108)
Course Code	Title	Credits	
USHO108	Food Safety & Nutrition	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	10	02		--	--	--	--	--

Contents of syllabus for USHO 108

OBJECTIVES:

At the end of Semester – I

- To learn about the importance of hygiene & sanitation in the catering industry
- To get acquainted with the food standards.
- To learn about ways to minimize food poisoning and infections.
- To understand function, sources & deficiency of nutrients.
- To gain basic knowledge of nutrition
- To gain knowledge about maintenance of good health.
- To understand the changes brought about in food nutrients during processing

Semester I – 15 weeks

UNIT	TOPIC	TOTAL NO. OF HOURS
I	**INTRODUCTION TO HYGIENE** 1.1 Rules & importance of hygiene 1.2 Personal Hygiene 1.3 Cleaning of premises 1.4 Pest Control 1.5 Waste disposal 1.6 Dishwashing methods	15
	HACCP 2.1 Introduction 2.2 Importance 2.3 VII Critical Control Points	
	MICROBES 3.1 Introduction (Bacteria, Yeast, Mould) 3.2 Classification 3.3 Factors for growth 3.4 Role of microbes in manufacture of fermented foods (dairy products, Veg. & bakery preparations, alcoholic Bev., vinegar, fermented Indian foods)	
II	**FOOD BORNE ILLNESS** 1.1 Natural Toxins (Kesari Dal, Potatoes, Mushrooms, Shell Fish, Peanuts) 1.2 Chemical (Tin, Copper, Arsenic, Lead) 1.3 Bacterial toxins (staphylococcus, salmonella, Clostridium perfringens, Clostridium botulinum) 1.4 Food poisoning & Infections • Definitions • Food contamination & Spoilage • Differentiation • Examples	15

FOOD ADULTERATION 2.1 Definition and types 2.2 Test to detect (coffee, semolina, flour, ghee, butter, margarine, oil, milk, turmeric, coriander powder, pepper corn , meat etc. 2.3 Food standards in India (PFA, FPO, MPO, BIS-ISI, AGMARK, ISO)	

	FOOD ADDITIVES 3.1 Colours & Flavours 3.2 Browning reactions-causes, desirable & undesirable effects)	
	FOOD PRESERVATION ❖ **Methods of Preservation** 4.1 Natural & Chemical Preservation 4.2 Low temperature(Refrigeration, Freezing) 4.3 High Temperature(Pasteurisation, Sterilization, Canning) 4.4 Irradiation	
	FOOD STORAGE 5.1 Dry food store 5.2 Refrigerated store 5.3 Freezer store 5.4 Holding at High Temperature 5.5 Stock rotation & cross contamination	
III	**INTRODUCTION TO NUTRITION** 1.1- Definitions(Food, balanced diet, nutrition, over nutrition, under nutrition, malnutrition, health) 1.2 - Balanced diet-Food pyramid 1.3 - Meal planning steps	15

	CARBOHYDRATES 2.1 - Classification & composition 2.2 - Functions & requirements, sources 2.3 - Excess & Deficiency 2.4 -Uses in food preparation (Gelatinization, Gel formation, Dextrinization, Gluten formation, Caremelization)	
	PROTEINS 3.1 - Classification & Composition 3.2 - Functions & requirements, Sources 3.3 - Excess & Deficiency 3.4 - Uses in food preparation 3.5 - Effect of heat (Denaturation, Coagulation) 3.6 - Gel formation 3.7 - Foaming	
	FATS&OILS 4.1 - Classification & Composition 4.2 - Functions & requirements, Sources 4.3 - Excess & Deficiency 4.4 - Types, Sources, Uses 4.5 - Factors causing deterioration 4.6 - Rancidity 4.7 - Flavour reversion 4.8 - Shortening 4.9 - Polymerisation	

	VITAMINS, MINERALS, WATER & COLLOIDS 5.1 - Functions 5.2 - Sources 5.3 - Deficiency & Excess 5.4 - Fat soluble & water soluble Vitamins (A,D,E,K,B1,B2,B3,C) 5.5 - Minerals (Ca,P, Na,K,Fe,I,Fl) 5.6 - Importance, balance & Sources 5.7 - Cooking losses & prevention 5.8 - Definitions (sol, gels, foam, emulsion) 5.9 - Examples(roasting, grilling, frying, baking, boiling, poaching, microwave) 5.10 - Importance in food industry	

REFERENCE BOOKS

Sr no	Author	Title	Publisher	Place	Year
1	Hobbs, Betty & Roberts,	Food Poisoning and Food	Hoddr & Stoughton	Great Britiain	1993
2	Rodey S		Tata Mcgraw Hill	New Dehli	1999
3	Trickett, Jill	Food Hygiene for Food Handlers	Macmillion	Hongkong	1997
4	Knowles Tim	Food Safety in the Hospitalty Industry	Butterworth Heinamann	Oxford	2002
5	Scott Elizabeth & Sockett Paul	How To Prevent Food	John Wiley & sons	New York	1998
6	Loken Joan	The HACCP Food Safety Manual	John Wiley & sons	New York	1994
7	Commercial law Publishers	The Prevention of Food	Commercial law Publishers	Mumbai	2008
8	Mahindru S.N.	Food Additives	APH Publishing Corp	New Delhi	2008
9	Sareen, Sandeep	Food Preservation	Sarup & sons	New delhi	1999
10	VanGarde Shirley & Woodburn	Food Preservation & Safety	Surabhi Publication	Jaipur	1999
11	M.Swaminathan	Food & Nutrition Vol-I	Bappco.	Bangalore	1985
12	M.Swaminathan	Food & Nutrition Vol-II	Bappco.	Bangalore	1985

13	M.Swaminathan	Food & Nutrition	Bappco.	Bangalore	1996
14	B.Srilakshmi	Food Science	New Age International	New Delhi	2007
15	Roday Sunetra	Food Science & Nutrition	Oxford Uni.Press	New Delhi	2010
16	Adams MR. & Moss.M.O.	Food Microbiology	New Age International	New Delhi	2006
17	Jim Mann & A. Stewart Truswell	Essentials of Human Nutrition	Oxbord University Press	New Delhi	2010

Scheme of Examination (Theory)

(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

Semester 1 - B.Sc.(Hospitality Studies)

		Class Room Instruction Face to Face									Notional				Credits			
Course Code	Subject	Per Week			Per Sem			Per Sem Hrs										
		L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
USHO101	Food Production & Patisserie I	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO102	Food & Beverage Service I	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO103	Front Office I (pg 19)	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO104	Housekeeping I	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO105	Rooms Division Mgt (Practicals)-I (pg 27	-	4	-		60	-	-	60			10		70	-	2	-	2
USHO106	Communication Skill I (English & French)	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO107	Information Technology	1	2	-	15	30	-	15	30	-	20	5	-	70	2		-	2
USHO108	Food Safety & Nutrition	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
	Total	19	14	-	285	210	-	285	210	-	170	35	-	700	14	6	-	20
	L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial																	
	Notional includes time spent in library / home / other institutions for preparation and writing of assignments, quizes, open book test, journal, case studies, project, practical, field work, excursion, etc.																	
	Information Technology will be single head of passing.																	

FOOD PRODUCTION & PATISSERIE–I (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food Production & Patisserie-I(USHO 101)
Course Code	Title	Credits	
USHO101	Food Production & Patisserie-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	2					
Credit	2	2					

Class Room Instruction Face to Face									Notional				Credits			
Per Week			Per Sem			Per Sem Hrs										
L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4

OBJECTIVES:

- To inculcate a right attitude and the required basic knowledge and technical skills in the art of culinary and the food production department.
- To introduce the various equipments and utensils used in the kitchen.

Contents of syllabus for USHO 101

UNIT NO.	Ch.No.	TOPIC	Hrs.
01	1	Introduction to the Food Production Department 1.1 Levels of Skills and Experience 1.2 Attitude and Behaviour in the Kitchen 1.3 Kitchen Uniforms 1.4 Personal Hygiene 1.5 Safety Procedures for Handling Equipment	01
	2	Culinary History and Culinary Terms (Explanation with Examples) Origins of Modern Cookery Modern Development in Equipment and Technology	02
	3	Equipment and Hand Tools used in Kitchen & Different Types of Fuels used in Kitchen 3.1 Hand tools and utensils used in Kitchen 3.2 Various Fuels used in the Kitchen 3.3 Advantages & Disadvantages of Various Fuels 3.4 Various Equipment used in the Kitchen	04
	4	Introduction to Cooking 4.1 Aims and Objectives of Cooking 4.2 Classification of Various Raw Materials according to Functions 4.3 Various Textures and Consistencies 4.4 Methods and Techniques of Preparation	04
	5	Stocks 5.1 Definition of Stock 5.2 Types of Stocks 5.3 Preparation (Recipe), Storage, Care and Precautions in Preparation	02
	6	Culinary Terms	02
UNIT NO.	Ch.No.	TOPIC	Hrs.
02	7	Methods of Cooking 7.1 Various Methods of Cooking Foods (Roasting, Grilling, Frying, Baking, Boiling, Poaching, Microwave) 7.2 Principles of each Method and Precaution to be taken	04

	8	Hierarchy and Kitchen Staffing 8.1 Classical Kitchen Brigade 8.2 Modern Staffing in Various Category Hotels 8.3 Duties and Responsibilities of Various Chefs 8.4 Role and Duties of the Executive Chef 8.5 Inter-Departmental Co-operation and Co-ordination	03
	9	Egg 9.1 Selection of Eggs 9.2 Structure of Eggs 9.3 Uses of Eggs 9.4 Nutritive Value of Eggs	02
	10	Vegetables & Fruits 10.1 Classification of Vegetables 10.2 Colour Pigments in Vegetables and Effects of Heat, Acid and Alkali on each of them 10.3 Cuts of Vegetables 10.4 Classification of Fruits 10.5 Uses of Fruits 10.6 Salad & Salad Dressing	04
	11	Bakery & Pastry Sugar 11.1 Importance of Sugar 11.2 Types of Sugar 11.3 Cooking Stages and Temperature of Various Stages 11.4 Uses of Sugar	02
UNIT NO.	Ch.No.	TOPIC	Hrs.
03	12	Sauces 12.1 Classification of Sauces / Composition 12.2 Mother Sauces and its Recipes (1 Litre) 12.3 Derivatives	04

Bechamel Sauce	Veloute Sauce	Espagnole Sauce
Mornay	Allemande	Demi-glaze
Cream	Supreme	Madeira
Parsley	Mushroom	Nancy
Mustard	Hongroise	Chasseur
Onion	Ivory	Robert
Soubise	Aurore	Bordelaise
Cardinal	Caper	Devil
Tomato Sauce	Hollandaise Sauce	Mayonnaise
Barbecue	Bearnaise	Tartare
Italienne	Maltaise	Thousand Island
Portugaise	Choron	Cocktail
Provencal	Foyot	Chantilly
Bretonne	Mustard	Gribiche

	Milanaise	Mousseline	Vincent	
	Chaudfroid	Noisette	Andalouse	
13	Bakery & Pastry			
	13.1 Bread Making			03
	Principles of Bread Making			
	Role of Each Ingredient			
	Simple Yeast Bread			
	Baking Temperature & its Importance			
	13.2 Cookies			
	Types of Cookies			02
	Methods of Preparation			
	13.3 Flour – Structure of Wheat			
	Types of Wheat			04
	Types of Flour			
	Milling of Flour			
	Nutritive Value			
	13.4 Raising Agents			
	Classification and Role of Raising Agents			02

Culinary Terms (Explanation of the following Culinary Terms with examples)

Au gratin	Bake	Barbeque
Baste	Batter	Béarnaise
Beat	Béchamel	Beurre Noir
Beurre Manie	Blanch	Blend
Bouquet garni	Broil	Brunoise
Brush	Bouillon	Caramel
Consommé	Court Bouillon	Croutes
Croutons	Custard	Dough
Mince	Estouffade	Espagnole
Fume	Garnish	Glaze
Hollandaise	Infusion	Liason
Beurre Maître d' Hotel	Marinate	Mire Poix
Mis-en-place	Par boil	Pare
Poach	Roux	Sabayon
Sauté	Stock	

REFERENCE BOOKS

Thangam Philip – Modern Cookery I & II – Orient Longman – 2001
Auguste Escoffier – Ma Cuisine – Hamlyn – 2000
Digvijay Singh – Cooking Delight of the Maharajas – Vakils, Feffer & Son's Ltd. – 1982
Philip Dowell & Adrian Barley – The Book of Ingredients – Mermaid Books – 1987
Wayne Gisslen – Professional Baking – John Wiley & Sons – 1994
Martha Day – Baking – Lorenz Books – 1999
M. J. Leto & Bode – The Larder Chef – Heinemann Publishing House – 1989
Parvinder S. Bali - Food Production Operations
Thangam E. Philip - Modern Cookery for Teaching and Trade - 4th Vol. - 1996

Krishna Arora - Theory of Cookery – 2nd – 1992
Wayne Gisselen - Professional Cooking – 4th – 1992
Wayne Gisselen - Professional Baking – 2nd – 1994
J. C. Dubey - Basic Bakery - 1st – 1992
Kinton Ceserani - Theory of Catering – 7th – 1996
Bernard Davis - Food Commodities - 4th – 1998
Daniel R. Stevenson - Basic Cookery The Process Approach - 5th – 1997

(Practical - Bakery)

Sr.	Topic
1	Breads Bread Rolls Bread Loaf Chelsea Buns
2	Pastries Jam Tarts Lemon Curd / Chocolate Tarts Bakewell Tarts
3	Cakes Chocolate Chip Muffins Ribbon Cake Madeleines Swiss Roll Genoese Sponge
4	Cookies Butter Cookies Melting Moments Peanuts Macaroons
5	Doughnuts

(Food Production Practical)

Sr.	Topic
1	Identification of Tools & Equipments (Familiarization of Kitchens BTK, QTK, ATK, Bakery, Pot Wash & Utility Area) Introduction to Basic Commodities used in the Kitchen
2	Methods of Cooking Roasting, Grilling, Frying, Baking, Boiling, Poaching, Microwave. Principles of each method of cooking & precautions to be taken. Cuts of Vegetables and Egg Preparation
3	Suggested Menu Patterns Indian Menus Continental Menus

PRACTICAL MENU

I	Cuts of Vegetables		
	Slicing	Chopping	Mincing
	Shredding (Chiffonade)	Fardinier (Batons)	Allumettes
	Julienne	Dices	Brunoise
	Lozenge	Paysanne	
	Eggs		
	Boiled Eggs (Soft and hard) Friend Eggs Fried Eggs [sunny Sideup, Double Fried (Over Easy, Flipped)] Scrambled Eggs Omelet – Cheese, Spanish and Masala		
II	Salads		
	Veg Kachumber Mixed Veg Raita Cole Slaw with Vinegrette Dressing Cole Slaw with Mayonnaise Russian Salad		
III	Soups		
	Crème of Tomate / Épinard / Champignon Consommé Julienne / Brunoise / Royale Puree Dubarry Potage Minestrone Cabbage Chowder Bisque (Crab, Prawn)		
IV	Poisson		
	Fillet de Pomfret Colbert au beurre maître d' hotel Fillet de Pomfret Bonne Femme Fillet de Pomfret Belle Meuniere Fillet de Pomfret Orly Masala Fried Fish		
V	Poulet		
	Poulet sauté a la king Poulet Saute Chasseur Poulet Saute Champignon Methi Murg Murg Masala		
VI	Entrees		
	Irish Stew Shepherds Pie Boeuf Stroganoff Palak Ghosht Mutton Masala Pork Vindaloo		
VII	Legumes (Vegetables)		
	Glazed Carrots / Beans Petite Pos a la Flamande Chouox fleux au Gratin Ratatouille Legumes aux fine herbs Épinard a la Crème		

	Palak Paneer Cabbage Foogath Batata Bhujia Vegetable Rogout
VIII	Pommes de terre
	French Fries Pommes Persilles Mashed Potato Pommes de terre Lyonnaise Duchees Potatoes Pommes de terre anna Hash Brown Potato Roast Potatoes
IX	Cereals & Pulses
	Boiled Rice Jeera Rice Mixed Veg Pulao Tadka Dal Masala Dal Moong Dal with Palak
X	Rotis
	Phulkas Chappatis Pooris
XI	Hot Desserts
	Doodhi Halwa Seviyan Kheer Caramel Custard Bread and Butter Pudding Crème Brulee Albert Pudding
XII	Cold Desserts
	Coffee Mousse Fruit Salad with Crème Anglaise Lemon Souffle Soufflé au Caramel Bavarois a la Crème

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination
(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
4	**Internal assessment**	**20**

(b) Semester end assessment - 30 marks

- Candidate will be given a menu comprising of 4 dishes.
- Indent sheet and plan of work sheet to be filled by the candidate of the menu he gets.
- He / she supposed to collect indents, prepare and present the dishes in the menu within stipulated time.
- Cleaning and securing equipments and working area is also to be done within stipulated time.

Assessment will be done as follows –

Journal	Indent Sheet & plan of work	Colour	Consistency	Taste	Texture	Viva-voce	Personal Grooming, Cleaning
10	10	10	10	10	10	10	10

Marks obtained out of 80 shall be converted to out of 30 to the next integer for final calculation.

FOOD AND BEVERAGE SERVICE - I

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food & Beverage Service-I I(USHO 102)
Course Code	Title	Credits	
USHO102	Food & Beverage Service-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Semester I – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture + Practical
03	45	25	02		04	60	10	02		04

OBJECTIVES:

At the end of semester I the student will be able to:-

- Identify the role of the Food and Beverage Service department and explain its organization structure and importance.
- Explain how "moments of truth" affect guests, staff members, and managers, and describe the value of guests and staff members to a food service operation.
- Describe the duties and responsibilities of beverage service staff members, and summarize techniques and procedures for responsibly selling and serving cocktails, beer, and wine.
- Identify the operational and Auxiliary areas as well as equipments used in the Food and Beverage department.
- Understand the various service methods and procedures followed in the department.

Contents of syllabus for USHO 102

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. INTRODUCTION TO HOTEL AND CATERING INDUSTRY** 1.1 Role of catering establishment in travel / tourism industry 1.2 Types of F& B operation (Classification). Commercial (residential / Non Residential) • Welfare • Institutional • Transport (Roads, Railways, Airlines, Marine) 1.3 Structure of hospitality industry and career opportunities	06
	2. DEPARTMENTAL ORGANISATION AND STAFFING 2.1 Organisation of F & B Department of a Hotel (English & French) 2.2 Etiquette & Attributes of an F & B Personnel. 2.3 Duties and responsibilities of F & B Staff. a) F & B Manager. b) Banquet manager. c) Outlet Manager (All day dining/ Bar/ In Room Dining/ Specialty Restaurant, etc) d) Senior captain/ Captain/ Supervisor. e) Steward. f) Sommelier. g) Hostess. h) Cashier. 2.4 Departmental Relationship of F& B with other Departments.	09
II.	**1. OPERATIONAL & AUXILLARY AREAS OF FOOD AND BEVERAGE DEPARTMENT : IMPORTANCE & LAYOUTS** a) Coffee shop b) Snack bar/ counter service c) Kiosks d) Specialty restaurant/ theme restaurant e) Banquet operations/ outdoor catering f) In-Room Dining g) Dispense Bar / Discotheque/ night club/ pub h) Pantry/Still room i) Kitchen stewarding j) Silver room k) Linen room l) Vending machine	06
	2. FOOD AND BEVERAGE SERVICE EQUIPMENT 2.1 Classification of equipment. (Familiarization of equipment). 2.3 Criteria for selection and requirements.	09

	• Tableware/ silverware (cutlery/ hollowware/flatware) • Glassware • Crockery • Bar equipment (For all of the above Brands, Measures & Quality suppliers) • Special equipment with their uses. • Furniture (Tables/Chairs/Trolleys/Dumb Waiter) • Linen. • Light and décor • Care and maintenance of equipment. • Napkin folds. 2.4 Table d 'hote ,ala c"arte Mis-en –place, Mis -en –Scene	

III.	**1. DINING SERVICES METHOD AND PROCEDURES** 1.1 Different methods of services a. Table service • Silver service/ English service • American/ Plated • Family • Russian • French/ butler • Gueridon b.Bar Counter c.Assisted Service • Carvery • Buffets d.Self Service •Cafeteria : a).Counter b).free-flow c).Echelon d).Supermarket e)Single point service •Take-away •Drive through •Fast food •Vending •Kiosk •Food court •Bar f). Specialised (in-situ) •Tray •Trolley •Home delivery •Lounge	09

	•Room •Drive in	
	1.2 Special Service • Formal Service • Wave service • Carlton club service 1.3 a. Rules to be observed while laying the table. b. Rules to be observed while waiting at the table. c. Dos & don'ts in a restaurant	06
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

1. Food & Beverage Service – R. Singaravelavan-Oxford University Press
2. Dennis Lillicrap, John Cousins and Robert Smith
3. Vijay Dhawan- Food and Beverage Service
4. Peter Dias- The Steward
5. John Fuller & A.J. Currie
6. Sudhir Andrews- Food and Beverage Service
7. Bobby George-Food & Beverage Service

FOOD AND BEVERAGE SERVICE SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Design and Layout of a operational areas of Food and Beverage department.	
2.	Organizational Chart of a Small, Medium & Large Hotel.	
3.	Comparative analysis of at least two quotations from any supplier to understand rates and quality of crockery.	
4.	Comparative analysis of at least two quotations from any supplier to understand rates and quality of glassware.	
5.	Design and Layout of Air catering or Marine catering.	

FOOD & BEVERAGE SERVICE SEMESTER – 1
(PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	**INTRODUCTION TO HOTEL AND CATERING INDUSTRY**.	08

	Visit to various catering outlets a. Coffee shop b. specialty restaurant c. Bar d. Room Service e. Banquets f. Snack bar (any fast food or QSR) g. Kiosk After visiting the above mentioned outlets the student is required to submit report.	
2	Emerging trends in the hospitality industry – Guest lecture from the Industry After the lecture the student is required to submit a report	02
3	**DEPARTMENTAL ORGANISATION & STAFFING** Role play on the attributes, attitude & etiquette of a food service personnel	04
4	**DEPARTMENTAL ORGANISATION & STAFFING** Standard phrases used in food & beverage service outlets (Role play)	04
5	**OPERATIONAL & AUXILLARY AREAS OF FOOD & BEVERAGE DEPARTMENT : IMPORTANCE & LAYOUTS** Practical: Drawing Layouts of operational & auxiliary areas. a. Coffee shop b. specialty restaurant c. Bar d. Room Service e. Banquets f. Snack bar (any fast food or QSR) g. Kiosk	08
6	**FOOD AND BEVERAGE SERVICE EQUIPMENT**. 1. Familiarization of equipment a. Silverware b. Glassware c. Crockery d. Linen e. Furniture	08
7	**FOOD AND BEVERAGE SERVICE EQUIPMENT** 2. Napkin fold: 15 napkin folds Book fold, Fan fold, Sunrise, Candle & fan, Bishop's mitre, Cocks comb, Ta dome, Cinderella shoe, Pinwheel, Rose, Sydney opera, Arum's Lily, Lover's k Triple wave & Cone.	08

8	3. Stacking of side station	02
9	. Polishing of silver ware (Polivit, Silver dip and Burnishing methods)	02
10	Cleaning& Wiping of glassware and wiping of crockery	02
11	**DINING SERVICES METHOD AND PROCEDURES** PRACTICE: 1. Carrying and balancing the salver/tray. 2. Laying and relaying of tablecloth. 3. Water service 4. carrying, placing and clearance of plates 5. Handling and using service fork/spoon 6. Laying of a la carte cover 7. Clearance of ashtray& crumbing at the table 8. Role play on do's and dont's in a restaurant.	01 02 01 02 02 01 01 02
	TOTAL PRACTICAL HOURS	**60**

FOOD AND BEVERAGE SERVICE SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments on the following:

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Presentation to be done on visits conducted to restaurants.	
2.	Presentation to be done on any one - Emerging trends in Bar / Restaurants / Pubs / Banquets .	

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks

Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

- Question no. 1 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.
- Question 2, 3 & 4 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a menu to compile and laying table for it.
- Assessment will be done as follows

Journal	Grooming	Identification of cutlery, crockery, glass ware and hollow ware	Menu Planning	Cover laying	Viva - voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

FRONT OFFICE SEMESTER – I (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	FRONT OFFICE I(USHO 103)
Course Code	Title	Credits	
USHO103	FRONT OFFICE-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02	--	--	--	--	--	--

OBJECTIVES:

At the end of semester I:-

- Introduce the students to the Hotel & Tourism Industry
- Understand the appropriate organization structures and duties in the Front Office and related departments.
- Develop, prepare guest relations and evaluate practical aspect with guests.
- Understand the role of public relations with hotel industry.
- Develop skills required as an efficient and effective receptionist in any hotel (large or Small) and to handle situations and types of guest in the job.
- Understanding the functioning of the Telecommunication department.

Contents of syllabus for USHO 103

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**Introduction to the Hotel and Tourism Industry** • An account of development and growth of hotel and tourism industry in the world • Development and Growth of Hotel and Tourism industry in India. **Classification of Hotels by** • Location • Architectural design • Number of Rooms • Ownership • Pricing Plan • Type of Clientele • Duration of Guest stay • Facilities offered • Star rating criteria in India (HRACC) Supplementary accommodation	**15**

II	**Tariff Structure** **1. Types of Rooms** Single, Double, Twin, Hollywood twin, Interconnecting, Adjacent, Adjoining, Lanai, Penthouse, Duplex, Efficiency, Physically Challenged, Studio, Parlour, Hospitality Room, Suite (Types) **2. Tariff Fixation** Check-in and Check-out basis, 24 hour basis, on the basis of competitor's rate, Night basis, Day rate. **3. Types of Meal Plans** European, Continental, Bermuda Plan, Modified American Plan (Half-Board, Demi- Pension), and American Plan (Full-Board: En Pension). **4. Packages and Special Rates** Rack rate, Group rate, Volume rate, Government rate, FIT, Wholesale net rate, discounted rates, Seasonal rate, Crib Rate, Extra bed rate, Family rate, Crew rate, Week day/Weekend rates, Membership rates, Executives of the other units of the same chian, Corporate rate, Commercial rate, Advance purchase rate Package rate, Ad-hoc rate **5. Taxation** • Luxury tax, Expenditure tax, Sales tax, Value added tax and other statutory taxes. • Service Charges. **Organisation of the Front Office Department** 1. Organisation charts of • Small Hotel • Medium Hotel • Large Hotel 2. Sections of the Front Office Department 3. Inter and Intra departmental Co-ordination 4. Job Specifications and Job Description • Front Office Manager • Duty Manager • Guest Relations Executive	**15**
III.	**Telecommunications** • Introduction • Types of Exchange- PBX, PABX, EPABX • Other Communication Equipment- Walkie- Talkies, Pagers, Mobile Phones, Telephone Instruments, Pay Phones, Facsimile. • Organisation of the Telecommunications department • Job descriptions of the Telecommunications department supervisor & Operator • Skills and Competencies of the Telephone Operator • General duties of a Telephone Operator • Internet Access- Introduction, Dial up access, High speed with wired access, High speed with wireless access • Future of Hotel telephones- Voice-over-internet-protocol (VOIP) • AYS – at your service	**15**
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

Name of the book	Author	Publisher	Place of Publication
Jatashankar Tiwari	Front Office Management	Oxford University Press	New Delhi
Andrews, Sudhir	Hotel Front Office Training Manual	The Tata M'cGraw Hill	New Delhi
Kasavana, Michael & Brooks, Richard	Managing Front Office Operations	AHMA	USA
Baker & Bradley	Principles of Hotel front Office Operations	Cassell	London
Deveau, insley & deveav, Patricia	Front Office Management and Operations (2)	Prentice Hall	NEW JERSEY
Bullied, An Ritchie, Caroline	Reception	Stanley Thornes	london
Chakravarti, B.K.	Front Office Management In Hotel	BNS Publishers	New Delhi
Braham, Bruce	Hotel Front Office	Hutchinson	London
Ford, Robert & Heaton, Cherrill	Managing the guest Experience	Delmar Publishers	London
Bardi,James	Hotel Front office Management	John wiley & sons	new Jersey
Aggarwal.Ravi	Hotel front Office	sublime Publications	jaipur
Huyton Jeremy & Baker Sue	Case Studies in Rooms Operations and Management	Hospitality Press P Ltd.	Melbourne
Bhatnagar S.K.	Front office Management	Frank Bros & Co.	New delhi
Andrews, Sudhir	Hotel Front Office Training Manual(latest ed)	The Tata M'cGraw Hill	New delhi
Chakravarti B.K.	Front Office Management in Hotel	CBS Publisher	New Delhi
Chakravarti B.K.	Concept of Front Office Management	APH Publishing	New Delhi
	India(Tourist Guide)	Lonely Planet	

FRONT OFFICE SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1	Countries, Capitals, Currencies	
2	Airlines and Airline codes (National Carrier and Domestic)	
3	Names of Airports : National and International	

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

HOUSEKEEPING SEMESTER – I (THEORY)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Housekeeping I(USHO 104)
Course Code	Title	Credits	
USHO104	Housekeeping-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:
At the end of semester I:-

- The student will be able to identify the role of the housekeeping department and explain its organization structure and importance.
- The student will be able to list the basic cleaning equipments, cleaning agents and explain their use.
- Will be able to perform basic cleaning procedures of various surfaces.

Contents of syllabus for USHO 104

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. INTRODUCTION TO HOUSE KEEPING DEPARTMENT** 1.1 Types of Hotel & services offered 1.2 Types of Room 1.3 Role of Housekeeping department in a Hotel 1.4 Personality Traits of Housekeeping Personnel 1.5 Daily routine in Housekeeping 1.6 Glossary	15
II.	**1. ORGANIZATION OF HOUSEKEEPING DEPARTMENT** 1.1 Organization Chart of a Small, Medium & Large Hotel 1.2 Duties & Responsibilities of House Keeping Personnel	09

	1.3 Inter departmental coordination 1.4 Control Desk Operations	
	2. CLEANING EQUIPMENT 2.1 Classification of Cleaning Equipment 2.2 Use & Care of Equipment 2.3 Glossary	06
III.	**1. CLEANING AGENTS** 1.1 Classification 1.2 Use, care & Storage 1.3 Distribution & Control 1.4 Glossary	08
	2**. CLEANING & POLISHING OF DIFFERENT SURFACES** 2.1 Metals 2.2 Glass 2.3 Plastic 2.4 Ceramics 2.5 Wood 2.6 Leather 2.7 Rexene	07
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

1. Hotel Housekeeping Operations and Management – G. Raghubalan & Smritee Raghubalan – Oxford University Press.
2. Housekeeping Operations, Design and Management – Malini Singh & Jaya B. George – Jaico Publications.
3. Housekeeping Management – Margaret Kappa, Aleta Nitschken, Patricia B. Schappert – A.H. & L.A.
4. Hotel Hostel and Hospital Housekeeping – Joan Branson & Margaret Lennox –
5. Hotel Housekeeping Management & Operations – Sudhir Andrew – McGraw Hill Companies.

HOUSEKEEPING SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Design and Layout of a Room Maids Trolley (Front View & Top View)	10
2.	Organizational Chart of a Small, Medium & Large Hotel.	10
3.	Layout of the Housekeeping Department of a Small, Medium & Large Hotel.	10
4.	Layout and design of a Floor Pantry.	10
5.	Cleaning Agents from one manufacturer	10

Scheme of Examination (Theory)

(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

ROOMS DIVISION MANAGEMENT –I (PRACTICAL)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	RDM-I Practical-USHO105
Course Code	Title	Credits	
USHO105	RDM-Practical-I	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	--	4					
Credit	--	2					

Semester I – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture
--	--	--	--	--	4	60	10	02	--	02

Contents of syllabus for USHO 105

Front Office – I (Practical)

Sr.	Topic	Hr
1	• Grooming Standards- For Boys and Girls • Social Etiquettes- Soft Skills	6
2	**TELEPHONE HANDLING** • Transferring calls • Call on hold Procedure • Voice modulation	12
3	**KNOW YOUR CITY- MUMBAI/ NAVI MUMBAI ETC** Shopping, Tourist attractions, Beaches, Historical and Archaeological monuments, Religious sites, Hotels and Restaurants, Live Theatres, Cinema Halls and Multiplexes, Handicrafts, Hospitals, Consulates and Embassies etc.	12

HOUSEKEEPING - I (PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	Introduction to Housekeeping practical, grooming and journal	02
2	Introduction to all cleaning equipments, agents and surfaces & Orientation of the different areas	02
3	Dusting (high & low)	04
4	Floor cleaning- Sweeping & mopping – Dry and Wet Mopping	02
5	Floor cleaning – Scrubbing – Manual and with Machines	02
6	Cleaning and Polishing of Brass (Functional & Decorative) – Demo &	02

	Practical	
7	Cleaning and polishing of Silver (Functional & Decorative) – Demo & Practical	02
8	Cleaning and polishing of steel/chrome – Demo & Practical	02
9	Cleaning of Glass – Demo & Practical	02
10	Cleaning of Tiles – Demo & Practical	02
11	Cleaning and polishing of Wood Surfaces – Demo & Practical	02
12	Cleaning and polishing of Laminated Wood – Demo & Practical	02
13	Cleaning and polishing of Marble/ Granite – Demo & Practical	04
	TOTAL PRACTICAL HOURS	**30**

REFERENCES:

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a 2 activities bed making and polishing or special cleaning of any surface or area
- Assessment will be done as follows

Journal	Grooming	Work sheet	Activity One	Activity Two	Viva-Voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

COMMUNICATION SKILLS (ENGLISH & FRENCH)

LANGUAGE SKILLS – 45 Hours

Semester - I

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Communication Skills USHO106
Course Code	Title	Credits	
USHO 106	Communication Skills (English and French)	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:

- Developing and adapting speaking and achieve listening skills and strategies.
- Generating, planning and drafting ideas
- Improving vocabulary for precision and impact
- Using grammar (French & English) accurately and appropriately.
- Structuring, organising and presenting texts in variety of formats.
- To be able to understand and speak basic French.

Contents of syllabus for USHO 108

Unit 1		
I	• 1.1 The sentence – Kinds of sentences – Subjects & Predicate • 1.2 The Phrase and the Clause • 1.3 Parts of speech – Noun, Adjective, Pronoun, Verb, Adverb, Preposition, Conjunction, Interjection	3 Hours

	2.1 Noun- Kinds of Noun- i.e Common, Proper, Collective, Abstract	6 Hours
	2.2 The Noun: Gender – Masculine, Feminine, Common and Neuter gender	
	2.3 The Adjective – Kinds of Adjectives, Comparison of Adjectives – Positive, Compartitive and Superlative Degrees. The correct use of some Adjectives Viz little, a little etc	
	2.4 Articles – Use of Definite Article and Indefinite Article	
	2.5 Personal Pronouns – Forms of the Personal Pronouns - i.e First Person etc.	
	(French)	
	1. Translate the Dialogue into English	
	2.Culinary Terms. Translate to French using match the columns/crosswords	
UNIT 1-15 TEACHING HOURS		
Unit2		
II	1.1 The Verb – Transitive and Intransitive Verbs, Person & Number' Active and Passive Voice' Direct and Indirect Speech;	6 Hours
	1.2 Tense: Present Tense; Past Tense; Future Tense;	
	1.3 Adverb: Kinds of Adverbs	
	1.4 The Preposition – Kinds of Prepositions – Using appropriate prepositions	
	1.5 The Conjunction – use of appropriate Conjunctions – Classes of Conjunctions The Interjection – Meaning of & some example	
	2.1 Punctuation	4 Hours
	2.2 Commonly confused words / Common Errors / Antonyms / synonyms	
	(French)	
1	Days , Months, Numbers, Seasons	5 Hours
2	Plan a five course menu in French	
	UNIT 2-15 TEACHING HOURS	

	Unit3	
III	1.1 Newspaper Reading – current affairs	6 Hours
	1.2 Comprehension , Precis writing, Paragraph writing	
	2.1 Conversation / Role Play	5 Hours
	2.2 Public Speaking	
	(French)	
1	Make Negative, make plurals, conjugate in the present tense: avoir etre,Faire, Manger,Boire,mettre	4 Hours
	UNIT 3-15 TEACHING HOURS	
	Total Theory Hours	45

REFERENCE (English)

- Business Communication – Meenakshi Raman and Prakash Singh
- Business Correspondence and Report writing – R.K.Sharma and Krishna Mohan
- Business Communication – Chaturvedi
- High School English – Wren and Martin
- Understanding Human Communication – Ronald B Adler and George Rodman (with CD)
- Skills Development for Business and Management Students - Kevin Gallagher
- Personality and Skills Development – Barun Mitra (with CD)
- Technical Communication , 2nd Edition – Meenakshi Raman (with CD)
- Corporate Communication – Jaishri Jethwaney
- Understanding Human Communication-Ronald B. Adler / George Rooman - Oxford

REFERENCES (French)

- E. J. Neather - Mastering of French I & II - Macmillan - 1982
- Bridget Anfossy - Speak French Today - Augo - 1991
- R. Diez La Cortina - Cortina's French Method - Grosset & Dunlop - 1988
- Mathuram Bondo - Modern French Course - D. C. Heath & Co. -.1983.
- Course de langue et civilizaiion Franchises. G. Mauger.
- Oxford French Dictionary

SEMESTER - I (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Paragraph writing on myself (100 words) & Presentation on it.	10
2.	Essay on hospitality industry (500 words)	10
3.	Group Discussion, news paper reporting, letter writing (formal & informal)	10
4.	Speaking skills – conversation skills in French	10
5.	Presentation on any given topic	10

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments / projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ group discussion/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities & teamwork demonstrated through organizing co-curricular activities, etc.	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

INFORMATION TECHNOLOGY (THEORY)
(SEMESTER – I) – 15 Weeks

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	INFORMATION TECHNOLOGY(USHO 107)
Course Code	Title	Credits	
USHO107	INFORMATION TECHNOLOGY	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	1	2					
Credit	2						

Semester I – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture
01	15	20	02	--	02	30	05	02	--	02

Objective: To equip the student with the theory inputs with respect to understanding the fundamentals of computers and necessary skills to operate the generic applications and standard operating systems

Contents of syllabus for USHO 107

(Theory – 15 Hrs)

Unit I

Sr. Topic Hr

A Introduction to Computer Fundamentals **15 Hours**

- 5 Parts of Computer
- Difference between Hardware & Software
- Difference Between Data and Information
- Types of Computers – Server (Types), Clients (Types of Portable Computer)
- Application Software
- System Software
- Software Copyright – Freeware, Shareware, Licensed

B Software

- Application Software – Word Processor, Spreadsheet, Database Management, Presentation, Media, Outlook, Browser and Utility Software like Acrobat Reader
- System Software – Operating System (Windows, Linux, Android)
- Device Driver
- Utility Software – VLC Player, File Converter

C Hardware

- Introduction of Central Processing Unit
- Processor – Intel, AMD, Clock Speed
- Input Devices – Keyboard, Mouse, Mic, Scanner, Barcode Reader, RFID, Touch Screen
- Output Devices – Displays (CRT, TFT, LCD, Plasma, LED, Projector)
- Display Resolution
- Printers – Inkjet, Laser, Thermal
- Storage Devices – Primary (RAM & ROM), Secondary (HDD, Flash Drive, USB, CD/DVD, Blue Ray, Media Players)

D Networking

- Types of Network (LAN, WAN, MAN)
- Topology (Bus, Star, Ring, Mesh & Tree)
- Network Hardware – (Cables – RJ45, RJ11, MTRJ, Switch, Routers, Access Point, Modem)
- IP and MAC Address, Subnet, Gateway, DNS
- Understanding Network Address & Node Address
- Network Security – Firewalls (Hardware & Software)
- Bandwidth

E Internet

- Intranet, Internet & Extranet
- WWW, HTTP, Domains
- VPN & VoIP
- Search Engines
- ISP & Bandwidth

(Practical 30 Hrs)

Sr.	Topic	Hr
1	**Computer Architecture (DEMO)** • Motherboard, RAM, PCI Slots, SMPS & different Ports	**02**
2	**Operating System** • DOS Commands (CMD, IP, IPCONFIG, DIR, CLS, PING etc.) • Introduction to Desktop • Control Panel • Configuring Printers (Standalone & Network) • Sharing & Security	**06**
3	**Word 2007** **Microsoft word** File, Edit, View, Insert, Format, Tools, Table Commands Page Setup, Print Options, Setting Page Margins Clip Arts, Inserting Pictures/Charts/Files Correcting Text, Cut, Paste, Undo, Redo, Deleting Blank Lines, Inserting A Page, Typing Over Text, Replacing Text, Moving And Copying Text. Menu Method, Key Board Method, Tool Bar Method, Drag & Drop Method, Checking Text, The Spell Checker, Auto Correct Check Up, The Sanrus, The Grammar Checker, Formatting A Text, Changing Type Style, Character Highlighting, Alignment Of Text, Left, Right, Center, Justifying Text-Types & Tab Setting, Setting Tab Using Ruler, Indenting Paragraphs, Increasing And Decreasing Indents, Using Ruler To Set Indents, Spacing Paragraph Line Spacing, Spacing Between Paragraphs, Page Views, Normal Views,	**06**

Page Layout View, Outline View, Print Preview, "Full Screen View, Master Document View, Magnification, 200 M Control In Any View, Page Formatting, Setting Margins, Paper Size, Printing In Landscape Or Portrait Orientation, Page Numbering, Adjoining Page Numbering, Deleting Page Numbering, Header & Footer, Creating And Editing, Inserting And Deleting Pages In A Document, Saving The Text, Saving The File To Disk, Closing A File, Opening A Non-Work Document, Printing The Text.

4 EXCEL **06**

Processing With Ms Excel, Starting Excel, Starting New Work Book, Entering And Editing Data, Formatting Work Sheet, Sorting The Data, The Worksheet Selecting Cells And Ranges, Selecting With Mouse, Data Entry, Entering Numbers, Text, Date 4 Time Entries, Entering Series, Filing A Text Series With Auto Fill, Filing A Number Series, Editing Data, Clearance And Replacing Contents Of A Cell, Deleting The Contents Of A Range Of Cell, Rearranging Work Sheet Data, Copying, Auto Correct, Spell Checking, File dose, Formatting Data, Font Selection, Aligning Data, Format Style, Formatting Work Book, Arranging, Hiding, Un hiding, Inserting Columns And Rows, Adjusting Width, Copying And Moving, Inserting And Deleting Sheets From Work Book, Mathematical Operator, Exponentiation And Percentage Operators, Logical Or Comparison Operators, Using Mouse To Create A Formula.

Inserting A Chart, Chart Types, Modifying Chart, Adding Drawing To The Chart, Printing In Excel, Print Parameters, Default And Changing Default Settings, Sorting, Printing Etc.

5 POWERPOINT **08**

Power Point Terminology-Getting Into Power Point-Creating, Opening And Saving Presentations- The Easy Way-Using Auto Content Wizard-Working With Blank Presentation-Using The Templates-Using The Slide Master-Working With Color Schemes-Working With Slides-Making A New Slide -Move, Copy Or Duplicate Slides-Delete A Slide-Copy A Slide From One Presentation To Another-Go To Specific Slide-Change The Lay Out Of A Slide-Zoom In Or Out Of Slide-Working With Text In Power Point-Cutting, Copying and Pasting-Formatting Text, Change Font & Size, Shadowing, Embossing-Alignment The Text-Left, Center, Right And Justify-Power Of Graphics In Power Point-Working With Clipart Picture-Using Microsoft Excel-Chart-Using Organization Charts-Power Point Drawings-Ways To Draw-Adding Lines-Connecting Lines-Borders And Adding Curves-Creating Word Tables-Making Great Looking Presentations(Putting On A Show)-Arranging, Creating Animated Slides- Manually Advancing Slides-Adding And Removing Transitions-Running A Presentation Continuously-Printing The Presentation Elements.

6 Outlook **02**

- Configuration

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will asked to carry out skill based practical in the Computer lab.
- Assessment will be done as follows

File	Grooming	Skill Set-I	Skill Set-II	Viva -voce
10	10	10	10	10

- Marks obtained out of 50 shall be converted to out of 30 to the next integer for final calculation.

FOOD SAFETY AND NUTRITION

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	I	Food Safety & Nutrition(USHO 108)
Course Code	Title	Credits	
USHO108	Food Safety & Nutrition	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	10	02		--	--	--	--	--

Contents of syllabus for USHO 108

OBJECTIVES:

At the end of Semester – I

- To learn about the importance of hygiene & sanitation in the catering industry
- To get acquainted with the food standards.
- To learn about ways to minimize food poisoning and infections.
- To understand function, sources & deficiency of nutrients.
- To gain basic knowledge of nutrition
- To gain knowledge about maintenance of good health.
- To understand the changes brought about in food nutrients during processing

Semester I – 15 weeks

UNIT	TOPIC	TOTAL NO. OF HOURS
I	**INTRODUCTION TO HYGIENE** 1.1 Rules & importance of hygiene 1.2 Personal Hygiene 1.3 Cleaning of premises 1.4 Pest Control 1.5 Waste disposal 1.6 Dishwashing methods	15
	HACCP 2.1 Introduction 2.2 Importance 2.3 VII Critical Control Points	
	MICROBES 3.1 Introduction (Bacteria, Yeast, Mould) 3.2 Classification 3.3 Factors for growth 3.4 Role of microbes in manufacture of fermented foods (dairy products, Veg. & bakery preparations, alcoholic Bev., vinegar, fermented Indian foods)	
II	**FOOD BORNE ILLNESS** 1.1 Natural Toxins (Kesari Dal, Potatoes, Mushrooms, Shell Fish, Peanuts) 1.2 Chemical (Tin, Copper, Arsenic, Lead) 1.3 Bacterial toxins (staphylococcus, salmonella, Clostridium perfringens, Clostridium botulinum) 1.4 Food poisoning & Infections • Definitions • Food contamination & Spoilage • Differentiation • Examples	15

FOOD ADULTERATION 2.1 Definition and types 2.2 Test to detect (coffee, semolina, flour, ghee, butter, margarine, oil, milk, turmeric, coriander powder, pepper corn , meat etc. 2.3 Food standards in India (PFA, FPO, MPO, BIS-ISI, AGMARK, ISO)	

	FOOD ADDITIVES 3.1 Colours & Flavours 3.2 Browning reactions-causes, desirable & undesirable effects)	
	FOOD PRESERVATION ❖ **Methods of Preservation** 4.1 Natural & Chemical Preservation 4.2 Low temperature(Refrigeration, Freezing) 4.3 High Temperature(Pasteurisation, Sterilization, Canning) 4.4 Irradiation	
	FOOD STORAGE 5.1 Dry food store 5.2 Refrigerated store 5.3 Freezer store 5.4 Holding at High Temperature 5.5 Stock rotation & cross contamination	
III	**INTRODUCTION TO NUTRITION** 1.1- Definitions(Food, balanced diet, nutrition, over nutrition, under nutrition, malnutrition, health) 1.2 - Balanced diet-Food pyramid 1.3 - Meal planning steps	15

	CARBOHYDRATES 2.1 - Classification & composition 2.2 - Functions & requirements, sources 2.3 - Excess & Deficiency 2.4 -Uses in food preparation (Gelatinization, Gel formation, Dextrinization, Gluten formation, Caremelization)	
	PROTEINS 3.1 - Classification & Composition 3.2 - Functions & requirements, Sources 3.3 - Excess & Deficiency 3.4 - Uses in food preparation 3.5 - Effect of heat (Denaturation, Coagulation) 3.6 - Gel formation 3.7 - Foaming	
	FATS&OILS 4.1 - Classification & Composition 4.2 - Functions & requirements, Sources 4.3 - Excess & Deficiency 4.4 - Types, Sources, Uses 4.5 - Factors causing deterioration 4.6 - Rancidity 4.7 - Flavour reversion 4.8 - Shortening 4.9 - Polymerisation	

	VITAMINS, MINERALS, WATER & COLLOIDS 5.1 - Functions 5.2 - Sources 5.3 - Deficiency & Excess 5.4 - Fat soluble & water soluble Vitamins (A,D,E,K,B1,B2,B3,C) 5.5 - Minerals (Ca,P, Na,K,Fe,I,Fl) 5.6 - Importance, balance & Sources 5.7 - Cooking losses & prevention 5.8 - Definitions (sol, gels, foam, emulsion) 5.9 - Examples(roasting, grilling, frying, baking, boiling, poaching, microwave) 5.10 - Importance in food industry	

REFERENCE BOOKS

Sr no	Author	Title	Publisher	Place	Year
1	Hobbs, Betty & Roberts,	Food Poisoning and Food	Hoddr & Stoughton	Great Britiain	1993
2	Rodey S		Tata Mcgraw Hill	New Dehli	1999
3	Trickett, Jill	Food Hygiene for Food Handlers	Macmillion	Hongkong	1997
4	Knowles Tim	Food Safety in the Hospitalty Industry	Butterworth Heinamann	Oxford	2002
5	Scott Elizabeth & Sockett Paul	How To Prevent Food	John Wiley & sons	New York	1998
6	Loken Joan	The HACCP Food Safety Manual	John Wiley & sons	New York	1994
7	Commercial law Publishers	The Prevention of Food	Commercial law Publishers	Mumbai	2008
8	Mahindru S.N.	Food Additives	APH Publishing Corp	New Delhi	2008
9	Sareen, Sandeep	Food Preservation	Sarup & sons	New delhi	1999
10	VanGarde Shirley & Woodburn	Food Preservation & Safety	Surabhi Publication	Jaipur	1999
11	M.Swaminathan	Food & Nutrition Vol-I	Bappco.	Bangalore	1985
12	M.Swaminathan	Food & Nutrition Vol-II	Bappco.	Bangalore	1985

13	M.Swaminathan	Food & Nutrition	Bappco.	Bangalore	1996
14	B.Srilakshmi	Food Science	New Age International	New Delhi	2007
15	Roday Sunetra	Food Science & Nutrition	Oxford Uni.Press	New Delhi	2010
16	Adams MR. & Moss.M.O.	Food Microbiology	New Age International	New Delhi	2006
17	Jim Mann & A. Stewart Truswell	Essentials of Human Nutrition	Oxbord University Press	New Delhi	2010

Scheme of Examination (Theory)

(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

Semester II - B.Sc. Hospitality Studies

Course Code	Subject	Class Room Instruction Face to Face									Notional				Credits			
		Per Week			Per Sem			Per Sem Hrs										
		L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
USHO201	Food Production & Patisserie II	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO202	Food & Beverage Service II	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO203	Front Office II	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO204	Housekeeping II	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO205	Rooms Division Management(Practicals) II	-	4	-	-	60	-	-	60	-	-	10		70	-	2	-	2
USHO206	Communication Skill II (English & French)	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO207	Principles of Hotel Accountancy	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO208	Principles of Management	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
	Total	21	12	-	315	180	-	315	180	-	175	30	-	700	14	6	-	20

L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial

Notional includes time spent in library / home / other institutions for preparation and writing of assignments, quizes, open book test, journal, case studies, project, practical, field work, excursion, etc.

FOOD PRODUCTION & PATISSERIE–II (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Food Production & Patisserie -II(USHO 201)
Course Code	Title	Credits	
USHO102	Food Production & Patisserie-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Class Room Instruction Face to Face									Notional				Credits			
Per Week			Per Sem			Per Sem Hrs										
L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4

OBJECTIVES:

- To develop a keen interest in food production and to enable students to experiment, innovate and progressively produce a variety of preparation / dishes.
- To gain confidence to adapt to the technical skills and the art of preparing different menus, Indian as well as Continental.
- By the end of the second semester students should be confident enough in their skills which would boost their morale to take up the challenge of bulk cookery in the third and fourth semester.

Contents of syllabus for USHO 201

UNIT NO.	Ch. No.	TOPIC	Hrs.
01	1	**Culinary Terms with Explanation & Examples**	03
	2	**Layout of Kitchen**	03
		2.1 General Layout of the Kitchen	
		2.2 Receiving Area	

		2.3 Storage 2.4 Wash up	
	3	**Soups** 3.1 Classification with Examples 3.2 Consommé and Garnishes with their names (Any 10 common name)	**02**
	4	**Fish Mongery** 4.1 Classification of Fish with examples 4.2 Selection, Cooking & Storage of Fish 4.3 Local Names of Fin Fish and Shell Fish 4.4 Cuts of Fish	**02**
	5	**Poultry** 5.1 Cuts of Poultry 5.2 Selection and Uses of Cuts	**02**
	6	**Rice, Cereals & Pulses** 6.1 Introduction, Classification of Cereals and Pulses 6.2 Varieties of Rice and Byproducts 6.3 Nutritive Value of Various Cereals 6.4 Sprouts and Uses	**03**
UNIT NO.	**Ch. No.**	**TOPIC**	**Hrs.**
02	**7**	**Meat** 7.1 Introduction to Meat Cookery 7.2 Cuts of Lamb, Pork, Beef / Veal 7.3 Variety of Meats / Offal 7.4 Selection and Storage of Meats	**04**
	8	**Milk and Milk Products** 8.1 Introduction, Processing of Milk, Pasteurization**,** Homogenization, Milk in Various Forms e.g. Toned, Powder, Skimmed, Condensed & Evaporated. 8.2 Cream – Introduction, Processing & Types 8.3 Butter – Introduction, Processing & Types 8.4 Cheese – Introduction, Classification with Examples, Processing, Types, Cooking with Cheese and Uses.	**05**
	9	**Bakery & Pastry** **Shortening – Fats and Oils** 9.1 Saturated and Un-saturated Fats 9.2 Advantages & Disadvantages of Using Fats 9.3 Varieties of Shortening	**03**
	10	**Tea & Coffee** 10.1 Introduction 10.2 Producing Regions/Country 10.3 Types and Methods of Preparation 10.4 Popular Brands and Variety Available	**02**
	11	**Thickening Agents used in Indian Gravies** 11.1 Role of Thickening Agents	**01**

UNIT NO.	Ch. No.	TOPIC	Hrs.
03	12	**Indian Cookery**	03
		12.1 History of Spices and Trade Routes	
		12.2 Basic Spices, Condiments and Masalas	
		12.3 Role of Spices in Indian Cuisine	
		12.4 Indian Equivalent name	
		12.5 Blending of Spices	
		12.6 Concept of Wet and Dry Masalas	
		12.7 Regional Varieties of Basic Masalas	
		12.8 Basic Composition of Some Important Masalas	
	13	**Menu Planning**	02
		13.1 History of Menu	
		13.2 Types of Menu	
		13.3 Menu Planning Principles	
	14	**Bakery & Pastry**	04
		14.1 **Pastries**	
		• Classification of Pastries	
		• Varieties	
		• Role of Each Ingredient	
		• Baking Temperature and Time of Each Pastry	
		14.2 **Pastry Cream**	03
		• Basic Pastry Cream	
		• Use in Confectionery	
		• Preparation and Care in Production	
		14.3 **Cocoa and Chocolate**	
		• Introduction, Production and Manufacture	03
		• Varieties of Chocolates	
		• Tempering of Chocolates	

Culinary Terms
(Explanation of the following Culinary Terms with examples)

1. Bhurta	2. Baghar	3. Bain Marie
4. Bisque	5. Bortsch	6. Brioche
7. Canapés	8. Choux	9. Cisel
10. Compote	11. Concasse	12. Condiments
13. Croissant	14. Darne	15. Force Meat
16. Garniture	17. Gateaux	18. Genoese
19. Hors d' oeuvre	20. Larding	21. Macedione
22. Matignon	23. Mousse	24. Mousseline
25. Panada	26. Paneer	27. Pimento
28. Khoya	29. Potage	30. Pot Pourri
31. Ragout	32. Rechauffe	33. Roe
34. Royal	35. Royale	36. Saffron
37. Sear	38. Seasoned Flour	39. Soufflé
40. Stew	41. Supreme	42. Kofta
43. Tronçon	44. Zest	

REFERENCE BOOKS

1. Parvinder S. Bali – Quantity Food Production and Indian Cuisine
2. Thangam Philip – Modern Cookery I & II – Orient Longman – 2001
3. Auguste Escoffier – Ma Cuisine – Hamlyn – 2000
4. Digvijay Singh – Cooking Delight of the Maharajas – Vakils, Feffer & Son's Ltd. – 1982
5. Philip Dowell & Adrian Barley – The Book of Ingredients – Mermaid Books – 1987
6. Wayne Gisslen – Professional Baking – John Wiley & Sons – 1994
7. Martha Day – Baking – Lorenz Books – 1999
8. M. J. Leto & Bode – The Larder Chef – Heinemann Publishing House – 1989
9. Parvinder S. Bali - Food Production Operations
10. Thangam E. Philip - Modern Cookery for Teaching and Trade - 4th Vol. - 1996
11. Krishna Arora - Theory of Cookery – 2nd – 1992
12. Wayne Gisselen - Professional Cooking – 4th – 1992
13. Wayne Gisselen - Professional Baking – 2nd – 1994
14. J. C. Dubey - Basic Bakery - 1st – 1992
15. Kinton Ceserani - Theory of Catering – 7th – 1996
16. Bernard Davis - Food Commodities - 4th – 1998
17. Daniel R. Stevenson - Basic Cookery The Process Approach - 5th - 1997

(Practical - Bakery)

Sr.	Topic
1	**Breads** • Cheese & Garlic Bread • French Bread • Brioche
2	**Pastries** • Flaky Pastry • Puff Pastry (Cheese Straws) • Quiche • Danish Pastry
3	**Cakes** • Yule Log • Fruit Cake • Chocolate Brownies • Marble Cake
4	**Cookies** • Peanut Cookies • Chocolate Chip Cookies • Coconut Macaroons
5	**Chocolate Rocks**

(Food Production Practical)

Sr.	Topic
1	**Suggested Menu Patterns** • Indian Menus • Continental Menus

PRACTICAL MENU

I	**Snack Menu**	
	Non-Veg	**Veg.**
	1. Chicken / Beef Burgers 2. Chicken Grilled Sandwich 3. Chicken Pizza 4. Kheema Samosa 5. Mince Meat Croquettes 6. Shami Kabab 7. Chicken Lollypop 8. Fish Fingers	1. Veg. Burger 2. Veg Grilled Sandwich 3. Veg. Pizza 4. Punjabi Samosa 5. Chutney Pattice 6. Chillie Cheese Toast 7. Aloo Chat 8. Wada
	Accompaniments: Green / Red / Tamarind Chutney, Tartare Sauce, Hot Garlic Sauce, Tomato Sauce	
II	**Salads**	
	1) Tossed Salad with French Dressing 2) Waldorf Salad 3) Palak / Pineaple / Anar Raita 4) Chicken Hawain Salad 5) Salad Caprese 6) Ceasar Salad	
III	**Soups**	
	1) Consommé Jacqueline / Celestine 2) Soupe à l' oignon à la François 3) Puree Lentils 4) Crème de Volaille 5) Soupe Cockie Leekie 6) Soupe Vichyssoise 7) Sea Food Chowder 8) Gazpacho 9) Mulligutwany	
IV	**Poisson**	
	1) Fried Fish with tartare Sauce 2) Grilled Fish with Hollandaise Sauce 3) Baked Fish in Provencale Sauce 4) Fillet de Pomfret Cubat 5) Goan Fish Curry	
V	**Poulet**	
	1) Poulet à la Rex 2) Poulet Sauté Mireille 3) Poulet Sauté Parmentier 4) Masala Roast Chicken 5) Murg Khorma	
VI	**Entrees**	
	1) Scotch Eggs 2) Spaghetti Bolognaise 3) Grilled Steaks with Pepper Sauce 4) Barbeque Pork Chops with Robert Sauce 5) Goulash de Boeuf à la Hongroise 6) Mutton Nilgiri Khorma	

	7) Mutton Rogan Josh	
VII	**Entremettes**	
	1) Mixed Vegetables Bhujiya 2) Baingan Bharta 3) Muttar Kumbh Masala 4) Courge Provencale 5) Corn and Pepper au gratin	6) Boquetier de Legumes 7) Aubergine à la Turque 8) Spaghetti with Mushroom & Cheese Sauce 9) Cheese and Cauliflower Soufflé 10) Baked Spinach
VIII	**Potatoes**	
	1) Pommes de terre Croquettes 2) Jacket baked Potatoes 3) Pommes Chateau 4) Pommes Marquise	5) Gratin de Pommes de terre Dauphinoise 6) Bubble and Squeak 7) Garlic & Herb Roast Potatoes 8) Soufflé de Pommes de Terre
IX	**Cereals & Pulses**	
	1) Aloo ki Tihari 2) Pea Pulao 3) Riz Pilaf 4) Makhani Dal 5) Dal Fry 6) Moong Dal with Palak	
X	**Rotis & Parathas**	
	1) Satpura Parathas 2) Dhakai Parathas 3) Missie Roti 4) Chapati	
XI	**Hot Dessert**	
	1) Gajar / Beetroot Halwa 2) Shahi Tukra 3) Christmas Pudding with Custard Sauce 4) Crêpe Suzette	
XII	**Cold Dessert**	
	1) Blancmange 2) Fruit Triffle 3) Chocolate Mousse 4) Diplomat Pudding 5) Chocolate / Vanilla Panacotta	

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination
(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
4	**Internal assessment**	20

(b) Semester end assessment - 30 marks

- Candidate will be given a menu comprising of 4 dishes.
- Indent sheet and plan of work sheet to be filled by the candidate of the menu he gets.
- He / she supposed to collect indents, prepare and present the dishes in the menu within stipulated time.
- Cleaning and securing equipments and working area is also to be done within stipulated time.

Assessment will be done as follows –

Journal	Indent Sheet & plan of work	Colour	Consistency	Taste	Texture	Viva-voce	Personal Grooming ,Cleaning
10	10	10	10	10	10	10	10

Marks obtained out of 80 shall be converted to out of 30 to the next integer for final calculation.

FOOD AND BEVERAGE SERVICE SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Food & Beverage Service-II(USHO 202)
Course Code	Title	Credits	
USHO202	Food & Beverage Service-II	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Semester II – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture + Practical
03	45	25	02		04	60	10	02		04

OBJECTIVES:

At the end of semester II the student will be able to identify:

- The different types of Menus and principles of menu planning.
- Sequence and course in the French classical menu also identify general accompaniments.
- Types, storage and service of Tobacco and Non alcoholic beverages.
- Simple control system followed in a restaurant.

Contents of syllabus for USHO 202

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. MEALS AND MENU PLANNING** 1.1 Menu – Origin, definition & objectives 1.2 Types of meals (Breakfast, Brunch, Lunch, Afternoon tea, High tea, Dinner) 1.3 Types of Menu	15

	a) A la carte b) Table d' hote c) Cyclic menu d) Banquet menu e) Carte du jour / plat du jour f) Californian menu g) Take-away Other types of menu a). Children's menu b). Club menu c). Ethnic menu d). Health menu e). Spa Menu, f). Ayurvedic Menu 1.4 Principles of Menu planning 1.5 Breakfast: English, Continental, American, Indian 1.6 Types of Tea Service: Full Afternoon Tea, High Tea.	
II.	**1. French Classical Menu:** 1.1 a. Sequence and Courses. b. General Accompaniments. 1.2 Ice creams: Types & categories of Ice creams	12
	2. TOBACCO a) Introduction to Cigars and cigarettes. b) Types of tobacco c) Shape, size, color & Brand names with country of origin.	03
III.	**1.1 NON ALCOHOLIC BEVERAGES** a. Definition of beverages b. Classification chart –alcoholic & non alcoholic drinks. c. Stimulating-Tea, Coffee & Cocoa, (origin, manufacture, Method of preparation, types & brands) d. Nourishing-health drinks e. Refreshing –juices, squashes, crushes, syrups & aerated water f. Table Water (origin, types & brands) & carbonated water.	06
	1.2 SIMPLE CONTROL SYSTEMS. a) Restaurant reservation system b) KOT Checking System c) Types of KOT / BOT	05

	d) Method of billing (manual & computerised)	
	GLOSSARY Aboyeur A la Carte A l'Anglaise A l'Orly Aperient water Allemande Brunch Banquet Buffet Froid Brasserie Bisques Batwina Brotsch Bouillabaisse Bills of fare Balsamic Vinegar Chalybeate water Chateaubriand Consomme Canapé Caesar Salad Charcuterie Corn on the cob Cranberry Sauce. Cayenne Pepper Cumberland Sauce. Café au lait Caviar Cyclic Menu Carte du jour Dessert Debarrasseur Entrée Escargots Entremets En cocotte Farineux Formage French Dressing Fruitarians Gravlax Gnocchi Hors-d'oeuvres Hûitres Humidor Horseradish Sauce. Kroupnich Kosher Legumes Lacto-Ovo Vegetarians Mineral water Malt Vinegar Menu Mousses Macaroni Mint Sauce Maitre d' hotel Nicoise Salad Natural Spring water Oeufs Olive Oil Potages Poisson Pates Parisienne Rouille Releve Rôti Sorbet Salade Savoureux Smoked Salmon Sur la plat Semolina Tofu Tabasco Sauce Tartare Sauce Table d'hôte TIPS Worcestershire Sauce	04
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

- Dennis Lillicrap, John Cousins and Robert Smith-
- Vijay Dhawan- Food and Beverage Service

- Peter Dias- The Steward-
- John Fuller & A.J. Currie-
- Sudhir Andrews- Food and Beverage Service-
- Bobby George-Food & Beverage Service-

FOOD AND BEVERAGE SERVICE SEMESTER - II(ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Planning a 13 course French classical menu with general accompaniments.	
2.	Planning of an a la carte menu of a Specialty Restaurant or coffee shop.	
3.	Planning of American and continental breakfast menu with appropriate layout.	
4.	List five types of Tea and Coffee , explaining the composition of each.	
5.	Formats of special food checks (KOT)	

FOOD & BEVERAGE SERVICE SEMESTER – 2
(PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	**MEALS AND MENU PLANNING** • Menu Planning (Planning and compilation of 4,5,6 courses menu. lunch and dinner, English & French) Table d hote menu (cover, taking order & service)	**12**
2	• Types of table service o Silver service/ English service o American/ Plated o Family o Russian o French/ butler	**08**
3	Points to be considered while waiting at the table.	**01**
4	Menu, cover, taking order & procedure for Service of Breakfast (Continental, American, English & Indian.	**10**
5	Breakfast tray & trolley setups.	**03**

6	Taking order & service of pot tea & coffee.	**02**
7	Menu, cover, taking order & procedure for full afternoon tea. (table, tray & trolley)	**04**
8	Menu, cover, taking order & procedure for High Tea. (table, tray & trolley)	**04**
9	**NON ALCOHOLIC BEVERAGES.** • Service of carbonated (fresh lime soda & soft drinks), refreshing (juice), nourishing (milk shakes)	**02**
10	• Procedure of service of tea. (tea bags, envelop, camomile & jasmine).	**02**
11	• Procedure of service of coffee (instant, plunger, filter, cappuccino & ristretto)	**02**
12	**CHAPTER 3. TOBACCO** Procedure of Service of cigars and cigarettes.	**02**
13	**CHAPTER 4. SIMPLE CONTROL SYSTEMS.** Writing of manual food check (KOT, suivant, supplement, retour en place, accident & Non chargeable)	**04**
14	Guest lecture on food & beverage controls After the lecture the student is required to submit a report.	**04**
	TOTAL PRACTICAL HOURS	**60**

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15

Total	60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a menu to compile and laying table for it.
- Assessment will be done as follows

Journal	Grooming	Service of Food & Non-Alcoholic Beverages	Menu Planning	Cover laying	Viva - voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

FRONT OFFICE SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	FRONT OFFICE II(USHO 203)
Course Code	Title	Credits	
USHO203	FRONT OFFICE-II	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II– 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:
At the end of semester II:-

The student should be able to understand the concept and functioning of room reservations, Reception and Guest services.

Contents of syllabus for USHO 203

Semester II – 15 weeks

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**RESERVATIONS** • Sources of Reservations • Modes of Reservations • Types of Reservations • Systems of reservations • Overbooking • Job Description of Reservation Personnel	15
II.	**RECEPTION** • Profiling the guest • Guest Registration Process • Regular and Non Regular Guest • 'C'Form & 'F' From	15

III.	**GUEST SERVICES** • Handling Guest Mail • Message Handling • Custody and Handling of Keys • Guest Paging • Safe Deposit Locker • Guest Room Change • Custody of Deposited Luggage	15
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

Name of the book	Author	Publisher	Place of Publication
Jatashankar Tiwari	Front Office Management	Oxford University Press	New Delhi
Andrews, Sudhir	Hotel Front Office Training Manual	The Tata M'cGraw Hill	New Delhi
Kasavana, Michael & Brooks, Richard	Managing Front Office Operations	AHMA	USA
Baker & Bradley	Principles of Hotel front Office Operations	Cassell	London
Deveau, insley & deveav, Patricia	Front Office Management and Operations (2)	Prentice Hall	NEW JERSEY
Bullied, An Ritchie, Caroline	Reception	Stanley Thornes	london
Chakravarti, B.K.	Front Office Management In Hotel	BNS Publishers	New Delhi
Braham, Bruce	Hotel Front Office	Hutchinson	London
Ford, Robert & Heaton, Cherrill	Managing the guest Experience	Delmar Publishers	London
Bardi,James	Hotel Front office Management	John wiley & sons	new Jersey
Aggarwal.Ravi	Hotel front Office	sublime Publications	jaipur
Huyton Jeremy & Baker Sue	Case Studies in Rooms Operations and Management	Hospitality Press P Ltd.	Melbourne
Bhatnagar S.K.	Front office Management	Frank Bros & Co.	New delhi
Andrews, Sudhir	Hotel Front Office Training Manual(latest	The Tata M'cGraw Hill	New delhi

	ed)		
Chakravarti B.K.	Front Office Management in Hotel	CBS Publisher	New Delhi
Chakravarti B.K.	Concept of Front Office Management	APH Publishing	New Delhi
	India(Tourist Guide)	Lonely Planet	

FRONT OFFICE SEMESTER - II (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1	Indian States and Union Territories – Capital and Their regional languages	
2	Fact sheet of 5 star hotels in Mumbai	
3	Website Review of Hotels in Mumbai	

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15

Total	60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

HOUSEKEEPING SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Housekeeping II(USHO 204)
Course Code	Title	Credits	
USHO204	Housekeeping-II	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02	

OBJECTIVES:
At the end of semester II:-

- The student will be able to list and explain the various operational areas, procedures and formats of the housekeeping department.
- The student will be able to enlist and implement Standard Operating Procedures (SOP's) for routine cleaning procedures of various guest areas.

Contents of syllabus for USHO 204

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I.	**1. CLEANING OF DIFFERENT AREAS** 1.1 Safe & Hygiene Cleaning 1.2 Principles & Factors Responsible for Cleaning 1.3 Types of Cleaning 1.4 Public Area Cleaning 1.5 Room Cleaning- Occupied, Departure & Vacant 1.6 Under Repair Room 1.7 Glossary	15
II.	**1. TYPES OF ROOM SERVICES** 1.1 Morning, Evening Service & Special Services	03
	2. MAIDS SERVICE ROOM / HOUSE KEEPING PANTRY 2.1 Location 2.2 Layout 2.3 Setting up a Maids Trolley	04

	3. GUEST ROOM SUPPLIES & AMENITIES 3.1 Standard, Regular, VIP 3.2 Standard Contents of a Guest Room	04
	4. FORMATS USED IN THE HOUSEKEEPING DEPARTMENT 4.1 Lost and Found Register 4.2 Lost and Found Slip 4.3 Gate Pass 4.4 Key Control Register 4.5 Guest Message Register/ Call Register 4.6 Housekeeping Room Status Report 4.6.1 Floor Supervisors Report 4.6.2 Control Desk Rooms Report (consolidated) 4.7 Departure / Clearance Report 4.8 Housekeeping Room Inspection Checklist / Maids Report 4.9 Log Book 4.10 Missing / Damaged Property Register 4.11 Maintenance Register 4.12 Spring Cleaning / Deep Cleaning Format 4.13 Special Cleaning Format	04
III.	**1. LOST & FOUND** 1.1 Procedure & Records	04
	2. KEY & KEY CONTROLS	02
	3. SITUATION HANDLING 3.1 How to enter a guest room - if the guest is sleeping in the room - if the guest is in the bathroom - if the guest in the room is inappropriately dressed 3.2 Maintenance Complaints 3.3 Opening of a room for guest 3.4 Room Status Discrepancy 3.5 Handling reportable situations - DND - DL - Scanty Baggage - No Baggage - Sleep Out - Suspicious Person - Extra Person	06
	4. PEST CONTROL 4.1 Prevention and control of commonly found pests – - Mosquitoes - white ants / termites - Flies - spiders - bed-bugs - rodents - cockroaches - wood borers - lizards - pigeons	03
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

1. Hotel Housekeeping Operations and Management – G. Raghubalan & Smritee Raghubalan – Oxford University Press.
2. Housekeeping Operations, Design and Management – Malini Singh & Jaya B. George – Jaico Publications.
3. Housekeeping Management – Margaret Kappa, Aleta Nitschken, Patricia B. Schappert – A.H. & L.A.
4. Hotel Hostel and Hospital Housekeeping – Joan Branson & Margaret Lennox –
5. Hotel Housekeeping Management & Operations – Sudhir Andrew – McGraw Hill Companies.

HOUSEKEEPING SEMESTER – II (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any 2.

SR. NO.	TOPIC FOR ASSIGNMENT	MARKS
1.	Different types of Cleaning Equipments with their brands, price and capacity **OR** Different types of Cleaning Agents with their brands, price and dilution ratio	10 10
2.	Composition, price, use and care and maintenance of different surfaces used in the hospitality industry (any 1 surface per student) - Marble - Granite - Kota - Ceramics - Stone - Wood - Vinyl - Glass - Kadappa - Rubber - Vitrified Tiles - Mosaic	10

Scheme of Examination (Theory)

(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Rooms Division Management –II (Practical)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	RDM-II Practical-USHO205
Course Code	Title	Credits	
USHO205	RDM-Practical-II	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	--	4					
Credit	--	2					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
--	--	--	--	--	4	60	10	02	--

Contents of syllabus for USHO 205

FRONT OFFICE PRACTICAL – II

Sr.	Topic	Hours
1	Taking down a room reservation	8
2	Check in procedure	8
3	Check out procedure	8
4	Escorting a guest	6
	TOTAL PRACTICAL HOURS	**30**

HOUSEKEEPING PRACTICAL – II

SR. NO.	TOPIC	HOURS
1.	Bed making by the Traditional method, making bed with a duvet, summer bed, turn down service, foot fold etc – Explanation and demo	06
2.	Bed making - practice	08
3.	Guest room Cleaning	04
4.	Bath Room Cleaning	04
5.	Carpet Cleaning – Spot cleaning and Vacuuming	02
6.	Telephone Cleaning	02
7.	Leather and Rexene cleaning	02
8.	Painted surface cleaning – spot cleaning	02
	TOTAL PRACTICAL HOURS	**30**

(a) Semester end examination (Pattern of Question Paper):-

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a 2 activities bed making and polishing or special cleaning of any surface or area
- Assessment will be done as follows

Journal	Grooming	Work sheet	Activity One	Activity Two	Viva-Voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

COMMUNICATION SKILLS (ENGLISH & FRENCH)

LANGUAGE SKILLS – 45 Hours

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Communication Skills –II USHO206
Course Code	Title	Credits	
USHO 206	Communication Skills (English and French)	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

	Unit 1	
1	**CONCEPT OF COMMUNICATION**	
	1.1 Process of Communication /	4 Hours
	1.2 Feed Back	
	1.3 Methods of Communication – Verbal / Non-Verbal	
	1.4 Channels of communication	
	1.5 Barriers of Communication	
2	**ORGANIZATIONAL COMMUNICATION**	
	2.1 Upward, downward, lateral communication and their purposes functions, grapevine	2 Hours
	2.2 Written communication – Memos, Circulars, notices	
	French	
1	Time, At the Office in a restaurant, Asking direction	9 Hours
UNIT 1-15 TEACHING HOURS		
Unit -2		

	BUSINESS COMMUNICATION	
1	1.1 Planning the right look of a letter	5 Hours
	1.2 Types of letters- quotations, orders, claim and adjustment, sales, application, complaint / apology	
	REPORT WRITING	
2	2.1 Types of Reports	
	2.2 Structure of a report	
	2.3 Types of Reports	
	(French)	
1	Receipes-put in the correct order, Translate to English, Making Tea, Coffee, Bechamel,Veloute, Simple soups and salads	10 Hours
2	Culinary Terms	
	UNIT 2-15 TEACHING HOURS	
	Unit -3	
1	**GROUP COMMUNICATION**	
	1.1 Types of meetings /Advantages and Disadvantages	2 Hours
	1.2 Participants Responsibilities / Brain Storming	
	1.3 Structure of a meeting – Agenda and Minutes	
2	**PRESENTATION**	
	2.1 Making effective presentation /Speaker's appearance and personality	2 Hours
	2.2 Using Visual aids	
3	**INTERVIEWS**	
	3.1 Purpose / Types	2 Hours
	3.2 Candidate's preparation – GD / PI	
	(French)	7 Hours
1	French Basic Conversation and Translation of Passages from French to English	
	UNIT 3-15 TEACHING HOURS	
	Total Theory Hours	**45 Hours**

REFERENCE (English)

•Business Communication – Meenakshi Raman and Prakash Singh
•Business Correspondence and Report writing – R.K.Sharma and Krishna Mohan
•Business Communication – Chaturvedi
•High School English – Wren and Martin
•Understanding Human Communication – Ronald B Adler and George Rodman (with CD)
•Skills Development for Business and Management Students - Kevin Gallagher
•Personality and Skills Development – Barun Mitra (with CD)
•Technical Communication , 2nd Edition – Meenakshi Raman (with CD)

REFERENCES (French)

●E. J. Neather - Mastering of French I & II - Macmillan - 1982
●Bridget Anfossy - Speak French Today - Augo - 1991
●R. Diez La Cortina - Cortina's French Method - Grosset & Dunlop - 1988
●Mathuram Bondo - Modern French Course - D. C. Heath & Co. -.1983.
●Course de langue et civilizaiion Franchises. G. Mauger.
●Oxford French Dictionary

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments / projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ group discussion/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities & teamwork demonstrated through organizing co-curricular activities, etc.	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

PRINCIPLES OF HOTEL ACCOUNTANCY

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	PRINCIPLES OF HOTEL ACCOUNTANCY (USHO 207)
Course Code	Title	Credits	
USHO 207	PRINCIPLES OF HOTEL ACCOUNTANCY	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

Contents of syllabus for USHO 207

SEMESTER – II

Sr.	Topic	Hr
	Unit – I (15 Hours)	
1.	**Introduction to Accounting & Double Entry Book-Keeping**	**3**
1.1	Terms (Account , Capital, Asset, Liabilities, Drawing, Goods, Debtor, Creditors, Solvent, Insolvent, Purchases, Sales, Bad debts)	
1.2	Nature, Importance, Objectives & advantages of accounting	
1.3	Nature & advantages of Double Entry Book –Keeping	
1.4	Classification of accounts.	
1.5	Applying Debit & Credit rules to a Transaction	
2.	**Journal**	**4**
2.1	Importance of Journal & its format	
2.2	Narrations	
2.3	Journalising simple & compound entries	
2.4	Practical Problems	
3.	**Ledger**	**3**
3.1	Importance of ledger & its format	
3.2	Posting entries & balancing ledger accounts	

4.	**CASH BOOK**	**5**
4.1	Triple Column Cash Book	
4.2	Contra Entries	
4.3	Practical Problems	
4.4	Types of Bank Account, Types of Cheques	
	UNIT -II	
1	**Subsidiary Books**	**3**
1.1	Advantages of subsidiary Books	
1.2	Types of subsidiary Books	
1.3	Simple Practical problems on Purchase Book, Sales Book, Purchase – Return Book & Sales Return Book.	
2.	**Elements of cost & concept of Profit**	**6**
2.1	Material cost (food & Beverage), Labour cost, overhead cost, Gross Profit, After wage profit & Net Profit.	
2.2	Practical Problems	
3.	**Bank Reconciliation Statement**	**5**
3.1	Purpose of Preparing B.R.S	
3.2	Advantages	
3.3	Simple Practical Problems	
4	**Trial Balance**	**1**
4.1	Importance of Trial Balance	
4.2	Net format of T.B	
	UNIT –III	
1.	**Capital & Revenue Expenditure & Deferred Revenue Expenditure**	**1**
1.1	Nature of Capital & Revenue Expenditure	
1.2	Nature of Deferred Revenue Expenditure	
1.3	Examples	
2.	**Final Accounts of sole – Trader (with Adjustments)**	**10**
2.1	Importance, Purpose & Need for preparation of Final accounts.	
2.2	Practical Problems covering the following adjustments:- Closing stock Prepaid Expenses Outstanding Expenses Depreciation Bad Debts & Provision for Bad debts	
3.	**Break Even Analysis :-**	**4**
3.1	Variable cost, fixed cost & semi variable cost.	
3.2	Contribution, Profit/Volume Ratio & Break Even Point.	
3.3	Simple Practical Problems	

Scheme of Examination (Theory)
(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1, 2, 3	15
Q - 2	1	15
Q - 3	2	15
Q - 4	3	15
	Total	**60**

- Question no. 1 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.
- Question 2, 3 & 4 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

PRINCIPLES OF MANAGEMENT
SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	PRINCIPLES OF MANAGEMENT (USHO 208)
Course Code	Title	Credits	
USHO208	PRINCIPLES OF MANAGEMENT	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

Contents of syllabus for USHO 208

OBJECTIVES:
At the end of semester II:-

- Programme activities and lecture to learn about emerging Indian Corporate World and Global Phenomenon with stress upon hospitality industry.
- To train the student as future managers and make them understand the working of an organisation.
- Teaching through PowerPoint presentations, case studies, activities, brain storming sessions, SWOT/PEST analysis etc.
- Trying to bridge the gap between management studies and real corporate world through real time stories from newspapers, journals and business magazines, books.
- Encouraging students to read more so as to refine their analytical power and sharpen business sense and become more aware of the business environment.
- Opportunity to participate in business discussions, article/book reviews and presentations

Semester II – 15 weeks

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I.	**1. INTRODUCTION TO MANAGEMENT** 1.1 Evolution of management 1.2 Definitions and Importance of Management 1.3 Management as a Science and Art 1.4 Principles of Management (14 principles of Fayol) 1.5 Levels of Management and their functions 1.6 Managerial skills 1.7 Functions of Management 1.8 Process of communication 1.9 Business communication **2. PLANNING** 2.1 Definition and Characteristics 2.2 Planning Process (Steps in Planning) 2.3 Essentials of a Good Plan 2.4 Vision and mission Statements 2.5 Planning with relation to hospitality industry 2.6 Meaning and Process of MBO 2.7 Meaning and steps in Decision Making	15
II	**3. ORGANIZING** 3.1 Meaning and Process of Organizing 3.2 Formal and Informal Organization and Distinction 3.3 Span of control (Meaning and Importance) 3.4 Tall and Flat Organization 3.5 Definition and Process of Delegation 3.6 Centralization and Decentralization of Authority 3.7 Departmentation and Basis of Departmentation 3.8 Organisation chart 3.9 Closed vs open system of organisation 3.10 Line and Staff organization **4. STAFFING AND COORDINATION** 4.1 Meaning and Imporance of Staffing 4.2 Internal and External Sources of Recruitment 4.3 Coordination - As an essence of Management 4.4 Principles of Coordination	15

III	**5. DIRECTING, MOTIVATING AND LEADING** 5.1 Meaning and importance of Directing 5.2 Element of Directions / Components 5.3 Definition of Motivation and factors 5.4 Maslow's Need Hierarchy Theory 5.5 Mc Gregor's Theory X and Theroy Y 5.6 Definition of Leadership and Leader 5.7 Qualities of a Leader 5.8 Leadership Styles 5.9 Leaders from hospitality industry 5.10 Leadership theory **6. CONTROLLING** 6.1 Meaning 6.2 Steps in Control process 6.3 Types of control:feed forward,feedback,concurrent 6.4 Time Management	15

REFERENCES

- Principles of Management – P.C.Tripati and Reddy
- Management Principles and Practices – Dr.M.Sakthivel Murugan
- Management and Organizational Development - Micheal Vaz and Meeta Seta
- Principles of Management-Harold Koontz

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15

Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

Semester II - B.Sc. Hospitality Studies

Course Code	Subject	Class Room Instruction Face to Face									Notional				Credits			
		Per Week			Per Sem			Per Sem Hrs										
		L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
USHO201	Food Production & Patisserie II	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO202	Food & Beverage Service II	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO203	Front Office II	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO204	Housekeeping II	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO205	Rooms Division Management(Practicals) II	-	4	-	-	60	-	-	60	-	-	10		70	-	2	-	2
USHO206	Communication Skill II (English & French)	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO207	Principles of Hotel Accountancy	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO208	Principles of Management	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
	Total	21	12	-	315	180	-	315	180	-	175	30	-	700	14	6	-	20

L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial

Notional includes time spent in library / home / other institutions for preparation and writing of assignments, quizes, open book test, journal, case studies, project, practical, field work, excursion, etc.

FOOD PRODUCTION & PATISSERIE–II (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Food Production & Patisserie -II(USHO 201)
Course Code	Title	Credits	
USHO102	Food Production & Patisserie-I	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Class Room Instruction Face to Face									Notional				Credits			
Per Week			Per Sem			Per Sem Hrs										
L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4

OBJECTIVES:

- To develop a keen interest in food production and to enable students to experiment, innovate and progressively produce a variety of preparation / dishes.
- To gain confidence to adapt to the technical skills and the art of preparing different menus, Indian as well as Continental.
- By the end of the second semester students should be confident enough in their skills which would boost their morale to take up the challenge of bulk cookery in the third and fourth semester.

Contents of syllabus for USHO 201

UNIT NO.	Ch. No.	TOPIC	Hrs.
01	1	**Culinary Terms with Explanation & Examples**	03
	2	**Layout of Kitchen**	03
		2.1 General Layout of the Kitchen	
		2.2 Receiving Area	

		2.3 Storage 2.4 Wash up	
	3	**Soups** 3.1 Classification with Examples 3.2 Consommé and Garnishes with their names (Any 10 common name)	**02**
	4	**Fish Mongery** 4.1 Classification of Fish with examples 4.2 Selection, Cooking & Storage of Fish 4.3 Local Names of Fin Fish and Shell Fish 4.4 Cuts of Fish	**02**
	5	**Poultry** 5.1 Cuts of Poultry 5.2 Selection and Uses of Cuts	**02**
	6	**Rice, Cereals & Pulses** 6.1 Introduction, Classification of Cereals and Pulses 6.2 Varieties of Rice and Byproducts 6.3 Nutritive Value of Various Cereals 6.4 Sprouts and Uses	**03**
UNIT NO.	**Ch. No.**	**TOPIC**	**Hrs.**
02	**7**	**Meat** 7.1 Introduction to Meat Cookery 7.2 Cuts of Lamb, Pork, Beef / Veal 7.3 Variety of Meats / Offal 7.4 Selection and Storage of Meats	**04**
	8	**Milk and Milk Products** 8.1 Introduction, Processing of Milk, Pasteurization**,** Homogenization, Milk in Various Forms e.g. Toned, Powder, Skimmed, Condensed & Evaporated. 8.2 Cream – Introduction, Processing & Types 8.3 Butter – Introduction, Processing & Types 8.4 Cheese – Introduction, Classification with Examples, Processing, Types, Cooking with Cheese and Uses.	**05**
	9	**Bakery & Pastry** **Shortening – Fats and Oils** 9.1 Saturated and Un-saturated Fats 9.2 Advantages & Disadvantages of Using Fats 9.3 Varieties of Shortening	**03**
	10	**Tea & Coffee** 10.1 Introduction 10.2 Producing Regions/Country 10.3 Types and Methods of Preparation 10.4 Popular Brands and Variety Available	**02**
	11	**Thickening Agents used in Indian Gravies** 11.1 Role of Thickening Agents	**01**

UNIT NO.	Ch. No.	TOPIC	Hrs.
03	12	**Indian Cookery**	03
		12.1 History of Spices and Trade Routes	
		12.2 Basic Spices, Condiments and Masalas	
		12.3 Role of Spices in Indian Cuisine	
		12.4 Indian Equivalent name	
		12.5 Blending of Spices	
		12.6 Concept of Wet and Dry Masalas	
		12.7 Regional Varieties of Basic Masalas	
		12.8 Basic Composition of Some Important Masalas	
	13	**Menu Planning**	02
		13.1 History of Menu	
		13.2 Types of Menu	
		13.3 Menu Planning Principles	
	14	**Bakery & Pastry**	04
		14.1 **Pastries**	
		• Classification of Pastries	
		• Varieties	
		• Role of Each Ingredient	
		• Baking Temperature and Time of Each Pastry	
		14.2 **Pastry Cream**	03
		• Basic Pastry Cream	
		• Use in Confectionery	
		• Preparation and Care in Production	
		14.3 **Cocoa and Chocolate**	
		• Introduction, Production and Manufacture	03
		• Varieties of Chocolates	
		• Tempering of Chocolates	

Culinary Terms
(Explanation of the following Culinary Terms with examples)

1. Bhurta	2. Baghar	3. Bain Marie
4. Bisque	5. Bortsch	6. Brioche
7. Canapés	8. Choux	9. Cisel
10. Compote	11. Concasse	12. Condiments
13. Croissant	14. Darne	15. Force Meat
16. Garniture	17. Gateaux	18. Genoese
19. Hors d' oeuvre	20. Larding	21. Macedione
22. Matignon	23. Mousse	24. Mousseline
25. Panada	26. Paneer	27. Pimento
28. Khoya	29. Potage	30. Pot Pourri
31. Ragout	32. Rechauffe	33. Roe
34. Royal	35. Royale	36. Saffron
37. Sear	38. Seasoned Flour	39. Soufflé
40. Stew	41. Supreme	42. Kofta
43. Tronçon	44. Zest	

REFERENCE BOOKS

1. Parvinder S. Bali – Quantity Food Production and Indian Cuisine
2. Thangam Philip – Modern Cookery I & II – Orient Longman – 2001
3. Auguste Escoffier – Ma Cuisine – Hamlyn – 2000
4. Digvijay Singh – Cooking Delight of the Maharajas – Vakils, Feffer & Son's Ltd. – 1982
5. Philip Dowell & Adrian Barley – The Book of Ingredients – Mermaid Books – 1987
6. Wayne Gisslen – Professional Baking – John Wiley & Sons – 1994
7. Martha Day – Baking – Lorenz Books – 1999
8. M. J. Leto & Bode – The Larder Chef – Heinemann Publishing House – 1989
9. Parvinder S. Bali - Food Production Operations
10. Thangam E. Philip - Modern Cookery for Teaching and Trade - 4th Vol. - 1996
11. Krishna Arora - Theory of Cookery – 2nd – 1992
12. Wayne Gisselen - Professional Cooking – 4th – 1992
13. Wayne Gisselen - Professional Baking – 2nd – 1994
14. J. C. Dubey - Basic Bakery - 1st – 1992
15. Kinton Ceserani - Theory of Catering – 7th – 1996
16. Bernard Davis - Food Commodities - 4th – 1998
17. Daniel R. Stevenson - Basic Cookery The Process Approach - 5th - 1997

(Practical - Bakery)

Sr.	Topic
1	**Breads** • Cheese & Garlic Bread • French Bread • Brioche
2	**Pastries** • Flaky Pastry • Puff Pastry (Cheese Straws) • Quiche • Danish Pastry
3	**Cakes** • Yule Log • Fruit Cake • Chocolate Brownies • Marble Cake
4	**Cookies** • Peanut Cookies • Chocolate Chip Cookies • Coconut Macaroons
5	**Chocolate Rocks**

(Food Production Practical)

Sr.	Topic
1	**Suggested Menu Patterns** • Indian Menus • Continental Menus

PRACTICAL MENU

I	**Snack Menu**	
	Non-Veg	**Veg.**
	1. Chicken / Beef Burgers 2. Chicken Grilled Sandwich 3. Chicken Pizza 4. Kheema Samosa 5. Mince Meat Croquettes 6. Shami Kabab 7. Chicken Lollypop 8. Fish Fingers	1. Veg. Burger 2. Veg Grilled Sandwich 3. Veg. Pizza 4. Punjabi Samosa 5. Chutney Pattice 6. Chillie Cheese Toast 7. Aloo Chat 8. Wada
	Accompaniments: Green / Red / Tamarind Chutney, Tartare Sauce, Hot Garlic Sauce, Tomato Sauce	
II	**Salads**	
	1) Tossed Salad with French Dressing 2) Waldorf Salad 3) Palak / Pineaple / Anar Raita 4) Chicken Hawain Salad 5) Salad Caprese 6) Ceasar Salad	
III	**Soups**	
	1) Consommé Jacqueline / Celestine 2) Soupe à l' oignon à la François 3) Puree Lentils 4) Crème de Volaille 5) Soupe Cockie Leekie 6) Soupe Vichyssoise 7) Sea Food Chowder 8) Gazpacho 9) Mulligutwany	
IV	**Poisson**	
	1) Fried Fish with tartare Sauce 2) Grilled Fish with Hollandaise Sauce 3) Baked Fish in Provencale Sauce 4) Fillet de Pomfret Cubat 5) Goan Fish Curry	
V	**Poulet**	
	1) Poulet à la Rex 2) Poulet Sauté Mireille 3) Poulet Sauté Parmentier 4) Masala Roast Chicken 5) Murg Khorma	
VI	**Entrees**	
	1) Scotch Eggs 2) Spaghetti Bolognaise 3) Grilled Steaks with Pepper Sauce 4) Barbeque Pork Chops with Robert Sauce 5) Goulash de Boeuf à la Hongroise 6) Mutton Nilgiri Khorma	

	7) Mutton Rogan Josh	
VII	**Entremettes**	
	1) Mixed Vegetables Bhujiya 2) Baingan Bharta 3) Muttar Kumbh Masala 4) Courge Provencale 5) Corn and Pepper au gratin	6) Boquetier de Legumes 7) Aubergine à la Turque 8) Spaghetti with Mushroom & Cheese Sauce 9) Cheese and Cauliflower Soufflé 10) Baked Spinach
VIII	**Potatoes**	
	1) Pommes de terre Croquettes 2) Jacket baked Potatoes 3) Pommes Chateau 4) Pommes Marquise	5) Gratin de Pommes de terre Dauphinoise 6) Bubble and Squeak 7) Garlic & Herb Roast Potatoes 8) Soufflé de Pommes de Terre
IX	**Cereals & Pulses**	
	1) Aloo ki Tihari 2) Pea Pulao 3) Riz Pilaf 4) Makhani Dal 5) Dal Fry 6) Moong Dal with Palak	
X	**Rotis & Parathas**	
	1) Satpura Parathas 2) Dhakai Parathas 3) Missie Roti 4) Chapati	
XI	**Hot Dessert**	
	1) Gajar / Beetroot Halwa 2) Shahi Tukra 3) Christmas Pudding with Custard Sauce 4) Crêpe Suzette	
XII	**Cold Dessert**	
	1) Blancmange 2) Fruit Triffle 3) Chocolate Mousse 4) Diplomat Pudding 5) Chocolate / Vanilla Panacotta	

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination
(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
4	**Internal assessment**	20

(b) Semester end assessment - 30 marks

- Candidate will be given a menu comprising of 4 dishes.
- Indent sheet and plan of work sheet to be filled by the candidate of the menu he gets.
- He / she supposed to collect indents, prepare and present the dishes in the menu within stipulated time.
- Cleaning and securing equipments and working area is also to be done within stipulated time.

Assessment will be done as follows –

Journal	Indent Sheet & plan of work	Colour	Consistency	Taste	Texture	Viva-voce	Personal Grooming ,Cleaning
10	10	10	10	10	10	10	10

Marks obtained out of 80 shall be converted to out of 30 to the next integer for final calculation.

FOOD AND BEVERAGE SERVICE SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Food & Beverage Service-II(USHO 202)
Course Code	Title	Credits	
USHO202	Food & Beverage Service-II	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Semester II – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture + Practical
03	45	25	02		04	60	10	02		04

OBJECTIVES:

At the end of semester II the student will be able to identify:

- The different types of Menus and principles of menu planning.
- Sequence and course in the French classical menu also identify general accompaniments.
- Types, storage and service of Tobacco and Non alcoholic beverages.
- Simple control system followed in a restaurant.

Contents of syllabus for USHO 202

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. MEALS AND MENU PLANNING** 1.1 Menu – Origin, definition & objectives 1.2 Types of meals (Breakfast, Brunch, Lunch, Afternoon tea, High tea, Dinner) 1.3 Types of Menu	15

	a) A la carte b) Table d' hote c) Cyclic menu d) Banquet menu e) Carte du jour / plat du jour f) Californian menu g) Take-away Other types of menu a). Children's menu b). Club menu c). Ethnic menu d). Health menu e). Spa Menu, f). Ayurvedic Menu 1.4 Principles of Menu planning 1.5 Breakfast: English, Continental, American, Indian 1.6 Types of Tea Service: Full Afternoon Tea, High Tea.	
II.	**1. French Classical Menu:** 1.1 a. Sequence and Courses. b. General Accompaniments. 1.2 Ice creams: Types & categories of Ice creams	12
	2. TOBACCO a) Introduction to Cigars and cigarettes. b) Types of tobacco c) Shape, size, color & Brand names with country of origin.	03
III.	**1.1 NON ALCOHOLIC BEVERAGES** a. Definition of beverages b. Classification chart –alcoholic & non alcoholic drinks. c. Stimulating-Tea, Coffee & Cocoa, (origin, manufacture, Method of preparation, types & brands) d. Nourishing-health drinks e. Refreshing –juices, squashes, crushes, syrups & aerated water f. Table Water (origin, types & brands) & carbonated water.	06
	1.2 SIMPLE CONTROL SYSTEMS. a) Restaurant reservation system b) KOT Checking System c) Types of KOT / BOT	05

	d) Method of billing (manual & computerised)	
	GLOSSARY Aboyeur A la Carte A l'Anglaise A l'Orly Aperient water Allemande Brunch Banquet Buffet Froid Brasserie Bisques Batwina Brotsch Bouillabaisse Bills of fare Balsamic Vinegar Chalybeate water Chateaubriand Consomme Canapé Caesar Salad Charcuterie Corn on the cob Cranberry Sauce. Cayenne Pepper Cumberland Sauce. Café au lait Caviar Cyclic Menu Carte du jour Dessert Debarrasseur Entrée Escargots Entremets En cocotte Farineux Formage French Dressing Fruitarians Gravlax Gnocchi Hors-d'oeuvres Hûitres Humidor Horseradish Sauce. Kroupnich Kosher Legumes Lacto-Ovo Vegetarians Mineral water Malt Vinegar Menu Mousses Macaroni Mint Sauce Maitre d' hotel Nicoise Salad Natural Spring water Oeufs Olive Oil Potages Poisson Pates Parisienne Rouille Releve Rôti Sorbet Salade Savoureux Smoked Salmon Sur la plat Semolina Tofu Tabasco Sauce Tartare Sauce Table d'hôte TIPS Worcestershire Sauce	04
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

- Dennis Lillicrap, John Cousins and Robert Smith-
- Vijay Dhawan- Food and Beverage Service

- Peter Dias- The Steward-
- John Fuller & A.J. Currie-
- Sudhir Andrews- Food and Beverage Service-
- Bobby George-Food & Beverage Service-

FOOD AND BEVERAGE SERVICE SEMESTER - II(ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Planning a 13 course French classical menu with general accompaniments.	
2.	Planning of an a la carte menu of a Specialty Restaurant or coffee shop.	
3.	Planning of American and continental breakfast menu with appropriate layout.	
4.	List five types of Tea and Coffee , explaining the composition of each.	
5.	Formats of special food checks (KOT)	

FOOD & BEVERAGE SERVICE SEMESTER – 2
(PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	**MEALS AND MENU PLANNING** • Menu Planning (Planning and compilation of 4,5,6 courses menu. lunch and dinner, English & French) Table d hote menu (cover, taking order & service)	**12**
2	• Types of table service o Silver service/ English service o American/ Plated o Family o Russian o French/ butler	**08**
3	Points to be considered while waiting at the table.	**01**
4	Menu, cover, taking order & procedure for Service of Breakfast (Continental, American, English & Indian.	**10**
5	Breakfast tray & trolley setups.	**03**

6	Taking order & service of pot tea & coffee.	**02**
7	Menu, cover, taking order & procedure for full afternoon tea. (table, tray & trolley)	**04**
8	Menu, cover, taking order & procedure for High Tea. (table, tray & trolley)	**04**
9	**NON ALCOHOLIC BEVERAGES.** • Service of carbonated (fresh lime soda & soft drinks), refreshing (juice), nourishing (milk shakes)	**02**
10	• Procedure of service of tea. (tea bags, envelop, camomile & jasmine).	**02**
11	• Procedure of service of coffee (instant, plunger, filter, cappuccino & ristretto)	**02**
12	**CHAPTER 3. TOBACCO** Procedure of Service of cigars and cigarettes.	**02**
13	**CHAPTER 4. SIMPLE CONTROL SYSTEMS.** Writing of manual food check (KOT, suivant, supplement, retour en place, accident & Non chargeable)	**04**
14	Guest lecture on food & beverage controls After the lecture the student is required to submit a report.	**04**
	TOTAL PRACTICAL HOURS	**60**

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15

Total	60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a menu to compile and laying table for it.
- Assessment will be done as follows

Journal	Grooming	Service of Food & Non-Alcoholic Beverages	Menu Planning	Cover laying	Viva - voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

FRONT OFFICE SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	FRONT OFFICE II(USHO 203)
Course Code	Title	Credits	
USHO203	FRONT OFFICE-II	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II– 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:
At the end of semester II:-

The student should be able to understand the concept and functioning of room reservations, Reception and Guest services.

Contents of syllabus for USHO 203

Semester II – 15 weeks

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**RESERVATIONS** • Sources of Reservations • Modes of Reservations • Types of Reservations • Systems of reservations • Overbooking • Job Description of Reservation Personnel	15
II.	**RECEPTION** • Profiling the guest • Guest Registration Process • Regular and Non Regular Guest • 'C'Form & 'F' From	15

III.	**GUEST SERVICES** • Handling Guest Mail • Message Handling • Custody and Handling of Keys • Guest Paging • Safe Deposit Locker • Guest Room Change • Custody of Deposited Luggage	15
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

Name of the book	Author	Publisher	Place of Publication
Jatashankar Tiwari	Front Office Management	Oxford University Press	New Delhi
Andrews, Sudhir	Hotel Front Office Training Manual	The Tata M'cGraw Hill	New Delhi
Kasavana, Michael & Brooks, Richard	Managing Front Office Operations	AHMA	USA
Baker & Bradley	Principles of Hotel front Office Operations	Cassell	London
Deveau, insley & deveav, Patricia	Front Office Management and Operations (2)	Prentice Hall	NEW JERSEY
Bullied, An Ritchie, Caroline	Reception	Stanley Thornes	london
Chakravarti, B.K.	Front Office Management In Hotel	BNS Publishers	New Delhi
Braham, Bruce	Hotel Front Office	Hutchinson	London
Ford, Robert & Heaton, Cherrill	Managing the guest Experience	Delmar Publishers	London
Bardi,James	Hotel Front office Management	John wiley & sons	new Jersey
Aggarwal.Ravi	Hotel front Office	sublime Publications	jaipur
Huyton Jeremy & Baker Sue	Case Studies in Rooms Operations and Management	Hospitality Press P Ltd.	Melbourne
Bhatnagar S.K.	Front office Management	Frank Bros & Co.	New delhi
Andrews, Sudhir	Hotel Front Office Training Manual(latest	The Tata M'cGraw Hill	New delhi

	ed)		
Chakravarti B.K.	Front Office Management in Hotel	CBS Publisher	New Delhi
Chakravarti B.K.	Concept of Front Office Management	APH Publishing	New Delhi
	India(Tourist Guide)	Lonely Planet	

FRONT OFFICE SEMESTER - II (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1	Indian States and Union Territories – Capital and Their regional languages	
2	Fact sheet of 5 star hotels in Mumbai	
3	Website Review of Hotels in Mumbai	

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15

Total	60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

HOUSEKEEPING SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Housekeeping II(USHO 204)
Course Code	Title	Credits	
USHO204	Housekeeping-II	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02	

OBJECTIVES:
At the end of semester II:-

- The student will be able to list and explain the various operational areas, procedures and formats of the housekeeping department.
- The student will be able to enlist and implement Standard Operating Procedures (SOP's) for routine cleaning procedures of various guest areas.

Contents of syllabus for USHO 204

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I.	**1. CLEANING OF DIFFERENT AREAS** 1.1 Safe & Hygiene Cleaning 1.2 Principles & Factors Responsible for Cleaning 1.3 Types of Cleaning 1.4 Public Area Cleaning 1.5 Room Cleaning- Occupied, Departure & Vacant 1.6 Under Repair Room 1.7 Glossary	15
II.	**1. TYPES OF ROOM SERVICES** 1.1 Morning, Evening Service & Special Services	03
	2. MAIDS SERVICE ROOM / HOUSE KEEPING PANTRY 2.1 Location 2.2 Layout 2.3 Setting up a Maids Trolley	04

	3. GUEST ROOM SUPPLIES & AMENITIES 3.1 Standard, Regular, VIP 3.2 Standard Contents of a Guest Room	04
	4. FORMATS USED IN THE HOUSEKEEPING DEPARTMENT 4.1 Lost and Found Register 4.2 Lost and Found Slip 4.3 Gate Pass 4.4 Key Control Register 4.5 Guest Message Register/ Call Register 4.6 Housekeeping Room Status Report 4.6.1 Floor Supervisors Report 4.6.2 Control Desk Rooms Report (consolidated) 4.7 Departure / Clearance Report 4.8 Housekeeping Room Inspection Checklist / Maids Report 4.9 Log Book 4.10 Missing / Damaged Property Register 4.11 Maintenance Register 4.12 Spring Cleaning / Deep Cleaning Format 4.13 Special Cleaning Format	04
III.	**1. LOST & FOUND** 1.1 Procedure & Records	04
	2. KEY & KEY CONTROLS	02
	3. SITUATION HANDLING 3.1 How to enter a guest room - if the guest is sleeping in the room - if the guest is in the bathroom - if the guest in the room is inappropriately dressed 3.2 Maintenance Complaints 3.3 Opening of a room for guest 3.4 Room Status Discrepancy 3.5 Handling reportable situations - DND - DL - Scanty Baggage - No Baggage - Sleep Out - Suspicious Person - Extra Person	06
	4. PEST CONTROL 4.1 Prevention and control of commonly found pests – - Mosquitoes - white ants / termites - Flies - spiders - bed-bugs - rodents - cockroaches - wood borers - lizards - pigeons	03
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

1. Hotel Housekeeping Operations and Management – G. Raghubalan & Smritee Raghubalan – Oxford University Press.
2. Housekeeping Operations, Design and Management – Malini Singh & Jaya B. George – Jaico Publications.
3. Housekeeping Management – Margaret Kappa, Aleta Nitschken, Patricia B. Schappert – A.H. & L.A.
4. Hotel Hostel and Hospital Housekeeping – Joan Branson & Margaret Lennox –
5. Hotel Housekeeping Management & Operations – Sudhir Andrew – McGraw Hill Companies.

HOUSEKEEPING SEMESTER – II (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any 2.

SR. NO.	TOPIC FOR ASSIGNMENT	MARKS
1.	Different types of Cleaning Equipments with their brands, price and capacity **OR** Different types of Cleaning Agents with their brands, price and dilution ratio	10 10
2.	Composition, price, use and care and maintenance of different surfaces used in the hospitality industry (any 1 surface per student) - Marble - Granite - Kota - Ceramics - Stone - Wood - Vinyl - Glass - Kadappa - Rubber - Vitrified Tiles - Mosaic	10

Scheme of Examination (Theory)

(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Rooms Division Management –II (Practical)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	RDM-II Practical-USHO205
Course Code	Title	Credits	
USHO205	RDM-Practical-II	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	--	4					
Credit	--	2					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
--	--	--	--	--	4	60	10	02	--

Contents of syllabus for USHO 205

FRONT OFFICE PRACTICAL – II

Sr.	Topic	Hours
1	Taking down a room reservation	8
2	Check in procedure	8
3	Check out procedure	8
4	Escorting a guest	6
	TOTAL PRACTICAL HOURS	**30**

HOUSEKEEPING PRACTICAL – II

SR. NO.	TOPIC	HOURS
1.	Bed making by the Traditional method, making bed with a duvet, summer bed, turn down service, foot fold etc – Explanation and demo	06
2.	Bed making - practice	08
3.	Guest room Cleaning	04
4.	Bath Room Cleaning	04
5.	Carpet Cleaning – Spot cleaning and Vacuuming	02
6.	Telephone Cleaning	02
7.	Leather and Rexene cleaning	02
8.	Painted surface cleaning – spot cleaning	02
	TOTAL PRACTICAL HOURS	**30**

(a) Semester end examination (Pattern of Question Paper):-

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a 2 activities bed making and polishing or special cleaning of any surface or area
- Assessment will be done as follows

Journal	Grooming	Work sheet	Activity One	Activity Two	Viva-Voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

COMMUNICATION SKILLS (ENGLISH & FRENCH)

LANGUAGE SKILLS – 45 Hours

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	Communication Skills –II USHO206
Course Code	Title	Credits	
USHO 206	Communication Skills (English and French)	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

	Unit 1	
1	**CONCEPT OF COMMUNICATION**	
	1.1 Process of Communication /	4 Hours
	1.2 Feed Back	
	1.3 Methods of Communication – Verbal / Non-Verbal	
	1.4 Channels of communication	
	1.5 Barriers of Communication	
2	**ORGANIZATIONAL COMMUNICATION**	
	2.1 Upward, downward, lateral communication and their purposes functions, grapevine	2 Hours
	2.2 Written communication – Memos, Circulars, notices	
	French	
1	Time, At the Office in a restaurant, Asking direction	9 Hours
UNIT 1-15 TEACHING HOURS		
Unit -2		

	BUSINESS COMMUNICATION	
1	1.1 Planning the right look of a letter	5 Hours
	1.2 Types of letters- quotations, orders, claim and adjustment, sales, application, complaint / apology	
	REPORT WRITING	
2	2.1 Types of Reports	
	2.2 Structure of a report	
	2.3 Types of Reports	
	(French)	
1	Receipes-put in the correct order, Translate to English, Making Tea, Coffee, Bechamel,Veloute, Simple soups and salads	10 Hours
2	Culinary Terms	
	UNIT 2-15 TEACHING HOURS	
	Unit -3	
1	**GROUP COMMUNICATION**	
	1.1 Types of meetings /Advantages and Disadvantages	2 Hours
	1.2 Participants Responsibilities / Brain Storming	
	1.3 Structure of a meeting – Agenda and Minutes	
2	**PRESENTATION**	
	2.1 Making effective presentation /Speaker's appearance and personality	2 Hours
	2.2 Using Visual aids	
3	**INTERVIEWS**	
	3.1 Purpose / Types	2 Hours
	3.2 Candidate's preparation – GD / PI	
	(French)	7 Hours
1	French Basic Conversation and Translation of Passages from French to English	
	UNIT 3-15 TEACHING HOURS	
	Total Theory Hours	**45 Hours**

REFERENCE (English)

•Business Communication – Meenakshi Raman and Prakash Singh
•Business Correspondence and Report writing – R.K.Sharma and Krishna Mohan
•Business Communication – Chaturvedi
•High School English – Wren and Martin
•Understanding Human Communication – Ronald B Adler and George Rodman (with CD)
•Skills Development for Business and Management Students - Kevin Gallagher
•Personality and Skills Development – Barun Mitra (with CD)
•Technical Communication , 2nd Edition – Meenakshi Raman (with CD)

REFERENCES (French)

●E. J. Neather - Mastering of French I & II - Macmillan - 1982
●Bridget Anfossy - Speak French Today - Augo - 1991
●R. Diez La Cortina - Cortina's French Method - Grosset & Dunlop - 1988
●Mathuram Bondo - Modern French Course - D. C. Heath & Co. -.1983.
●Course de langue et civilizaiion Franchises. G. Mauger.
●Oxford French Dictionary

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments / projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ group discussion/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities & teamwork demonstrated through organizing co-curricular activities, etc.	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

PRINCIPLES OF HOTEL ACCOUNTANCY

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	PRINCIPLES OF HOTEL ACCOUNTANCY (USHO 207)
Course Code	Title	Credits	
USHO 207	PRINCIPLES OF HOTEL ACCOUNTANCY	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

Contents of syllabus for USHO 207

SEMESTER – II

Sr.	Topic	Hr
	Unit – I (15 Hours)	
1.	**Introduction to Accounting & Double Entry Book-Keeping**	**3**
1.1	Terms (Account , Capital, Asset, Liabilities, Drawing, Goods, Debtor, Creditors, Solvent, Insolvent, Purchases, Sales, Bad debts)	
1.2	Nature, Importance, Objectives & advantages of accounting	
1.3	Nature & advantages of Double Entry Book –Keeping	
1.4	Classification of accounts.	
1.5	Applying Debit & Credit rules to a Transaction	
2.	**Journal**	**4**
2.1	Importance of Journal & its format	
2.2	Narrations	
2.3	Journalising simple & compound entries	
2.4	Practical Problems	
3.	**Ledger**	**3**
3.1	Importance of ledger & its format	
3.2	Posting entries & balancing ledger accounts	

4.	**CASH BOOK**	**5**
4.1	Triple Column Cash Book	
4.2	Contra Entries	
4.3	Practical Problems	
4.4	Types of Bank Account, Types of Cheques	
	UNIT -II	
1	**Subsidiary Books**	**3**
1.1	Advantages of subsidiary Books	
1.2	Types of subsidiary Books	
1.3	Simple Practical problems on Purchase Book, Sales Book, Purchase – Return Book & Sales Return Book.	
2.	**Elements of cost & concept of Profit**	**6**
2.1	Material cost (food & Beverage), Labour cost, overhead cost, Gross Profit, After wage profit & Net Profit.	
2.2	Practical Problems	
3.	**Bank Reconciliation Statement**	**5**
3.1	Purpose of Preparing B.R.S	
3.2	Advantages	
3.3	Simple Practical Problems	
4	**Trial Balance**	**1**
4.1	Importance of Trial Balance	
4.2	Net format of T.B	
	UNIT –III	
1.	**Capital & Revenue Expenditure & Deferred Revenue Expenditure**	**1**
1.1	Nature of Capital & Revenue Expenditure	
1.2	Nature of Deferred Revenue Expenditure	
1.3	Examples	
2.	**Final Accounts of sole – Trader (with Adjustments)**	**10**
2.1	Importance, Purpose & Need for preparation of Final accounts.	
2.2	Practical Problems covering the following adjustments:- Closing stock Prepaid Expenses Outstanding Expenses Depreciation Bad Debts & Provision for Bad debts	
3.	**Break Even Analysis :-**	**4**
3.1	Variable cost, fixed cost & semi variable cost.	
3.2	Contribution, Profit/Volume Ratio & Break Even Point.	
3.3	Simple Practical Problems	

Scheme of Examination (Theory)
(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1, 2, 3	15
Q - 2	1	15
Q - 3	2	15
Q - 4	3	15
	Total	**60**

- Question no. 1 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.
- Question 2, 3 & 4 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

PRINCIPLES OF MANAGEMENT
SEMESTER – II (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	II	PRINCIPLES OF MANAGEMENT (USHO 208)
Course Code	Title	Credits	
USHO208	PRINCIPLES OF MANAGEMENT	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester II – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

Contents of syllabus for USHO 208

OBJECTIVES:
At the end of semester II:-

- Programme activities and lecture to learn about emerging Indian Corporate World and Global Phenomenon with stress upon hospitality industry.
- To train the student as future managers and make them understand the working of an organisation.
- Teaching through PowerPoint presentations, case studies, activities, brain storming sessions, SWOT/PEST analysis etc.
- Trying to bridge the gap between management studies and real corporate world through real time stories from newspapers, journals and business magazines, books.
- Encouraging students to read more so as to refine their analytical power and sharpen business sense and become more aware of the business environment.
- Opportunity to participate in business discussions, article/book reviews and presentations

Semester II – 15 weeks

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I.	**1. INTRODUCTION TO MANAGEMENT** 1.1 Evolution of management 1.2 Definitions and Importance of Management 1.3 Management as a Science and Art 1.4 Principles of Management (14 principles of Fayol) 1.5 Levels of Management and their functions 1.6 Managerial skills 1.7 Functions of Management 1.8 Process of communication 1.9 Business communication **2. PLANNING** 2.1 Definition and Characteristics 2.2 Planning Process (Steps in Planning) 2.3 Essentials of a Good Plan 2.4 Vision and mission Statements 2.5 Planning with relation to hospitality industry 2.6 Meaning and Process of MBO 2.7 Meaning and steps in Decision Making	15
II	**3. ORGANIZING** 3.1 Meaning and Process of Organizing 3.2 Formal and Informal Organization and Distinction 3.3 Span of control (Meaning and Importance) 3.4 Tall and Flat Organization 3.5 Definition and Process of Delegation 3.6 Centralization and Decentralization of Authority 3.7 Departmentation and Basis of Departmentation 3.8 Organisation chart 3.9 Closed vs open system of organisation 3.10 Line and Staff organization **4. STAFFING AND COORDINATION** 4.1 Meaning and Imporance of Staffing 4.2 Internal and External Sources of Recruitment 4.3 Coordination - As an essence of Management 4.4 Principles of Coordination	15

III	**5. DIRECTING, MOTIVATING AND LEADING** 5.1 Meaning and importance of Directing 5.2 Element of Directions / Components 5.3 Definition of Motivation and factors 5.4 Maslow's Need Hierarchy Theory 5.5 Mc Gregor's Theory X and Theroy Y 5.6 Definition of Leadership and Leader 5.7 Qualities of a Leader 5.8 Leadership Styles 5.9 Leaders from hospitality industry 5.10 Leadership theory **6. CONTROLLING** 6.1 Meaning 6.2 Steps in Control process 6.3 Types of control:feed forward,feedback,concurrent 6.4 Time Management	15

REFERENCES

- Principles of Management – P.C.Tripati and Reddy
- Management Principles and Practices – Dr.M.Sakthivel Murugan
- Management and Organizational Development - Micheal Vaz and Meeta Seta
- Principles of Management-Harold Koontz

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15

Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

Students will be sent for Industrial Training either during the IIIrd or IVth semester as per the convenience of Industry/Institute. Classes will be conducted for the batch of students not undergoing Industrial Training.

Semester III/IV - B.Sc. Hospitality Studies

		Class Room Instruction Face to Face									Notional				Credits			
Course Code	Subject	Per Week			Per Sem			Per Sem Hrs										
		L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
USHO301	Food Production & Patisserie III	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO302	Food & Beverage Service III	3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4
USHO303	Front Office III	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO304	Housekeeping III	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO305	Rooms Division Management(Practicals)-III	-	4	-		60	-	-	60			10		70	-	**2**	-	2
USHO306	Hotel Accountancy & Cost Control	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO307	Hospitality Law & Human Resource Management	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
USHO308	Management Information System in Hospitality Industry	3	-	-	45	-	-	45	-	-	25	-	-	70	2	-	-	2
	Total	21	12	-	315	180	-	315	180	-	175	30	-	700	14	6	-	20
	L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial																	
	Notional includes time spent in library / home / other institutions for preparation and writing of assignments,																	

FOOD PRODUCTION & PATISSERIE–III/IV (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	Food Production & Patisserie-II(USHO 301)
Course Code	Title	Credits	
USHO301	Food Production & Patisserie-III/IV	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Class Room Instruction Face to Face									Notional				Credits			
Per Week			Per Sem			Per Sem Hrs										
L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
3	4	-	45	60	-	45	60	-	25	10	-	140	2	2	-	4

OBJECTIVES: To get trained on various aspects of regional Indian cuisine – Quantity Food Production (QFP)

Contents of syllabus for USHO 301

UNIT NO.	Ch.No.	TOPIC	Hrs.
01	1	**MENU PLANNING & ITS TYPES (QFP)** Basic Menu Planning – Recapitulation, Special emphasis on Quantity Food Production, Planning of Menus for various categories, such as: - Institutional & Industrial Catering (School / College, Canteen, Industrial Workers.) - Hospital Catering (Diet Menu, Importance of Hygiene.) - Off Premises Catering (Outdoor Parties, Theme Dinner, and Food Festival.) Parameters of Quantity Food Menu Planning.	07
	2	**Indian Culinary Terms**	04
	3	**INTRODUCTION TO CAKE MAKING:** Elements in Cake Making, Role of each Element in Cake Making, Methods of Cake Making, Recipes for Basic Cakes, Faults in Cake Making, Recipe Balancing.	04

UNIT NO.	Ch.No.	TOPIC	Hrs.
02	4)	**EQUIPMENT (QFP)** Quality of Equipment used, Specification of Equipment, Heat and Cold Generating Equipment, Maintenance of Equipment	3

List: -	
1. Mixers	2. Grinders
3. High Pressure Gas Burner	4. Ovens
5. Grillers	6. Knives
7. Choppers	8. Peelers (Potato)
9. Brat Pan	10. Bulk Boilers
11. Steamers	12. Walk in Coolers / Walk in Freezers / Deep Freezers
13. Tandoor	14. Storage & Receiving Quays
15. Griddle Plate	

Modern Developments in Equipment Manufacturing.

5) QUANTITY PURCHASE AND STORAGE (QFP) **3**

Introduction of Purchasing, Purchasing System, Purchase Specifications, Purchasing Techniques, Duties of Purchase Officer & Store Keeper, Storage.

6) INDENTING (QFP) **5**

Principles of Indenting, Quantities / Portions for Bulk Production, Conversion of Recipes for Indenting, Practical difficulties involved in Indenting.

7) Pastry: **04**

Recipes, Method of Preparation, Differences, Uses of each Pastry, Care to be taken while preparing Pastry, Role of each Ingredient, Temperature of Baking the following Pastries, Short Crust, Choux Pastry, Laminated, Hot Water / Rough Puff.

UNIT NO.	Ch.No.	TOPIC	Hrs.
03	8)	**INDIAN COOKERY (QFP)** **Introduction to Regional Cooking:** 1) Factors affecting eating habits. 2) Heritage of Indian Cuisine. 3) Regional Commodities, Spices & Masalas (Wet & Dry). 4) Geographical location, Historical background, Availability of raw material (seasonal), Equipment and fuel (special), Staple diet, Speciality Cuisine, Food prepared for festivals and occasions of the following states: - Andhra Pradesh / Hyderabad, Bengal, Goa, Gujarat, Karnataka, Kashmir, Kerala / Malabari, Madhya Pradesh, Maharashtra / Malwani, North Eastern States, Punjab, Rajasthan, Tamilnadu / Chettinad, Uttar Pradesh / Dum & Avadh / Lucknawi, Also Communities / Styles such as : Parsee, Bohra & Indian Gravies.	12
	9)	**VOLUME FEEDING (QFP)** Institutional & Industrial Feeding, Banquet and Buffet.	03

INDIAN CULINARY TERMS:

1. Imarti	16. Dhuanaar	31. Marinade	46. Quabarga
2. Baffad	17. Dum	32. Moilee	47. Rabri
3. BalUSHOhi	18. Dum Pukht	33. Murgh Musallam	48. Raita
4. Bharta	19. Gaujas	34. Mutanjan	49. Rasam
5. Baghar	20. Gustaba	35. Mulligutwanny Curry	50. Roomali Roti
6. Bhunao	21. Aappam	36. Naan	51. Rogan Josh
7. Bonda	22. Jalebi	37. Neera	52. Rista
8. Biryani	23. Kabab	38. Nargisi Kofta Curry	53. Rasgullas
9. Bhaturas	24. Kalia	39. Pachadi	54. Shami Kebab
10. Sheera	25. Kesari	40. Paneer	55. Shrikhand
11. Charoli	26. Khoa	41. Payasam	56. Seekh Kebab
12. Cocum	27. Kofta	42. Phirnee	57. Sandesh
13. Dagad Phool	28. Panch Phoran	43. Pulao	58. Toddy
14. Dhansak	29. Loochi / Luchi	44. Chingri Malai Curry	59. Vindaloo
15. Dahibhalla	30. Macher Jhol	45. Palak Mutton / Chicken	60. Wark
			61. Zarda
			62. Ratan Jog

ASSIGNMENTS

Students have to do at least four group assignments on Indian Regional Cuisine.

REFERENCES

1. Thangam Philips - Modern Cookery Vol. 1 - Orient Longman - 1997
2. A. L. Cracknell and R.J. Kanfmann - Practical Professional Cookery - Macmillan – 1992
3. Anthony O'Reilly - Cookery Manual - Pitman Publishing –1993.
4. Victor Cererem, Ronald Kinton, David Foskett - Practical Cookery - Aodder & Stonghton – 1999
5. David R. Stevenson - Basic Cookery - Stanley Thornes (Publishes) Ltd. –1991
6. REBO Productions - Encyclopedia of Bakery - Rebo Publishers – 1999

7. Robert T. Marshall, W. S. Arbuckle - Ice Cream - ITP International Thomson Publishing - 1996.
8. Malcolm Stogo - Ice Cream & Frozen Desserts - John Wiley & Sons, Inc - 1997
9. L. G. Nicolelb, J Dinsdale - Basic Pastry Work Techniques - Hodder & Stoughton - 1991.
10. Mohini Sethi, Surjeet Malhan - Catering Management (An Integrated Approach) - Wiley Easter Limited - 1993.
11. Robert Bradnock - India Handbook - Footprint Handbook - 2000.
12. Ranjit Rai - Tandoor (The Great Indian Barbeque) - Viking - 1995.
13. Satarupa Banerjee - Book of Indian Sweets - Rupa & Co - 1994.
14. Digvijaya Singh - Cooking Delights of The Maharajas - Vakils, Fetter & Simons Ltd. - 1995
15. Master Chefs of the Ashoka Group - Royal Indian Recipes - J. G. Press - 1995.
16. Purobi Babbar - Rotis & Naans of India - Vakil Fetter & Simon Ltd. - 1994.
17. Inder Singh Kalra - Prashad, Cooking with the Indian Masters - Allied Publishers Ltd. - 1993.
18. Devaki Babbar - Gujrat Nu Jaman - India Book House - 1996.
19. Chandra Padmanabhan - Dakshin - Harper Oollins – 1995.
20. Jeroo Mehta - Parsi Guisine - Vakil, Fetter & Simons Ltd. - 1993.
21. Hegde - Manglorean Cuisine - India Book House – 1994.
22. Gilda Mendonsa - The Best of Goan Cooking - UBS Publishers Distributors Ltd. – 1995.
23. Neerja - Kashmiri Cooking - Penguin Books - 1995.
24. Madhur Jaffery - A Taste of India - Pavillion Books Ltd., - 1985.
25. Minakshie Das Gupta - The Bengal Cook Book - UBS Publishers Distributors Ltd. – 1998.
26. Kaumudi Marathe - Maharshtrian Cuisine - Business Publications Inc. – 1999.
27. Food Production Operation – Parvinder S. Bali.

(Food Production Practical)

Each institute will prepare their own menus as per the pattern given below. Well-known and authentic dishes from particular region should be included while compiling the menu.

States
1. Andhra Pradesh / Hyderabadi 2. Bengal & North Eastern States 3. Goa 4. Gujarat / Parsi / Bohri 5. Karnataka 6. Kashmir 7. Kerala / Malabari 8. Maharashtra / Malvani 9. Punjab 10. Rajasthan 11. Tamil Nadu / Chettinad 12. Uttar Pradesh / Dum & Avadh / Lucknavi

BAKERY & CONFECTIONERY PRACTICAL

Demonstration of the following
Cakes – 4 varieties
Pastries – Short Crust, Puff Pastry, Flaky Pastry & Choux Pastry
Cookies – 6 varieties

FOOD PRODUCTION PRACTICAL MENUS – SEMESTER 3 or 4			
MENU NO.	**PRACTICAL TOPIC**	**Any 6 dishes per Menu (Prepare any 1 or 2 dishes per course)**	
1	Andhra Pradesh / Hyderabadi Cuisine	Starter Options:	Shammi Kebab / Shikampuri Kebab
		Main Course Options:	Tamater ka Kut / Mirchi ka Salan/ Baghara Baingan/ Burhani/ Achari Gosht/ Nehari/ Haleem/ Khichra/ Murgh Malai Korma
		Breads, Rice & Dal Options:	Sheermal/ Bakharkhani/ Khameeri Roti/ Hyderabadi Biryani/ Sofyani Biryani/ Qabooli/ Khatti Dal
		Dessert Options:	Double ka Meetha/ Khubani ka Meetha/ Sheer Qurma/ Gil e Firdaus
2	North Eastern States / Bengali Cuisine	Starter Options:	Begun Bhaja/ Panthar Ghugni/ Alu Chop/ Egg Roll
		Main Course Options:	Shukto/ Alu Posto/ Palak Panch Phoran / PanchMishali Charchari/ Macher Jhol/ macher Kalia/ Doi Mach/ Chingri Malai Kari/ Mangsho
		Breads, Rice & Dal Options:	Luchi/ Dhakai Paratha/ Ghee Bhat/ Cholar Dal/ Mishti Mug Dal
		Dessert Options:	Gulab jamun/ Balu Shahi/ Rasmalai/ Mishti Doi
3	Goan Cuisine	Soup & Starter Options:	Caldo Verde/ Sopa Grossa/ Rissois de Camarao/ Stuffed Prawn Papad/Goan Fried Fish/Pomfret Recheiado/ Prawn Balchao/ Kismur

		Main Course Options:	Goan Fish Curry/ Amottik Fish Curry/ Sorpotel/ Vindaloo/ Baffat/ Chicken Cafreal/ Galina Xacuti
		Breads, Rice & Dal Options:	Sannas/ Pav/ Boiled Rice/Coconut Rice/ Daali Thoy
		Dessert Options:	Neureos/ Coconut Bhatt/ Bebinca/Dodol/Perada
4	Gujarati Cuisine	Starter Options:	Dhokla/Patra/Muthiya
		Main Course Options:	Oondhiya/ Sev Tameta nu Shaak/ Tuvar Ringna nu Shaak/ Flower Batata nu Shaak
		Breads, Rice & Dal Options:	Thepla/Rotla/Munga Dal Khichdi/ Vagheral Bhaat/ Shaakwala Bhaat/ Dal Dhokli/ Kadhi
		Dessert Options:	Basundi/ Dudh Paak/ Mohan Thaal/ Gor Papdi
5	Bohri Cuisine	Starter Options:	Shammi kebab/ Kheema Samosa/ Kheema Pattice/ Kheema Cutlet (with mint chutney)
		Main Course Options:	Alishan Baingan/ Bohri Chicken Kari/ White Mutton kari/ Dabba Gosht
		Rice & Dal Options:	Chawal/ Khada Masala Pulav/ Kheema Pulav/ Dal/Palidu
		Dessert Options:	Thuli/Malido
6	Parsi Cuisine	Starter Options:	Papeta nu Pattice/ Papeta ne Cheese na Pattice/ Eda Chutney na pattice
		Main Course Options:	Kolmi no Patio/ Saas ni Macchi/ Salli Murghi/ Patra ni Macchi/ Margi na Farcha/ Mutton Dhansaak
		Rice/ Dal Option:	Dhan (steam rice)/ Brown Rice/Dar
		Dessert Options:	Lagan nu Custard/ Kopra Pak

FOOD PRODUCTION PRACTICAL MENUS – SEMESTER 3 or 4

MENU NO.	PRACTICAL TOPIC	Any 6 dishes per Menu (Prepare any 1 or 2 dishes per course)	
7	Karnataka Cuisine	Starter Option:	Alu Bonda
		Main Course Options:	Uppu Curry/ Chana Ghashi/ Upkari/ Koli Gassi/ Mangalorean Fish Curry
		Bread & Rice Options:	Jolada(Jwar Roti)/ Neer Dosa/ Bisi Bele Huliana
		Dessert Options:	Worne/ Chiroti
8	Kashmiri Cuisine	Starter Options:	Seekh Kebab/ Shammi Kebab
		Main Course Options:	Dum Oluv/ Navratan Korma/ Dhaniwal Korma/ Mutton Roganjosh/Gustaba/Rista
		Breads & Rice Options:	Khameeri Naan/ Khameeri Roti/ Kashmiri Pulav/ Yakhni Pulav

		Dessert Options:	Phirni/ Zarda/Seb ki Kheer
9	Kerala / Malabari Cuisine	Main Course Veg. Options:	Drumstick Ullitheeyal/ Avial/ Olan/Kalan/Erussery
		Main Course Non veg. Options:	Meen Moilee/ Meen Curry/ Malabari Fish Curry/ Kozhi Vartha Curry/ Mutton Kuruma/ Malabari Egg Curry
		Breads, Rice & Dal Options:	Kerala Parotta/ Lime Rice/ Boiled Rice/ Nai Chor(Ghee Bhat)/ Rassam/ Sambhar
		Dessert Options:	Payasam
10	Maharashtrian / Malwani Cuisine	Starter & Salad Options:	Sabudana Wada/ Aluchi wadi/ Kothimbirwadi/Batata Vada/Koshimbir/Khamang Kakdi
		Main Course Options:	Bharli Vangi/ Zhunka/ Kala Vatana Rassa/ Btatyachi Bhaaji/ Kombdicha Rassa/ Kolhapuri Mutton/ Malvani Kombdi
		Breads, Rice & Dal Options:	Bhakri/ Chapati/ Thalipith/Puri/Masale Bhat/Tendli Bhat/Varan/Amti/Dal Bhaji/Usal/Sol Kadhi
		Dessert Options:	Sheera/ Shrikhand/ Kheer/ Besan Ladu/Puran Poli/ Modak
11	Punjabi Cuisine	Starter & Accompaniment Options:	Dahi Bhalle/Paneer Pakoda/ Alu Tikki/ Tandoori Chicken/ Chicken Tikka/ Hara Bhara Kebab/ Alu Chat/ Alu Papdi Chat/Boondi Raita/ Pudina Raita
		Main Course Options:	Matar Paneer/ Malai Kofta/ Sarson da Saag/ Baigan Bharta/ Pindi Chole/ Rajmah/Murgh Makhani/ Palak Gosht
		Breads, Rice & Dal Options:	Makai di Roti/ Missi Roti/ Pudina Paratha/ Mooli Paratha/ Kulcha/ Bhatura/ Matar Pulav/ Jeera Rice/ Dal Makhani/ Dal Amritsari/ Punj Ratni Dal/ Punjabi Kadhi
		Dessert Options:	Gajrela/ Rabri/Jalebi/Malpoora
FOOD PRODUCTION PRACTICAL MENUS – SEMESTER 3 or 4			
MENU NO.	**PRACTICAL TOPIC**	**Any 6 dishes per Menu (Prepare any 1 or 2 dishes per course)**	
12	Rajasthani Cuisine	Starter Options:	Pyaz ki Kachori/ Matar ki Kachori
		Main Course Options:	Panchmel Subji/ Gatta Curry/ Ker Sangri/ Methi Mangodi Subji/ Amrud ki Subji/Lal Maas/ Makai ka Soweta/ Maas ki Kadhi
		Breads, Rice & Dal Options:	Masala Tikadia/ Missi Roti/Moongdal paratha/ Hare Matar ki Puri/ Bajre ki Roti/ Gatte ka Pulav/ Tej laung Pulav/ Khichdi/Dal Banjari/Dal Churma/Rajasthani Kadhi
		Dessert Options:	Moongdal Halwa/ Malpuva/ Churma Laddu/Rava dry fruit Ghugra
13	Tamilnadu / Chettinad Cuisine	Starter & Accompaniment Options:	Chanadal Vada/ Dosa/Pachadi/Coconut Chutney
		Main Course Options:	Gundu Poriyal (baby potato poriyal)/ Beans Poriyal/ Khathrikai Kozambu (Brinjal Curry)/ Cauliflower Kootu/ Kari Kolambu (Mutton Curry)/ Kozi Mulagu Varuval (Chicken Pepper Fry)/ Chicken Chettinad/ Nilgiri Korma

		Rice & Dal Options:	Puli Satham/ Thayar Satham/ Takali Satham/ Elamcha Satham/ Ulli Sambhar/Koli Rasama (Chicken Rassam)
		Dessert Options:	Payasam/ Kesari
14	Uttar Pradesh / Lucknow Cuisine	Starter Options:	Pasanda Kebab/Galouti Kebab/ Chapli Kebab
		Main Course Options:	Banarasi Alu/ Dhingri Dulma/ Paneer Pasanda/ Gosht Korma/ Chandi Kaliyan
		Bread & Rice Options:	Tehri/ Laccha Paratha/ Kulcha/ Naan
		Dessert Options:	Seviyan ka Muzaafar/ Anannas ka Muzaafar/ Shahi Tukra

Practical: - 4 hours / Week
Total Menus in Semester 3 or 4: - Menus (14) + Exam Menu (1) = 15 Menus.
Total Hours in Sem.3 or 4: - 15 Menus * 4 hours = 60 Hours.

Scheme of Examination (Theory)
(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination
(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
4	**Internal assessment**	20

(b) Semester end assessment - 30 marks

- Candidate will be given a menu comprising of 4 dishes.
- Indent sheet and plan of work sheet to be filled by the candidate of the menu he gets.
- He / she supposed to collect indents, prepare and present the dishes in the menu within stipulated time.
- Cleaning and securing equipments and working area is also to be done within stipulated time.

Assessment will be done as follows –

Journal	Indent Sheet & plan of work	Colour	Consistency	Taste	Texture	Viva-voce	Personal Grooming, Cleaning
10	10	10	10	10	10	10	10

Marks obtained out of 80 shall be converted to out of 30 to the next integer for final calculation.

FOOD & BEVERAGE SERVICE SEMESTER – III/IV (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	Food & Beverage Service-III(USHO 302)
Course Code	Title	Credits	
USHO302	Food & Beverage Service-III	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Semester III/IV – 15 weeks

THEORY					PRACTICAL					Total Credits
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Lecture + Practical
03	45	25	02	--	04	60	10	02		04

OBJECTIVES:
At the end of semester III/IV:-

- Describe the duties and responsibilities of beverage service staff members, and summarize techniques and procedures for responsibly selling and serving cocktails, beer, and wine.
- Understanding the production process of Beer, Wine and Spirits.
- Making of cocktails with use of ingredients such as liqueurs and bitters.

Contents of syllabus for USHO 302

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**ALCOHOLIC BEVERAGES** a. Definition, history of Alcoholic Beverages & classification. b. Benefits and harmful effects of alcohol.	02
	WINES	13

	1.1 Definition & history of wines. **1.2 Types of Wines:** Still (red, white & rose), sparkling/Champagne, Fortified (sherry, port, Madeira, marsala & malaga), Aromatized wines (Vermouth). **1.3 Methods of production, Still (red, white, rose).** a) **Viticulture** (Wine calendar, terroir, vine species, grape varieties & diseases). b) **Vinification** (Manufacturing process, elements of wine & faults in wines). c) **Champagne & Sparkling Wines**. (History, districts, grape varieties, Methode Champenoise, cuvee close, transfer method, charmat & impregnation, Names & bottle sizes). d) **Fortified Wines (Production & types).** 1) Sherry (Solera system) 2) Port 3) Madeira (estufagen) 4) Marsala 5) Malaga e) **Aromatised wines (Definition & types)**	
II.	**1.1 Wine producing countries of the world** (Regions, Wine laws, labels & shippers). a) Old world wine producing countries (France, Italy, Germany, Spain & Portugal). b) New World wine producing countries (Australia, New Zealand, South Africa, U.S.A. & India).	10
	1.2 Wine tasting, Storage & Service	02
	1.3 Food and wine Harmony.	03
III.	**1.1 BEER & OTHER FERMENTED BEVERAGES** a) **Definition, History & Brewing process.** (Components of beer, top fermentation, bottom fermentation) b) **Types of Beer, Storage & Service** (Lager, Pilsner, Draught, Ale, Stout, Porter, Ice, Lambic & Smoked).	03

	c) **Other fermented beverages (Cider, Perry, Mead, Sake & Toddy).**	
	1.2 SPIRITS a) Introduction and definition b) Pot and patent still method of production. **1.3 History, Production, types & Brand names (national & International)** a) Whisky (Scotch, American, Canadian, Irish & Japanese) b) Rum (White, Gold, Dark & Flavoured) c) Brandy (Cognac, Armagnac & Fruit) d) Gin e) Vodka, flavoured vodka f) Tequila & Mezcal	05
	1.4 Alcoholic Strength :Proof, GL, Sykes, U.S., British (OIML) **1.5 Other Spirits (Aquavit, schnapps, Pastis, ouzo, arrack)** **1.6 LIQUEURS** Introduction, definition, classification & production of liqueurs a) Different types of liqueurs: Base, Flavours, Country of origin. b) Brand names of liqueurs (Generic & Proprietary)	04
	1.7 APERITIFS & BITTERS a) Definition b) Brand names	01
	1.8 GLOSSARY OF TERMS RELATED TO Alcoholic beverages, Menu terminologies. Acidity Alcohol Aldeyhyde Ampelography Baume Blanc de blancs Blanc de Noirs Blush wine Bodega Bonded Botrytis cinerea Cap Cask Centrifugation Chambrer Chaptalisation Cork Cotes	02

	Cuvaison Cuve close Cuvee Decanter Decanting Degorgement Eau-de-vie Estufagem Eiswein Fining Gyropalette Lees Malolactic fermentation Must Mulled wine Negociant Oechsle Oenology Oenophile Organic wines Pasteur, Louis Passe-tout-grains Petillant Photosynthesis Punt Racking Refractometer Residual sugar Rince cochon Saccharometer Saccharomyces ellipsoideus Sommelier Siissreserve Tannin Tastevin Tears Vendange Vinification Vintage wine Viscosity Tannin Tastevin Tears Vendange Vinification Vintage wine Viscosity Vitis vinifera Wash Weeper Yeast Yeast autolysis	
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

- Dennis Lillicrap, John Cousins and Robert Smith- Food and Beverage Service
- Larousse Christopher Foulkes- Encyclopedia of Wines-
- Roy Hayter Food And Drink Service Levels 1 And 2
- Greg Dempsey- The Perfect Cocktail-
- Joanna, Simon- Wine With Food- Simon & Schuster
- Dave Broom- Handbook of Whiskey
- Shatbi Basu- The can't go wrong Cocktail book
- Brian Glover- The world encyclopedia of Beer
- Tom Stevenson- Champagnes and Sparkling Wines guide
- Vijay Dhawan- Food and Beverage Service

FOOD & BEVERAGE SERVICE SEMESTER – III/IV (ASSIGNMENTS)

All students should be given individual assignments. Out of the following given options each student needs to work on any two.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Collecting wine labels of different wine producing countries and explain any one in detail.	
2.	Identifying International and Indian brands of Spirits.	
3.	Identifying International and Indian brands of Beer.	
4.	Explore any two innovative cocktails according to different methods of making cocktails.(Built up / Stirred / Shaken / Blended /Muddled)	
5.	Visit to Vineyard.	

FOOD & BEVERAGE SERVICE SEMESTER – III/IV (PRACTICAL)

SR. NO.	PRACTICALS	HOURS
1	**ALCOHOLIC BEVERAGES** Attributes of a bar personnel Bar equipment, cutlery & glassware Table setup of TDH menu with wine glasses	**06**
2	**WINE PRACTICE** Procedure of Service of white, rose & red (old & young) wines. (Temperature of service / Glassware).	**04**
3	Procedure of Service of Champagne & fortified/ aromatized wines. (Temperature of service / Glassware).	**03**
4	Wine tasting	**04**
5	Menu compilation (5, 6, 7 courses) with appropriate wine and their services. (French classical, English & Indian)	**16**
6	**BEER & OTHER FERMENTED BEVERAGES** Procedure of Service of Beer: Temperature of service / type of glassware,	**03**
7	Service of bottled, canned beer & draught beer.	**02**
8	**SPIRITS** Service of Liquors: Whisky, Brandy & Rum	**02**
9	Service of Liquors: Vodka, Gin & Tequila	**02**
10	Service of Liquors: Other spirits (Aquavit, Schnapps, Pastis, Ouzo, Arrack).	**02**
11	**LIQUEURS** Service of Liqueur: Temperature of service / type of glassware.	**01**
12	**APERITIFS & BITTERS** Service of Aperitifs: Temperature of service / type of glassware	**01**
13	**COCKTAILS & MIXED DRINKS** **PRACTICE**: Procedure of Service & Preparation of Cocktails. (Stirred, Shaken, Built-up/Layered, Blended & Muddled)	**12**
	Procedure of Service & Preparation of Mocktails.	**02**
	TOTAL PRACTICAL HOURS	**60**

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20

2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a menu to compile and laying table for it.
- Assessment will be done as follows

Journal	Grooming	Service of Alcoholic Beverages	Menu Planning	Cover laying	Viva - voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

FRONT OFFICE SEMESTER – III /IV (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	FRONT OFFICE III/IV(USHO 303)
Course Code	Title	Credits	
USHO303	FRONT OFFICE-III/IV	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

OBJECTIVES:

At the end of semester III:-

The student is expected to possess knowledge and skills with respect to handling Group Reservations, Assigning Rooms, Check-in, Cashiering and Security Systems.

Contents of syllabus for USHO 303

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**Advanced Guest Cycle (Reservation, Assigning Rooms, Check-in)** • Group (Tourist/ Conference/ Convention) • Crew (Airline- Layovers/ Cruise lines/ Cargo) • Regular Guests Special Attention Guests (Handle With Care, Single ladies, unaccompanied children, Sr. Citizens, Disabled Guest) **ROOM CHANGE PROCEDURES** • By Hotel (Upgrade/ Up sell)	15

	By Guest (Discrepancy/ Personal Preference)	

II.	**HANDLING OF COMPLAINTS** • Types of Complaints(Service related/ Attitudinal/ Mechanical/ Unusual complaints) Guidelines to handle complaints **FRONT OFFICE ACCOUNTING SYSTEM AND SETTLEMENT** • Guest and Non Guest Folio • Types of Folio • Types of Vouchers • City Ledger • Billing Procedure instruction • Methods of settlement(Cash/ CC- Direct currency converter/ BTC/ TAV/ PSO/ COMP Voucher)	15
III.	**SECURITY SYSTEMS IN HOTELS** • Fire Alarm Systems • Burglar Alarm Systems • Electronic Locking Systems **TERMINOLOGY**	15
	TOTAL THEORY HOURS	**45**

REFERENCE BOOKS:-

Name of the book	**Author**	**Publisher**	**Place of Publication**
Jatashankar Tiwari	Front Office Management	Oxford University Press	New Delhi
Andrews, Sudhir	Hotel Front Office Training Manual	The Tata M'cGraw Hill	New Delhi
Kasavana, Michael & Brooks, Richard	Managing Front Office Operations	AHMA	USA
Baker & Bradley	Principles of Hotel front Office Operations	Cassell	London
Deveau, insley & deveav, Patricia	Front Office Management and Operations (2)	Prentice Hall	NEW JERSEY
Bullied, An Ritchie, Caroline	Reception	Stanley Thornes	london
Chakravarti, B.K.	Front Office Management In Hotel	BNS Publishers	New Delhi
Braham, Bruce	Hotel Front Office	Hutchinson	London
Ford, Robert & Heaton, Cherrill	Managing the guest Experience	Delmar Publishers	London
Bardi,James	Hotel Front office Management	John wiley & sons	new Jersey
Huyton Jeremy & Baker Sue	Case Studies in Rooms Operations and	Hospitality Press P Ltd.	Melbourne

	Management		
Bhatnagar S.K.	Front office Management	Frank Bros & Co.	New delhi
Andrews, Sudhir	Hotel Front Office Training Manual(latest ed)	The Tata M'cGraw Hill	New delhi
Chakravarti B.K.	Front Office Management in Hotel	CBS Publisher	New Delhi
Chakravarti B.K.	Concept of Front Office Management	APH Publishing	New Delhi
	India(Tourist Guide)	Lonely Planet	

Scheme of Examination (Theory)

(b) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

HOUSEKEEPING SEMESTER – III / IV (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	Housekeeping III(USHO 304)
Course Code	Title	Credits	
USHO304	Housekeeping-III	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester III / IV – 15 weeks Semester I – 15 weeks

THEORY				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02	

OBJECTIVES:
At the end of semester III / IV:-

- The student will be able to explain various operational procedures and formats pertaining to linen, uniforms, and laundry.
- The student will be able to create formats and design layouts of linen room, uniform room and laundry.
- The student will be able to create Flower Arrangements for various occasions and locations.
- The student will be able to plan and implement décor for special occasions.

Contents of syllabus for USHO 304

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I.	**1. LINEN ROOM OPERATIONS** 1.1 Introduction, classification and sizes of linen 1.2 Selection criteria for linen 1.3 Calculation of linen requirement – Par stock 1.4 Purchase of linen 1.5 Layout and equipment in linen room 1.6 Activities in linen room 1.7 Linen control 1.7.1 Linen exchange procedure 1.7.2 Inventory control – Procedures and records	10

	1.7.3 Recycling of condemned linen 1.8 Linen hire 1.9 Glossary	
	2. FORMATS 2.1 Linen Exchange Slip 2.2 Purchase Index Card 2.3 Linen Replenishment Slip 2.4 Master Inventory Sheet – Linen/Uniforms/F&B Linen 2.5 Floor Inventory Sheet 2.6 Stock Register 2.7 Linen Discard Sheet 2.8 Lost Linen Record 2.9 Laundry List	05
II	1**. UNIFORM AND SEWING ROOM** 1.1 Importance of uniforms 1.2 Designing of uniform, Selection criteria (Functional & Aesthetic) 1.3 Layout of uniform room 1.4 Issuing and exchange of uniforms 1.5 Storage of uniforms 1.6 Importance and activities of sewing room	05
	2. LAUNDRY OPERATIONS 2.1 Introduction to laundry operations 2.2 Types of laundries – Commercial / In house (OPL) 2.3 Advantages and Disadvantages of OPL 2.4 Laundry agents 2.5 Laundry equipments 2.6 Layout of laundry 2.7 Laundry process – On Premises and Off Premises 2.7.1 Wash cycle 2.7.2 Coordination between laundry and linen room 2.8 Stain removal methods 2.9 Dry cleaning – Chemicals and Process 2.10 Handling Guest Laundry/Valet Service 2.11 Glossary	10
III	**1. FLOWER ARRANGEMENT** 1.1 Introduction to Flower Arrangement 1.2 Flower arrangement materials – Flowers, Fillers, and equipments, tools, accessories 1.3 Selection, care and conditioning of plant material 1.4 styles of flower arrangements – Western, Free style, Abstract, Oriental (Ikebana) 1.5 Principles of Western flower arrangement 1.6 Glossary	10
	2. ERGONOMICS IN HOUSEKEEPING	05
	TOTAL THEORY HOURS	**45**

1 Hotel Housekeeping Operations and Management – G. Raghubalan & Smritee Raghubalan – Oxford University Press.
2 Housekeeping Operations, Design and Management – Malini Singh & Jaya B. George – Jaico Publications.
3 Housekeeping Management – Margaret Kappa, Aleta Nitschken, Patricia B. Schappert – A.H. & L.A.
4 Textiles – Fiber to Fabric – Bernard P. Corbman
Library of congress category
5 Stain Removal – Stephanie Zia – Bounty Books
6 Professional Management of Housekeeping Operations – Thomas J. A. Jones – John Wiley & Sons
7 Flower Arranging – Joyce Rogers – Paul Hamlyn London
8 Textile and Laundry in Hotel Industry - Dr. D.K.Agrawal - Aman Publications
9 The Art of Flower Arranging - Ian Hall & Sarah Waterkeyn - Smithmark Publications
10 Creative Flower Arranging - Tamaris Ryan - Tiger Books International, London
11 The World of Flower Arranging - Barbara Pearce - Optimum Books
12 Flower Arrangement. Expert :- Dr. D G Hessayon - British Library , Tranworld Publishers

HOUSEKEEPING SEMESTER - III / IV (ASSIGNMENTS)

Out of the following given options each student needs to work on both.

SR. No.	TOPIC FOR ASSIGNMENTS	MARKS
1.	Uniform designing OR Flower arrangement – Rates of flowers, different types of flowers and foliage. Significance of flowers used for various occasions such as baby shower, wedding, religious function, festivals etc (students need to work on any 4 occasions)	10
2.	Special decorations for different Theme Events (Group assignment) as per • Planning • Costing • Purchasing • Implementing	10

Scheme of Examination (Theory)
(c) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners,	05

	skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

ROOMS DIVISION MANAGEMENT –III (PRACTICAL)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	RDM-I Practical-USHO305
Course Code	Title	Credits	
USHO305	RDM-Practical-III	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	--	4					
Credit	--	2					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
--	--	--	--	--	4	60	10	02	--

Contents of syllabus for USHO 305

FRONT OFFICE PRACTICAL- III

Note: Formats to be taken from MIS and to be practised in Front office Practicals.

Sr.	Topic	Hr
1	SELECTION OF THE FRONT OFFICE MANAGEMENT SYSTEM Software –Shawmans Property Management System-Amadeus. Fidelio	5
2	ROOM MANAGEMENT SOFTWARE Room Inventory, Room Status availability	5
3	REGISTRATION Reservation/ Guest data (profile) GHC, Reports /self check-in	5
4	POSTING Paid Out/ Miscellaneous Voucher, Telephone, Display Folio (bill), Reports	5
5	CALL ACCOUNTING Guest Information/ Employee Information/ Post Charges/ Messages/ Wake Calls	5
6	CHECK OUT Folio /Adjustment/ Cashier/ Back Office Guest History	5

HOUSEKEEPING (PRACTICAL) –III/IV

SR. NO.	PRACTICALS	HOURS
1	STAIN REMOVAL • Ink • Tea/Coffee • Juice • Lipstick/nail polish • Curry • Shoe polish • Oil / grease • Chewing gum • Hair dye • Henna/Mehendi • Blood/Chocolate • Urine/Vomit	6
2	FLOWER ARRANGEMENT • Ikebana/Western/Free style • Demo • individual (any one)	10
3	IRONING	4
4	VARIOUS STITCHES • Straight/Running stitch • Hemming • Button and buttonhole • Hook and eye	4
5	UNIFORM DESIGNING	6
	TOTAL PRACTICAL HOURS	**30**

Conduct of Practical Examination

(a) Internal assessment- 20 marks

Sr. No.	Evaluation type	Marks
1	Two best practical	10
2	Journal	05
3	Viva	05
		20

(b) Semester end assessment - 30 marks

- A candidate will be given a 2 activities bed making and polishing or special cleaning of any surface or area
- Assessment will be done as follows

Journal	Grooming	Work sheet	Activity One	Activity Two	Viva-Voce
10	10	10	10	10	10

- Marks obtained out of 60 shall be converted to out of 30 to the next integer for final calculation.

HOTEL ACCOUNTANCY & COST CONTROL

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	HOTEL ACCOUNTANCY & COST CONTROL (USHO 306)
Course Code	Title	Credits	
USHO 306	HOTEL ACCOUNTANCY & COST CONTROL	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester I – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

Contents of syllabus for USHO 306

SEMESTER – III/IV

Sr.	Topic	Hr	Marks
1	**Unit - I** **<u>Company Accounts</u>** • Preparation of Company Final Accounts i.e.Trading Account , Profit & Loss Accounts, Profit & Loss Appropriation Account & Balance Sheet with adjustments in accordance with Provisions of the Companies Act. • Practical Problems in horizontal format • Adjustment – 1. Closing stock 2. O/S exp 3. Prepaid exp 4. Depreciation 5. Prov. For tax 6. Bad debts 7. Trans to Res. 8. Prop. Div.	12	
2.	**<u>Allowances & Visitors Paid outs:</u>** • What are Allowances & Visitors Paid outs? • Difference between Discounts & Allowances. • Formats of Allowance & Visitors paid outs.	3	

1.	**Unit - II** **<u>The Guest Weekly Bill & Visitors Tabular Ledger</u>** • Importance, Purpose, layout & format of Guest weekly Bill & Visitors Tabular ledger. • Practical Problems on Guest weekly bill	7	
2.	**<u>Uniform System of Accounting for Lodging Industry</u>** • Importance, uses & approach • Income statement as per uniform system of accounts in lodging industry – scheduler –Rooms, F & B, laundry dept only. • Practical Problems	8	
1.	**Unit - III** **<u>Internal Audit, Statutory Audit & Night Audit</u>** • Introduction to Internal Audit & Statutory Audit • Distinction between Internal Audit & Statutory Audit • Importance, Purpose & advantages of Night Audit & daily Revenue Report. • Functions & Duties of Night Auditor	4	
2.	**<u>Food & Beverage Cost Control:</u>** Steps in Food & Beverage Control : Purchasing , Receiving, Storing, Issuing, Preparing & Selling. Formats of Purchase Requisition, Purchase order, Delivery Challan, Bin-card, K.O.T, K.O.T Analysis, Restaurant Bill, Food cost Report	4	
3.	**<u>Standard Costing & Variance Analysis</u>** • Advantages & Limitations of Standard Costing • Variance Analysis • Material Variances: Material Cost Variance, Material Price variance & Material Usage (quantity variance) • Labour Variances – Labour cost variance, Labour Rate variance & Labour Efficiency variance. • Practical Problems	7	

Scheme of Examination (Theory)

(d) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks

Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

HOSPITALITY LAW & HUMAN RESOURCE MANAGEMENT
SEMESTER – III/IV (THEORY)

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III /IV	HOSPITALITY LAW & HUMAN RESOURCE MANAGEMENT (USHO 307)
Course Code	Title	Credits	
USHO 307	HOSPITALITY LAW & HUMAN RESOURCE MANAGEMENT	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester III / IV – 15 weeks Semester I – 15 weeks

THEORY				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02	

Contents of syllabus for USHO 307

Semester III /IV – 15 weeks

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
I	**1. SOURCES OF LAW** 1.1 Definition: Law 1.2 Sources of Indian Law 1.3 Preamble to the Indian Constitution 1.4 Fundamental Rights and Fundamental Duties	01
	2. LAW OF CONTRACT 2.1 Definition: Contract. 2.2 Difference between Agreement and Contract 2.3 Essentials of Valid Contract. 2.4 Contract of Indemnity and Contract of Guarantee.	02

	3. LAW OF AGENCY 3.1 Definition: Agency, Agent and Principal. 3.2 Rights and Duties of Principal and Agent	01
	4. LAW OF BAILMENT 4.1 Definition and Nature of Bailment. 4.2 Rights and Duties of the Bailor and Bailee.	01
	5. CONSUMER PROTECTION ACT 5.1 Objectives of the Act, 5.2 Definition: Consumer, Goods/Service, Consumer Complaint, Consumer Dispute, Deficiency, Defect	01
	6. PREVENTION OF FOOD ADULTERATION ACT 6.1 Definition: Food, Adulterant, Adulteration, Misbranding and Label 6.2 Food Inspector - Powers and Duties 6.3 Procedure to be followed by Food Inspectors	02
	7. INDUSTRIAL DISPUTES ACT 7.1 Objectives and Applicability 7.2 Definition: Industry, Workmen, Industrial Dispute, Strike, Layoff, Lockout, Closure, Misconduct 7.3 Causes and Effects of Industrial Dispute 7.4 Kinds of Punishments: Minor and Major	03
	8. INDUSTRIAL EMPLOYMENT (STANDING ORDERS) ACT 8.1 Definition: Standing Orders 8.2 Model Standing Orders 8.3 Procedure for Disciplinary Action	02
	9. FACTORIES ACT 9.1 Definition: Factory, Occupier 9.2 General Duties of the Occupier. 9.3 Health, Safety and Welfare Provisions	
	10. BOMBAY SHOPS AND ESTABLISHMENTS ACT 10.1 Definition of Establishment, Commercial Establishment 10.2 Procedure for Registration. 10.3 Working hours	

UNIT NO.	TOPICS	TOTAL NO. OF HOURS
II	**Human Resource Development** 1.4.1 Introduction to Human Resource Development 1.4.2 Evolution of Human Resource Management 1.4.3 Importance of Human Resource Management 1.4.4 HRD Culture and Climate **Job Analysis and Job Design** – Meaning and Definition of Job Analysis – Job Analysis Objectives and Process of Job Analysis Job Description Job Specification – Job Design Factors affecting Job Design Approaches to Job Design **Human Resource Planning** – Introduction to Human Resource Planning (Definition and Concept) – Human Resource – Planning Process HR Demand Forecast HR Supply Forecast Measurement in Human Resource Planning Sub Topics – Human Resource Information System (HRIS) – Human Resource Audit	15
III	**Action Area** – Recruitment and Selection – Orientation and Placement – Training and Development On the job training Off the job training – Performance Appraisal Meaning and Purpose Limitations of Performance Appraisal Methods of Job Appraisal – Transfer, Promotion and Reward Policies	15

	Challenges of Human Resource Management – Absenteeism and Turnover – Balancing work with Life – Managing Diversity – Ethical Issues in HRM	
	TOTAL THEORY HOURS	**45**

REFERENCE

Name of the Book	**Author**	**Publisher**	**Place of Publication**	**Year**
Human Resource Development	David Mankin	Oxford University Press	New York	2009
Human Resource and Personnel Management (Text and Cases);	K.Aswathapa	Tata Mc Graw Hill	New Delhi	2005
Human Resource Management	Michael Vaz			
Elements of Commercial Law	Mr. N D Kapoor	Sultanchand		
Business Law	Mr. P C Tulsian			
Business Law	Venkataraman Kalaivani	Vipul Prakashan		
Bombay Rents, Hotel and Lodging House Rates Control Act 1947				
Prevention of Food Adulteration Act,1954				
Bombay Shops & Establishments Act, 1948				

Scheme of Examination (Theory)

(e) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated	05

	through organizing co-curricular activities, etc.	
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

MANAGEMENT INFORMATION SYSTEMS

Name of the Programme	Duration	Semester	Course/Course Code
B.Sc. in Hospitality Studies	Six Semesters	III/IV	MANAGEMENT INFORMATION SYSTEMS (USHO 308)
Course Code	Title	Credits	
USHO 308	MANAGEMENT INFORMATION SYSTEMS	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	--					
Credit	2	--					

Semester III/IV – 15 weeks

THEORY					PRACTICAL				
Hours / week	Total Hours	Notional Hours	Credits	Total Marks	Hours / week	Total Hours	Notional Hours	Credits	Total Marks
03	45	25	02		--	--	--	--	--

Contents of syllabus for USHO 308

(SEMESTER – III/IV) – 15 Weeks

Objective: To equip the student with the required knowledge to understand the theory and practical aspects of the functioning of the systems department of a hotel with focus on skills development in handling Property Management Systems software.

(Theory – 45 Hrs)

UNIT 1 **15 Hrs**

Management Information Systems

- Definition of MIS
- MIS Personnel
- Managing multi processor environments
- MIS security issues

Selecting and Implementing Computer systems

- Analysing current information needs
- Collecting sales information
- Establishing system requirements
- Requesting proposals from vendors
- Contract negotiation

UNIT 2 **15 Hrs**

Reservation Systems

- E-Distribution systems
- Intersell agencies
- Central Reservation Systems
- Property Level Reservation systems
- Reservations through the internet

Rooms Management and Guest Accounting Applications

- Room Management Module
- Guest Accounting Module

Point of Sale Technologies

- POS Order entry units
- POS Printers
- Accounts Settlement
- Managing Guest Accounts
- POS Software
- Automated Beverage control systems

UNIT 3 **15 Hrs**

Food & Beverage Management Applications

- Recipe Management
- Sales Analysis
- Menu Management
- Integrated Food Service software
- Automated Beverage system reports

Sales & Catering Applications

- Hotel Sales Office Automation
- Revenue Management
- Catering Software

(Practical 15 Hrs)

Sr.	Topic	Hr
1	Suggested Softwares to be used for Practical Purposes a. Opera b. Amadeus c. Fidelio d. IDS e. Shawman **<u>Standard PMS Exercises</u>** a. Creating a Profile of a guest	**15 Hrs**

	b. Creating a reservation record c. Creating a registration record d. Shortcut keys e. Manual Posting of vouchers f. Billing g. Report Generation	

Scheme of Examination (Theory)

(f) Internal assessment- 40 marks

Sr. No.	Evaluation type	Marks
1	Two assignments/ case study/ projects	20
2	One class test (multiple choice questions objective)	10
3	Active participation in routine class instructional deliveries (case studies/ seminars/ presentation)	05
4	Overall conduct as a responsible student, manners, skill, in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total	40

(b) Semester end examination (Pattern of Question Paper):-

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		60

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Students will be sent for Industrial Training either during the IIIrd or IVth semester as per the convenience of Industry/Institute. Classes will be conducted for the batch of students not undergoing Industrial Training.

The Industrial training semester will be a minimum of 20 weeks.
This is required as students need minimum 4 weeks exposure to each of the core departments.(Kitchen, Food & Beverage Service, Front Office & Housekeeping. The Training hours are calculated on the basis of 6 days a week and minimum 8 hours per day.

Semester IV - B.Sc. Hospitality Studies

Course Code	Subject	Class Room Instruction Face to Face									Notional				Credits			
		Per Week			Per Sem			Per Sem Hrs										
		L	P	T	L	P	T	L	P	T	L	P	T	Total	L	P	T	Total
USHO401	Industrial Exposure Training	-	48	-		960	-	-	960			40		1000	-	20	-	20
	Total	-	48			960	-	-	960			40		1000	-	20	-	20

L one lecture / period of 60 minutes (1 hr.) **P**

Notional includes time spent in library / home / other institutions for preparation and writing of assignments, quizes, open book test, journal, case studies, project, practical, field work, excursion, etc.

INDUSTRIAL TRAINING – USHO 401

Semester - IV

1. Exposure to Industrial Training is an integral part of the 4th semester. The class would be divided into two groups or as the case may be. The 20 weeks industrial training would be divided into all the major departments of the hotel.

2. Industrial Training will require an input of 120 working days i.e. (20 weeks x 06 days = 120 days).

3. For award of marks, 50% marks of IT would be on the basis of feed-back from the industry in a prescribed Performance Appraisal Form (PAF). It will be the students responsibility to get this feed-back / assessment form completed from departments of the hotel for submission to the institute at the end of Industrial Training. For the remaining 50% marks(10%-Presentation Skills,10% Viva, 10% Log Book and 20% Training Report) students would be assessed on the basis of seminar / presentation before a select panel. A hard copy of the report will also have to be submitted to the panel.

4. Responsibilities of Institute, hotel and the student / trainee with aims & objectives have been prescribed for adherence.

5. Once the student has been selected / deputed for industrial Training by the institute, he / she shall not be permitted to undergo IT elsewhere. In case students make direct arrangements with the hotel for Industrial Training, these will necessarily have to be approved by the institute. Students selected through campus interviews will not seek Industrial Training on their own.

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

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Semester V - B. Sc. (Hospitality Studies)

Course Code	Course	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO501	Food Production & Patisserie	3	4	-	45	60	-	45	60	-	105	100	100	2	2	-	4
USHO502	Food & Beverage Operations Management	3	4	-	45	60	-	45	60	-	105	100	100	2	2	-	4
USHO503	Front Office (16)	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO504	Housekeeping	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO505	Rooms Division Management(Practical)(pg 24)	-	4	-	-	60	-	-	60	-	60		100	-	2	-	2
USHO506	Corporate English	3	3	-	45	45	-	45	45	-	90	100	100	2	2	-	4
USHO507	Environmental & Sustainable Tourism	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
	Total	18	15	-	270	225	-	270	225	-	495	600	400	12	8	-	20
	L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial																

FOOD PRODUCTION & PATISSERIE (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semesters	V	Food Production & Patisserie- (USHO 501)
Course Code	**Title**	**Credits**	
USHO501	Food Production & Patisserie	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 501	Food Production & Patisserie	03	04	-	45	60	-	45	60	-	105	100	100	02	02	-	04

OBJECTIVES:

- To educate students on basic to advance culinary skills.
- To give an overview of culinary specialties across the globe.
- To educate students on latest food trends.
- To highlight the importance of food safety.
- To train students for better employment prospects.

Contents of syllabus for USHO501

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	Basic of Food Production 1.1 Classical Kitchen Brigade 1.2 Cuts of Vegetable 1.3 Cuts of Meat, Fish, Poultry 1.4 Basic Methods of Cooking 1.5 Stocks 1.6 Sauces 1.7 Soups 1.8 Salads	15	15
	2	Basics of Bakery & Confectionery 2.1 Breads 2.2 Cakes 2.3 Cookies 2.4 Pastries		
	3	Modern Cooking Techniques & Processes 3.1 Sous Vide Cooking, Cook Chill & Cook Freeze 3.2 HACCP (Definition, Process in brief, Application in the Kitchen) 3.3 FSSAI Law		
	4	Larder 4.1 Definition; layout of the department 4.2 Hierarchy, Duties & responsibilities of larder chef 4.3 Tools & Equipment of larder department 4.4 Importance of larder control 4.5 Yield testing		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	5	Charcuterie 5.1 Introduction to Charcuterie 5.2 Brines – Cures – Marinades - Smoking 5.2.1 Types, uses, differences 5.3 Forcemeats 5.3.1 Components of forcemeat 5.3.2 Methods of making forcemeat 5.4 Sausages 5.4.1 Components of sausage 5.4.2 Types of sausages 5.4.3 International sausages with country of origin	15	15

		5.5 Charcuterie Products 5.5.1 Galantine, Ballotine, Pates, Terrines 5.5.2 Mousse & Mousseline 5.5.3 Gelée, Aspic Jelly & Chaud Froid 5.6 Ham – Bacon – Gammon 5.6.1 Definitions 5.6.2 Types of Bacon 5.6.3 International Ham/Bacon with country of origin 5.6.4 Difference between Ham/Bacon/Gammon		
	6	Cheese 6.1 Definition & History 6.2 Manufacturing Process 6.3 Types & Uses 6.4 International Cheese with Country of origin 6.5 Cheese Board (Layout & Presentation)		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
03	**7**	International cuisine. 7.1 Geographic Location 7.2 Historical Background 7.3 Staple Food & Specialties With Recipes 7.4 Tourist Destination 7.5 Sports 7.6 Festivals 7.7 Regional Attire 7.8 Currency 7.9 Equipments & Raw Ingredients 7.10 Glossary Terms 7.11 Audio Visual Clips Assignment to be prepared any one from the following countries: • Europe Continent o France o Italy o Spain & Portugal o Germany o Great Britain o Scandinavian countries o Greece • Middle East o Morocco o Lebanon o Turkey • Far East o China	**15**	**15**

		○ Japan ○ Thailand • North Central America ○ USA ○ Mexico		
	8	Chocolate 8.1 History and sources 8.2 Manufacturing and processing of chocolate 8.3 Types of chocolates 8.4 Tempering of chocolate 8.5 Application of cocoa, butter and white chocolate		
	9	Icings 9.1 Definition & Introduction 9.2 Varieties of Icing 9.3 Uses of Icing		

- **List of Culinary Terms –**

1. Aloyou	18. Eeste	35. Noisette
2. Arêtes	19. En croute	36. Noix
3. Ballotine	20. Escargot	37. Rauget
4. Borde de lard	21. Esccrote	38. Rifroidir
5. Clou de girofle	22. Farine	39. Rognons
6. Cochon de loit	23. Fouetter	40. Roulade
7. Cornichon	24. Frappe	41. Rouler
8. Cotelette	25. Gelinette	42. Salpicon
9. Couronne	26. Gingembre	43. Saumure
10. Creamux	27. Godiveau	44. Suif
11. Crepine	28. Jombon	45. Tasse
12. Croquant	29. Laitance	46. Thon
13. Demi – devil	30. Medallion	47. Timbale
14. Denerver	31. Melange	48. Trencher
15. Depouiller	32. Merine	49. Viande
16. Eaut – gout	33. Navarin	50. Vide
17. Eberber	34. Nettoyer	

FOOD PRODUCTION & PATISSERIE (Practical)

Unit	Practical	Hours
1	**1.** France **2.** Italy **3.** Middle east **4.** China **5.** Breads (soft rolls/hard rolls/bread loaf)	20
2	**6.** USA **7.** Great Britain **8.** Spain / Portugal **9.** Mexico **10.** Pastries (Short Crust/Laminated/Choux)	20
3	**11.** Germany **12.** Thailand (South East) **13.** Greece **14.** International Classical Cakes (Black Forest/ Sacher Torte/ Dobos /Pavlova) **15.** Mystery Basket	20

- Each Menu will consist of dishes which comprises starter/soup/salad, main course with two accompaniments and a dessert.
- Examination Menu [Choice of 5 Menus – 5 Dishes which comprises of starter/soup/salad, main course with two accompaniments and a dessert. (1 Bakery Product compulsory)]

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	**Particulars for External Practical Examination**	**Marks**
1	Semester End Practical Examination	90
2	Journal	05
3	Viva	05
	Total	**100**

REFERENCE BOOKS

1. Hamlyn, Paul, (1984), *Larousse Gastronomique*, Hamlyn, London
2. Stevenson, Daniel, (1991), *Basic Cookery The Process Approach*, Stanley Thornes (Publishers Ltd., England
3. Kinsella John, & Harvey David, (1996), *Professional Charcuterie*, John Wiley & sons, Canada
4. Leto M.J.& Bode W.K.H., (2007), *The Larder Chef Food Preparation & Presentation*, Butterworth - Hinemann, UK
5. Campbell John , Foskett David, (2012), *Practical Cookery for level 2 NVQ & Apprenticeships*, Hodder Education, UK
6. Bali Parvinder S., (2012), *International Cuisine & Food Production Management*, Oxford University, New Delhi
7. Bali Parvinder S., (2011), *Quantity Food Production Operation*, Oxford University Press, New Delhi
8. Harbutt Juliet, (2009), *The World Encyclopedia of Cheese*, Hermes House , London
9. Ramesh P & Jos Wellman, (2009), *Professional Cookery -Theory & Practice*, Better Yourself Book, Mumbai
10. Basan Ghillie & Jan Terry, (2008), *A Practical Cook's Encyclopedia of Malaysia & Singapore*, Hermes House , London
11. Sheasby Anne, (2008), *New Soup Bible*, Hermes House , London
12. Chan Wynnie, (2004), *Fresh Chinese*, Hamlyn, Great Britain
13. Amiard Herve & Mouton Laurence, (2004), *A Taste of Morocco, Hachette, France*
14. Trutter Marion, (2009), *Culinaria Spain*, Konemann Publisher, Spain
15. Schlotter Katrin & Schmid Gregor, (2010), *Culinaria China; Cuisine, Country, Culture*, Hfullmann, China
16. Beazley Mitchell , (2007), *Cook Espana, Drink Espana - A Culinary Journey Around the food & Drink of Spain*, Mitchell Beazley, Great Britain
17. Foskett David & Cesrani Victor, (2007), *The Theory of Catering (with DVD)*, Book Power with Hodder, UK
18. Garlough robert & Campbell Angus, (2008), *Modern Garde Manger*, Thomson Delmer, Australia
19. France Christine, (2008), *Sauces*, Hermes House , London
20. Tubby Linda, (2008), *The Barbecue Bible*, Hermes House , London
21. Ingram Christine, (2008), *Appetizer, Starter Horsdoeures*, Hermes House , London
22. Ramesh P & Jos Wellman, 2009, *Professional Cookery -Theory & Practice*, Better Yourself Book, Mumbai
23. Gisslen Wayne, (2001), *Professional Cooking*, John Wiley & sons, New York
24. Larousssem, David, (1996), *Professional Garde Manger*, John wiley & sons, New Delhi

FOOD & BEVERAGE OPERATIONS MANAGEMENT (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	V	Food & Beverage Operations Management (USHO 502)
Course Code	**Title**	**Credits**	
USHO502	Food & Beverage Operations Management	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 502	Food & Beverage Operations Management	03	04	-	45	60	-	45	60	-	105	100	100	02	02	-	04

OBJECTIVES:

At the end of semester V the student will be able to:-

- Identify Food & Beverage setup and planning of various outlets in the department.
- Describe casual, theme restaurants etc. and how they are operated.
- How food service managers develop and manage labour & revenue control system.
- Explain how banquets and catering events are booked and planned, and describe how managers and staff members provide service for these events.
- Explain the operations of various catering establishments such as Railway, Airline & Marine caterings.

Contents of syllabus for USHO502

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	**1**	1.1 F & B Outlet Planning 1.1.1 Objective of a good layout 1.1.2 Steps in planning of layout. (Specialty Restaurants, Coffee Shop, Room Service) 1.1.3 Factors to be considered while planning the actual ambience (Colour, light, décor, furniture & uniform) 1.2 Operational aspects of various F & B Outlets (Specialty Restaurants, Coffee Shop, Room Service) 1.2.1 Menu planning 1.2.2 Constraints of Menu planning 1.2.3 Planning of staff requirement 1.2.4 Shifts (Panzer, Straight, Split & Reliever) 1.2.5 Factors to be considered for selecting appropriate Crockery, Cutlery, Glassware, and Linen. 1.3 Elements of cost 1.3.1 Types of cost (Material, Labour & Overhead) 1.3.2 Cost Groups (Fixed, semi-fixed & variable) & types of profit (gross & net) 1.3.3 Breakeven / Cost volume profit analysis	**15**	**15**

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	**2**	Function Catering / Banquets 2.1 Definition, History & Importance 2.2 Organization of Banquet dept., duties and responsibilities. 2.3 Types of Banquets: Formal, Semiformal & Informal 2.4 Banquet Sales 2.5 Banquet reservation diary and booking procedure. 2.6 Function contract & Function prospectus 2.7 Banquet Menus 2.8 Types of service in the banquets. 2.9 Staffing & Duty allocation 2.10 Toast procedure at wedding reception & Protocol 2.11 Outdoor catering. 2.12 Glossary **<u>Glossary</u>** **Audiovisual Equipment** Dais | Easel | Flip charts Keystoning | Lavaliere microphone | Lectern	**15**	**15**

Monitor	Opaque projector	Overhead projector
Podium (rostrum)	Roving microphone	Table microphone
Teleconferencing		

Exhibitions

Area exhibit	Booth exhibit	Consumer show
Exhibition (Exposition)	Floor load	Floor plan
Gross square feet	Hospitality suite	Island booth
Move-In/Move-Out Dates	Peninsula booth	Perimeter booth
Pipe and drape	Tabletop exhibit	Trade show/fair

Meeting And Convention Marketing

Breakout room	Citywide convention	CMP (Complete Meeting Package)
Cut-off date	Destination management companies	DMP (Day Meeting Package)
Duo serve	Function rooms	Home run accounts
ICW – In Conjunction With	Incentive travel house	Lead time
Letter of agreement	Major close	MICE
MMP (Modified Meeting Package)	Proposal	Sales blitz
Set-up time	Slippage	Spouse program
Tentative booking	Second-tier cities	Shoulder period
SMERF groups	Tickler file	Trial Close
Uni serve	Yield management	

Types of Meetings

Assembly	Breakout sessions	Clinic
Colloquium	Concurrent sessions	Conference
Congress	Convention	Dealer meetings
Forum	Incentive meetings	Plenary session
Retreat	Sales meeting	Seminar
Summit	Symposium	Workshop

Misc Function Catering Terminology

Air walls	Cash bar	Corkage
Crash bar	Guaranteed and Expected number	Head count
Host bar	PDR	Pre-function area
Reader Board	Reception	Skirting
Theme party	Upstage	

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	3	3.1 Buffet. 3.1.1 Definition & Types of buffets. (Meal period, manner of consumption, food served & other types – Display, Gourmet & Running) 3.1.2 Points to be considered while planning a buffet. 3.1.3 Buffet equipment 3.1.4 Banquet layout (formal, informal & cabaret) & Space area calculation 3.1.5 Meeting room setups: (U Shape, Hollow Square, Classroom Theatre, Board of Directors, 'T' Shape) 3.2 Food and Beverage Management in various catering establishments 3.2.1 Railway Catering & Airline catering 3.2.2 Marine Catering (offshore & cruise liners) 3.2.3 Industrial catering	15	15

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1	Design & Layout of a Specialty Restaurant, Coffee Shop or Room Service	(10)
2	Designing Function Prospectus	(10)
3	Layout of the various seating plans associated with banquets	(10)
4	Layouts of various buffet setup as per function & space requirement.	(10)

FOOD & BEVERAGE OPERATIONS MANAGEMENT (Practical)

Unit	Practical	Hours
1	1 Practice: Sample layout plans 1.1 Specialty Restaurants 1.2 Coffee Shop 1.3 Room Service 2 Compiling menus a la Carte (Specialty Restaurants, Coffee Shop, and Room Service). 3 Order-taking (Room Service). 4 Planning Duty Rota for, Specialty Restaurants, Coffee Shop, and Room Service	20
2	5 Drafting Function Prospectus 6 Table setups and arrangements for banqueting and buffet including menu designing with styles of service & Calculation of space requirement (Formal banquet, Cocktail parties, conventions, exhibition, fashion show, wedding reception).	20
3	7 Frilling (Box, Diamond & Accordion Pleated) 8 Screening of educational videos related to Railway, Airline, Marine & Industrial catering	20

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	90
2	Journal	05
3	Viva	05
	Total	**100**

REFERENCE BOOKS

1. Andrews S, (2009), *Food & Beverage Service A Training Manual,(Second Edition)*, Tata McGraw-Hill Publishing Company Limited, New Delhi
2. Fuller, John, (1992), *Advanced Food Service*, Stanley Thornes Publishers Ltd., England
3. Kivela, Jaksa, (1994), *Menu Planning for the Hospitality Industry*, Hospitality Press P Ltd., Melbourne
4. Lilicrap, Dennis & Cousins, John, (1994), *Food and Beverage Service*, Common Wealth Publication, New Delhi
5. Magris, Marzia, (1995), *An Introduction to Food & Beverage Studies*, Hospitality Press P Ltd, Melbourne
6. Singaravelavan .R, (2011), *Food and Beverage Service*, Oxford University Press, Delhi

FRONT OFFICE (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	V	Front Office (USHO 503)
Course Code	**Title**	**Credits**	
USHO503	Front Office	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 503	Front Office	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

Students will be able to:

- To understand the formulas that are applied in the front office for forecasting and evaluating
- Decision making through statistical data in Front office operations
- Understand the rules & acceptance of foreign exchange.

Contents of syllabus for USHO503

Unit No.	Chapter No.	TOPIC		
01	1	Planning Operations 1.1 Management Function 1.1.1 Planning, Organising, 1.1.2 Co-ordinating, 1.1.3 Staffing, Leading, 1.1.4 Controlling, Evaluating 1.2 Establishing Room Rate 1.2.1 Different Approaches for pricing rooms 1.2.2 Market Condition Approach, 1.2.3 Rule of Thumb, 1.2.4 Hubbart's Formula-Determining single and double rate 1.3 Special Room Rates Offered 1.3.1 Corporate / Commercial Rate, 1.3.2 Group Rate, 1.3.3 Promotional Rate, 1.3.4 Incentive Rate, 1.3.5 Family Rate, 1.3.6 Package, 1.3.7 Complimentary Rate 1.4 Forecasting Room Availability 1.4.1 Forecasting Data 1.4.1.1 Percentage of No-show, 1.4.1.2 Percentage of Cancellations, 1.4.1.3 Percentage of walk-ins, 1.4.1.4 Percentage of overstay, 1.4.1.5 Percentage of under stay, 1.4.2 Forecast formula; 1.4.3 Sample 3 and 10 days forecast; 1.4.4 Refining Forecast 1.5 Budgeting for Operations 1.5.1 Three Day Forecast; 1.5.2 Forecasting room revenue, 1.5.3 Estimating expenses, 1.5.4 Refining budget plans 1.6 Key Terms		
Unit No.	**Chapter No.**	**TOPIC**		
02	2	Evaluating Operations 2.1 Evaluating front office operations 2.1.1 Daily Operations Report, 2.1.2 Monthly Income Statement 2.1.3 Occupancy Ratios;		

		2.1.3.1 Occupancy Percentage 2.1.3.2 Room Count 2.1.3.3 House Count 2.1.3.4 Double Occupancy percentage 2.1.3.5 Bed Occupancy Percentage 2.1.3.6 Foreign Guest Percentage 2.1.3.7 Average Daily Rate 2.1.3.8 Revenue Per Available Room (RevPAR) 2.1.3.9 Average Rate Per Guest (ARG) 2.1.4 Yield Statistic. 2.1.5 Market Share Index/ Fare Market Share 2.1.6 Evaluation of Hotels By Guests 2.2 Key Terms		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	**3**	3.1 Handling Foreign Currency 3.2 Foreign Currency Exchange 3.3 Procedures to be followed while exchanging Foreign Currency 3.4 Currencies accepted by RBI 3.5 Foreign Exchange Certificate- Format 3.6 Foreign Exchange Settlements using Credit Cards. 3.7 Export Promotion Capital Goods Scheme (EPCG)		

Contents of syllabus for USHO505

FRONT OFFICE (Practical)

Unit	Practical	Hours
1	Group Discussion	
2	Situation Handling	
3	Manpower Planning	

FRONT OFFICE (ASSIGNMENTS)

Sr. No.	Topic for Assignments	Marks
1	Designing of Tariff card & Designing of Brochure	10

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q – 1	1	15

Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. Andrews, Sudhir, (1995), *Hotel Front Office Training Manual*, The Tata M'cGraw Hill, New Delhi.
2. Andrews, Sudhir, (2007), *Front Office Management & Operations*, The Tata M'cGraw Hill, New Delhi.
3. Aggarwal Ravi, (2002), *Hotel front Office*, sublime Publications, Jaipur.
4. Bhatnagar S.K, (2002), *Front office Management*, Frank Bros & Co., New Delhi.
5. Chakravarti B.K., (1999), *Front Office Management in Hotel*, CBS Publisher, New Delhi.
6. Chakrawarti B.K., (2006), *Concept of Front Office Management*, APH Publishing, New Delhi.
7. Singh R.K., (2006), *Front Office Management*, Aman Publication New Delhi.
8. Tewari Jatashankar R., (2009), *Hotel Front Office Operations & Management*, Oxford University Press, New Delhi.

HOUSEKEEPING (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	V	Housekeeping (USHO 504)
Course Code	**Title**	**Credits**	
USHO504	Housekeeping	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 504	Housekeeping	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

At the end of semester V:

- Explain and apply the guidelines for hiring various housekeeping contract services.
- Manage the man power planning in the housekeeping department in different category of hotels.
- Apply the elements and concept of interior decorations & elevations.

Contents of syllabus for USHO504

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	Current Trends In Housekeeping 1.1 Green housekeeping practices 1.2 Cleaning equipment and agents 1.3 Guest supplies and amenities 1.4 Level of service (Limited Service, Mid-Range and Full Service)	15	15
	2	Contract Services / Outsourcing 2.1 Types of contract 2.2 Guidelines for hiring contract services 2.3 Advantages and disadvantages of contract service		
	3	Manpower Planning 3.1 Determining staff strength (fixed staff) 3.2 Scheduling staff (Duty Rosters)		
Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
02	4	Lighting And Lighting Fixtures 4.1 Lighting for different areas of the hotel 4.2 Functional and aesthetic aspects of light	15	15
	5	Windows and Window Treatment 5.1 Types of windows and window treatment 5.2 Selection and care		
	6	Wall and Ceiling Finishes 6.1 Types 6.2 Selection 6.3 Care		
Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
03	7	Carpets and Floor Coverings 7.1 Types 7.2 Selection 7.3 Care	15	15
	8	Interior Designing 8.1 Elements of design 8.2 Principles of design 8.3 Colour schemes		

HOUSEKEEPING (ASSIGNMENTS)

Sr. No.	Topic for Assignments	Marks
1	Calculating Staffing levels / Manpower Planning (Small to medium hotel)	(10)
2	Calculating curtain material requirements and costing for different Window Treatments	(10)
3	Samples / brochures / pictures and information for Floor Coverings	(10)
4	Samples / brochures / pictures and information for Wall Finishes.	(10)
5	Sourcing of various housekeeping contract service providers in Mumbai – High rise cleaning/ Façade Cleaning/ Carpet Shampooing, Washroom Services etc.	(10)

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1 Raghubalan G., Raghubalan Smritee, (2007 – 2009), *Hotel Housekeeping Operations and Management*, 2nd Edition, Oxford University Press.
2 Singh Malini & George Jaya B., (2008), *Housekeeping Operations, Design and Management*, 1st Edition, Jaico Publications.
3 Jones Thomas J.A., (2005), *Professional Management of Housekeeping Operations*, 4th Edition, John Wiley & Sons.
4 Andrews Sudhir, (2007), *Text Book of Hotel Housekeeping Management & Operations*, 1st Edition, Tata McGraw Hill.

ROOMS DIVISION MANAGEMENT (Practical)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	V	Rooms Division Management (USHO 505)
Course Code	**Title**	**Credits**	
USHO505	Rooms Division Management	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact		4					
Credit		2					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 505	Rooms Division Management	03	04	-	45	60	-	45	60	-	105	100	100	02	02	-	04

OBJECTIVES:

- To enhance the capabilities of student in understanding the contemporary hospitality and general issues through discussion and managing situations.
- To understand the importance of manpower planning in accommodation operation.
- To practically learn and demonstrate housekeeping operation and get an insight into the concept of colour wheel and elements & principles of design.

Contents of syllabus for USHO505

FRONT OFFICE (Practical)

Unit	Practical	Hours
1	Group Discussion	10
2	Situation Handling	10
3	Manpower Planning	10

HOUSEKEEPING (Practical)

Unit	Practical	Hours
1	Creating SOPs (Standard Operating Procedure) for: • Turn-down service • Entering a guest room • Cleaning WC (Water Closet) • Cleaning and setting Vanity counter • Cleaning shower cubicle / bathtub • Vacuum Cleaning • Dusting guest room • Laundry collection • Stacking Maid's Trolley • Elevator cleaning	10
2	Creating Area Checklist (Rooms and Public Area)	05
3	Illustration of a colour wheel	05
4	Identifying & Creating colour schemes	10

Scheme of Examination (Practical)

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	90
2	Journal	05
3	Viva	05
	Total	**100**

CORPORATE ENGLISH (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	V	Corporate English (USHO 506)
Course Code	**Title**	**Credits**	
USHO506	Corporate English	2+2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	4					
Credit	2	2					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 506	Corporate English	03	04	-	45	60	-	45	60	-	105	100	100	02	02	-	04

OBJECTIVES:

- To enable the student to enhance their communication skills (verbal & written)
- To adapt to the challenges in the global scenario.
- To practice the dynamics of business etiquettes.

Contents of syllabus for USHO506

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	General Business English 1.1 Business English basics 1.2 General vocabulary 1.3 Introduction to International English	15	15
	2	Grammar 2.1 Words and Phrases 2.2 Overview of tenses 2.3 Other common areas of difficulty for Indian speakers 2.4 Prepositions, time expressions & pronouns 2.5 Articles and nouns 2.6 Sentence Construction		
	3	Group Discussions 3.1 Group discussion competencies 3.2 Active listening 3.3 Expanding Arguments 3.4 Functional language 3.5 Paragraph development		
	4	Public speaking & Presentation skills 4.1 Structuring your presentation 4.2 Linguistic techniques 4.3 Introduction to effective openings - task 4.4 Hooks : seeking the audience attention 4.5 Sign posting language 4.6 The visual and vocal components 4.7 Visual aids 4.8 Other essential Sub Skills 4.9 Body language 4.10 Dealing with questions 4.11 Effective Presentation Strategies 4.12 Interviews / Group Discussion		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	5	Vocabulary 5.1 Word building 5.2 Dictionary skills	15	15
	6	Power writing 6.1 The writing process		

		6.2 The Power writing process 6.3 Focus on content 6.4 Make your purpose clear 6.5 Make the intended action explicit 6.6 Focus on structure 6.7 Focus on language 6.8 Complete and concise messages		
	7	Interpersonal Skills		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
03	**8**	Academic Writing 8.1 The writing process 8.2 Structuring an essay 8.3 Writing ideal introductions 8.4 General statements 8.5 Paragraph construction 8.6 Organising main ideas & controlling ideas	**15**	**15**
	9	Topic sentences 9.1 Supporting sentences 9.2 Transition words & phrases 9.3 Plagiarism / Referencing 9.4 Critical thinking skills 9.5 Paraphrasing & writing effective conclusion		
	10	Corporate Communication 10.1 Business letters, Emails, Memo, Report 10.2 Meetings, Team work, MICCEE (Meetings, Incentives, Conventions, Conference, Events & Exhibition) 10.3 Cross cultural communication		

CORPORATE ENGLISH (Practical)

Unit	Practical	Hours
1	1. Revision of Grammar 2. Presentation I – Current Issues 3. Group Discussion	20
2	4. Personal Interviews 5. Presentation II (Groups & Individual) 6. Structuring the presentation 7. Visual Aids to enhance effective presentation	20
3	8. Formal E-mail & Telephonic etiquettes, 9. Active listening, body language, posture, eye contact 10. Academic writing (Report writing, essay writing, assignment) 11. Role play, conducting, meeting / conference	20

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	90
2	Journal	05
3	Viva	05
	Total	**100**

REFERENCE BOOKS

1. Thill, J.V. and Bovee C.L. (2005). *Excellence in Business Communication,* 6th ed. USA: Pearson Prentice-Hall
2. Kumar, S. and Lata, P. - (2012). *Communication Skills,* 1st ed. Oxford University press
3. Sen, L. (2008). *Communication Skills,* 2nd ed Prentice Hall of India Private Ltd.
4. Raman, M and Sharma, S. (2004) *Technical Communication,* Oxford University Press,
5. Francis, S. (2009) *Effective Business Communication,* 1st ed. Macmillan Publishers Pvt. Ltd

ENVIRONMENTAL & SUSTAINABLE TOURISM (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	V	Environmental & Sustainable Tourism (USHO 507)
Course Code	**Title**	**Credits**	
USHO507	Environmental & Sustainable Tourism	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 507	Environmental & Sustainable Tourism	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

At the end of semester V:

- The student will be able to understand and explain the importance of Environmental and Sustainable Tourism.
- The student will be able to identify and explain Environmental changes due to Tourism.
- The student will comprehend Sustainability of Tourism for future generations.
- The student will be able to understand about the World's fastest growing Travel & Tourism industry.

- **Contents of syllabus for USHO504**

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	Environmental Studies 1.1 Definition, Scope and Importance 1.2 Need for public awareness 1.3 Renewable & Non-renewable Resources (Definition & Importance) 1.4 Consumerism & Waste Products	15	15
	2	Introduction to Tourism & Travel 2.1 Flashback – From early times till today (Purpose of travel in ancient times, invention of wheel, contribution of Thomas Cook, today's scenario). 2.2 Definition of Tourism as stated by U.N.W.T.O. 2.3 Types of Tourism-Pilgrimage, Business Tourism, Health Tourism, Adventure Tourism, Sports Tourism, Culinary & Wine Tourism. 2.4 Definition of Travel 2.5 Various modes of Transport – Land (Rail and Road), Water (Ferries and Cruises), Air.		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	3	Tourism Organisations 3.1 National/Domestic Organisations (M.T.D.C., I.T.D.C.) 3.2 International Organisations (U.N.W.T.O., W.T.T.C., U.F.T.A.A., U.N.E.S.C.O., S.T.I.)	15	15
	4	Sustainable Development 4.1 Why Sustainable Development? 4.2 Rio Summit 4.3 Impact of Tourism on the World		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	5	Sustainable Tourism 5.1 Introduction to Sustainable Tourism 5.2 Sustainable Tourism with respect to Developed Countries (List of these countries, one major destination from each country that requires Sustainable development) 5.3 Sustainable Tourism with respect to Developing Countries	15	15

		(List of these countries, one major destination from each country that requires Sustainable development) 5.4 Sustainable Tourism in India 5.5 Sustainable Tourism in Mumbai 5.6 Sustainable Tourism as an Umbrella – Ecotourism, UNESCO Sites. 5.7 Impact of Travel on Sustainable Tourism 5.8 Impact of Accommodation on Sustainable Tourism 5.9 Responsible Tourism – Guidelines, "Making Tourism More Sustainable – A Guide for Policy Makers" – Role of United Nations Environment Programme (UNEP).		

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1	Sustainable Tourism advice for any location / place in India	10
2	Environmental effects of Tourism	

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. Roday, S., (2012), *Tourism Operation and Management*, 1st Edition, Oxford University Press.
2. Narasaiah, M., (2003), *Tourism and the Environment*, 1st Edition, Discovery Publishing House.
3. Holden, A., (2008), *Environment & Tourism*, 2nd Edition, Routledge.
4. Sharpley, R., (2009), *Tourism Development & the Environment: Beyond the Sustainability*, 1st Edition, Earthscan.
5. Zeppel, H., (2006), *Indigenous Ecotourism*, 3rd Edition, Cabi publications.
6. Raj, A., (2007), *Sustainability Profitability & Successful Tourism*, 1st Edition, Kanishka Publishers.

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

Semester VI - B. Sc. (Hospitality Studies)

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO601	**Organizational Behaviour**	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO602	**Strategic Management**	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO603	**Event Planning, Marketing & Management**	-	4	-	-	60	-	-	60	-	60		100	-	2	-	2
USHO604	**Core Elective (Any TWO)**	6	16	-	90	240	-	90	240	-	330	200	400	4	8	-	12
USHO604A	Advanced Food Production	3	8	-	45	120	-	45	120	-	165	100	200	2	4	-	6
USHO604B	Advanced Food & Beverage Operations Management	3	8	-	45	120	-	45	120	-	165	100	200	2	4	-	6
USHO604C	Advanced Housekeeping	3	8	-	45	120	-	45	120	-	165	100	200	2	4	-	6
USHO604D	Advanced Front Office(pg 29)	3	8	-	45	120	-	45	120	-	165	100	200	2	4	-	6
USHO604E	Advanced Bakery & Confectionery	3	8	-	45	120	-	45	120	-	165	100	200	2	4	-	6
USHO605	**Allied Elective (Any ONE)**	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO605A	Revenue Management	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO605B	Foreign Language (French)	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO605C	Services Marketing	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO605D	Financial Management	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
USHO605E	Strategic Human Resource Management	3	-	-	45	-	-	45	-	-	45	100		2	-	-	2
	Total	15	16	-	225	240	-	225	240	-	525	500	500	10	10	-	20
	L one lecture / period of 60 minutes (1 hr.) **P** Practical **T** Tutorial																

ORGANIZATIONAL BEHAVIOUR (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Organizational Behaviour (USHO 601)
Course Code	**Title**	**Credits**	
USHO601	Organizational Behaviour	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 601	Organizational Behaviour	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

- The objective of Organizational Behaviour is to provide students with the opportunity to diagnose Individual and Group Behaviour.
- The study of Structure, Motivation & Change helps to develop skills in improving individual and group performance in entrepreneurial and established ventures.
- To develop the overall personality and sustain in the dynamic environment.

Contents of syllabus for USHO601

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	**1**	**Introduction to Organizational Behaviour** 1.1 Definition of Organizational Behaviour 1.2 What Managers Do 1.2.1 Management Functions 1.2.2 Management Roles 1.2.3 Management Skills	**15**	**15**

		1.2.4 Effective v/s Successful Managerial activities 1.3 Disciplines that contribute to the Organizational Behaviour field 1.4 Individual Behaviour 1.4.1 Ability 1.4.2 Biographical characteristics 1.4.3 Learning & Process of Learning 1.4.4 Introduction & Importance to Perception, Values & Attitude 1.4.5 Personality & Its Determinants 1.5 Group Behaviour 1.5.1 Types of Groups 1.5.2 The Five stage model (Group Dynamics / Development)		
	2	**Organizational Structure** 2.1 What is Organizational Structure 2.1.1 Six Elements of organizational structure 2.2 Organizational Designs 2.2.1 Common Organizational Designs (Simple, Bureaucratic, Matrix) 2.2.2 New Design options (Virtual, Team, Boundaryless)		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	**3**	**Motivational Concepts** 3.1 Define Motivation 3.2 Early Theories of Motivation 3.2.1 Maslow Abraham's Hierarchy of Needs theory 3.2.2 Douglas McGregor's Theory X & Theory Y 3.2.3 Fredrick Herzberg's Two Factor Theory 3.2.4 Mc Cleland's Theory of Needs 3.3 Contemporary Theories of Motivation 3.3.1 Cognitive Evaluation Theory (Definition) 3.3.2 Goal setting Theory (Definition) 3.3.3 Self Efficacy Theory (Definition) 3.3.4 Reinforcement Theory (Definition) 3.3.5 Equity Theory (Definition) 3.3.6 Expectancy Theory (Definition) 3.4 Leadership & Types of Leadership	**15**	**15**
	4	**Stress Management** 4.1 What is Stress? 4.2 Potential Sources of stress 4.3 Consequences of Stress 4.4 Managing stress 4.5 Introduction to Quality of Work Life		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	5	**Organizational Change** 5.1 What is change? 5.2 Elements / Factors of Change (External & Internal) 5.3 Planned Change 5.4 Resistance to change 5.5 Overcoming Resistance to Change 5.6 Approaches to Managing Organizational change 5.6.1 Lewin's 3 step model 5.6.2 Action Research 5.6.3 Meaning of Organizational Development & Techniques / Intervention 5.7 Introduction to Diversity & Managing Diversity	15	15
	6	**Conflict Management** 6.1 Definition of Conflict 6.2 Sources & Types of Conflict 6.3 Conflict Management Styles 6.4 Power and Politics 6.4.1 Concept & Basis of Power 6.4.2 Organization Politics		

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

Sixth Semester (Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1	15
Q - 2	2	15

Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. Stephen P. Robbins, Timothy A. Judge, Seema Sanghi; (2010); *Organizational Behavior*; Tenth Edition; Pearson Education Publication
2. Fred Luthans; (2007); *Organizational Behavior*; Eleventh Edition; McGraw Hill Publication
3. Udai Pareek; (2011); *Understanding Organizational Behaviour*; Third Edition ; Oxford Publication
4. S S Khanka; (2012); *Organizational Behaviour Text & Cases*; Fourth Edition ; S Chand & Co. Limited
5. Uma Sekaran; (2004); *Organizational Behaviour Text & Cases*; Second Edition ; McGraw Hill

STRATEGIC MANAGEMENT (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Strategic Management (USHO 602)
Course Code	**Title**	**Credits**	
USHO602	Strategic Management	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 602	Strategic Management	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

At the end of semester VI:

- The students will identify the operating strategy of the organization.
- Develop skills in decision making
- Students will be able to strategize and participate in policy making.

Contents of syllabus for USHO602

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	**1**	**Introduction to Strategic management** 1.1 Definition – Strategy, Strategic Management and its relevance 1.2 Process of Strategic Management 1.3 Levels of Strategy : Corporate, Divisional Business, Operational or Functional	**15**	**15**

		1.4 7 'S' Frame Work		
	2	**Strategic Intent** 2.1 Vision , Mission, Business definition, Goals and Objectives 2.2 Mission Statement and its Characteristics 2.3 Corporate Social Responsibility		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
02	**3**	**Environmental Analysis** 3.1 Concept of Organizational Environment : Internal and External Environment 3.2 Process of SWOT analysis 3.3 Need for Environmental analysis (External Environment) 3.4 External Factor Evaluation Matrix (EFE)	**15**	**15**
	4	**Organizational Appraisal** 4.1 Dynamics of Internal Environment 4.2 Six Organizational Capability factors 4.3 Internal Factor Evaluation Matrix (IFE) 4.4 Competitive Profile Matrix (CPM) 4.5 Industry Analysis (Porter's Five Force Analysis)		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
03	**5**	**Strategy Formulation** 5.1 Types of Strategy 5.1.1 Intensification Strategies : 5.1.1.1 Market penetration 5.1.1.2 Market Development 5.1.1.3 New Product Development 5.1.1.4 Innovation 5.1.2 Integrative Strategies: 5.1.2.1 Horizontal 5.1.2.2 Vertical 5.1.3 Diversification Strategies 5.1.3.1 Concentric (Related) 5.1.3.2 Conglomeratic (Unrelated) 5.1.4 Restructuring / Retrenchment Strategies: 5.1.4.1 Turnaround 5.1.4.2 Divestment 5.1.4.3 Liquidation 5.1.4.4 Merger 5.1.4.5 Acquisition (Take Over) 5.1.4.6 Joint Venture	**15**	**15**
	6	**Strategic Evaluation** 6.1 Nature and its importance		

		6.2 Process of Strategic Evaluation		

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1.	SWOT Analysis	10
2.	CSR (Case Study)	
3.	Strategy Formulation (Any ONE)	
4.	Industry Analysis	

REFERENCE BOOKS

1. Kazmi, A.(2011) *Strategic Management and Business Policy 3rd ed.,* The McGraw Hill Companies.

2. David,F.(2011) *Strategic Management Concept and Cases* 13th ed., Pearson Education
3. Ramswamy ,V.S., Namakumari, S.(2007) *Strategic Planning Formulation of Corporate Strategy*, Macmillen
4. Srinivasan, R., (2006), Strategic Management *The Indian Context* , 2nd Prentice Hall of India
5. Enz,C., (2010), *Hospitality Strategic Management* 2nd ed. John Wiley and Sons, Inc.

EVENT PLANNING, MARKETING & MANAGEMENT (Practical)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Event Planning, Marketing & Management (USHO 603)
Course Code	**Title**	**Credits**	
USHO603	Event Planning, Marketing & Management	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact		4					
Credit		2					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 603	Event Planning, Marketing & Management	-	04	-	-	60	-	-	60	-	60	-	100	-	02	-	02

OBJECTIVES:

On successful completion of this course students will be able to:

- Apply Management Theories & Principles for Event management.
- Develop an ability to plan for conventions, seminars & events.
- Prepare financial reports and establish source of funding for a new operation.
- Plan events creatively and think strategically.
- Understand the financial, marketing, operational and strategic issues in setting up an event.
- Integrate approaches of time, money (capital), people and other resources.
- Understand the concept of Event Management.

Contents of syllabus for USHO603

Unit	Practical	Hours
1	1) Importance of Event Management 2) Financial Management (Projected, Estimated, Formats etc….)	20

	3) Concept, Theme, Design & Interiors (Housekeeping) 4) Publicity, Promotion and Guest Relation (Front Office)	
2	5) Revenue Generation (Sales & Marketing) 6) Production Planning & Menu Designing (Food Production) 7) Service, Planning & Delivery (Food & Beverage) 8) Entertainment, Licenses, Security etc…. (Management)	20
3	9) Industry Guest Speakers 10) Drafting of Reports 11) Final Report Presentation & Viva	20

Students need to prepare a Report of the Event, guidelines for the report is given below:

No.	Particular
1	Title of the Event
2	Name of the Student
3	Designation of the Student for the Event
4	Department of Operation
5	Event Objectives / Purpose / Theme
6	Introduction to the Event (Reason for the Theme)
7	Estimated Budget / Projection (Should include all departments for Final Estimated Cost)
8	Estimated Departmental Budget Breakup
9	Target Audience / Market / Foot falls / Projected
10	Competitive Marketing Analysis
11	Sales & Marketing Activity • Generation of Funds for the Event • Projected Sponsors
12	Publicity & promotion Activity (e.g. Advertisement, Collateral, Newspaper, Hoarding's Radio, TV etc.
13	Student Organizational Chart
14	Student Departmental Chart
15	Role / Contribution of the Individual Student in the Respective Department
16	Challenges faced by the Individual student and overall team
17	Troubleshooting of challenges and problems.
18	Learning Outcome
19	Annexure (e.g. Pre or Post event Photographs, Charts, Diagrams, Invites, Formats, Interviews etc.)

Scheme of Examination

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	90

2	Journal	05
3	Viva	05
	Total	**100**

NOTE: University External Examiner will be from the pool of Examiners approved by the University of Mumbai.

REFERENCE BOOKS

1. Bowdin,Glenn & Mcdonnell, (1999), *Events Management*, Ian Elserier, Amsterdam
2. Mcdonnell Ian & Allan Johnny, (1999), *Festival and Special Event Management*, John Wiley & sons, New York
3. Tarlow Peter, (2002), *Event Risk Management and Safety*, John Wiley & Sons,New York
4. Otoole,William & Mikolaitis,Phyllis, (2002), *Corporate Event Project Management*, John Wiley & Sons, New York.
5. Lemaire Clndy & Walkar Mardi, (2006), *Start & Run an Event Planning Business*, Jaico Publishing House, Mumbai
6. Conway Des, (2004), *The Event Manager's Bible*, How to Books, UK.
7. Goldblatt Joe, (1997), *Special Events*, John Wiley & Sons, New York

ADVANCED FOOD PRODUCTION (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Advanced Food Production - (USHO 604A)
Course Code	**Title**	**Credits**	
USHO604A	Advanced Food Production	2+4	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	8					
Credit	2	4					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO 604A	Advanced Food Production	03	08	-	45	120	-	45	120	-	165	100	200	02	04	-	06

OBJECTIVES:

- The objective is to get students to attain expertise in their culinary skills.
- To familiarize students on various aspects of kitchen management.
- To encourage and develop students to become independent entrepreneurs.

Contents of syllabus for USHO604A

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	Kitchen Management 1.1 Flow of work 1.2 Layout and design 1.3 Food Cost Control	15	15
	2	Kitchen Stewarding 2.1 Importance of kitchen stewarding. 2.2 Hierarchy of kitchen stewarding. 2.3 Functions of stewarding Manager. 2.4 Equipments found in stewarding department. 2.5 Garbage Disposal		

Unit No.	Chapter No.	TOPIC	Hours	Marks

<table>
<tr><td rowspan="3">02</td><td>3</td><td>Sandwich
3.1 History of Sandwich
3.2 Components of a sandwich
3.3 Types of sandwich
3.4 Guidelines for preparation and storage of sandwich
3.5 Accompaniments and Dips</td><td rowspan="3">15</td><td rowspan="3">15</td></tr>
<tr><td>4</td><td>Classical garnishes (25)
<table><tr><td>A La Francaise</td><td>Alaska</td><td>Allemande</td></tr><tr><td>Bercy</td><td>Bonne Femme</td><td>Bouquetiere (A la)</td></tr><tr><td>Bourguignonne</td><td>Cardinal</td><td>Chasseur</td></tr><tr><td>Colbert</td><td>Diable, Ala</td><td>Dieppoise</td></tr><tr><td>Maltaise</td><td>Milanaise</td><td>Nantua</td></tr><tr><td>Neapolitaine</td><td>Nicoise</td><td>Noisette</td></tr><tr><td>Parisienne</td><td>Portugaise</td><td>Thermidor</td></tr><tr><td>Veronique</td><td>Waldorf</td><td>Wellington</td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>5</td><td>Horsd’oeuvres
5.1 Definition and history
5.2 Guidelines for the preparation of Hors d’oeuvres and Amuse Bouche.
5.3 International Hors d’oeuvres(Hot & Cold)
5.4 Russian, Italian, Spanish, English, Swedish, Indonesian,
5.5 Japanese, Greek</td></tr>
</table>

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	**6**	Non Edible Displays 6.1 Ice-carving 6.2 Tallow sculpture 6.3 Fruit and vegetable displays 6.4 Salt dough 6.5 Thermocol work 6.6 Sugar & Chocolate Display	**15**	**15**
	7	Uses of wines, herbs and spices in cooking		
	8	Organoleptic & sensory evaluation of food		
	9	Contemporary cooking trends		
	10	Culinary terms (100)		

- **List of Culinary Terms –**

1. Abetis	35. Cru	69. Gras double
2. Agneau	36. Cuillere	70. Grenodin
3. Aiguille – a – Piquer	37. Decouper	71. Gretter
4. Aiguille – e – Brider	38. Degorger	72. Grillede

5. Airallas	39. Demi – devil	73. Grosso piece
6. Aloyou	40. Denerver	74. Jombon
7. Arêtes	41. Denoyauter	75. Laitance
8. Ballotine	42. Doree	76. Lattue
9. Bavette	43. Douilles	77. Medallion
10. Bonne bouche	44. Eberber	78. Melange
11. Borde de lard	45. Ecaillage	79. Mignon
12. Bouchee or volauvents	46. Ecailler	80. Monter au beurre
	47. Eeste	81. Moutarde
13. Brider	48. En croute	82. Navarin
14. Broye	49. En papillote	83. Noisette
15. Carapace	50. Epaule	84. Noix
16. Cereasse	51. Epices	85. Os a Moelle
17. Cerre	52. Eplucher	86. Rauget
18. Cervelle	53. Escargot	87. Rifroidir
19. Chapalure	54. Esccrote	88. Roghon
20. Chaufroiter	55. Estomac	89. Rognon
21. Chipolata	56. Farcir	90. Roulade
22. Clou de girofle	57. Farine	91. Rouler
23. Cochon de loit	58. Fender	92. Salpicon
24. Contrefilet	59. Foncer	93. Saumure
25. Corbeille	60. Fouetter	94. Tasse
26. Corjevil	61. Frappe	95. Thon
27. Cornichon	62. Fricandelle	96. Timbale
28. Cotelette	63. Gingmbre	97. Trenche
29. Couronne	64. Glacicre	98. Trencher
30. Crapaudine	65. Godiveau	99. Viande
31. Creamux	66. Gout	100. Vide
32. Crepine	67. Graisse	
33. Crepinette	68. Gras	
34. Croquant		

ADVANCED FOOD PRODUCTION (Practical)

Unit	Practical	Hours
1	1 High tea menu 2 Brunch 3 Breakfast 4 Festive 1 (Indian / International) 5 Festive 2 (Indian / International) 6 Festive 3 (Indian / International)	40

	7 Mystery Basket for a cocktail menu with 3 starters (veg) 8 Mystery Basket for a cocktail menu with 3 starters (Non-veg) 9 Sushi 10 Dimsum	
2	11 Demo by Guest Chef 12 Demo by Guest Chef 13 Larder 1 14 Larder 2 15 Mystery Basket (Vegetable) 16 Five course menu (soup/salad/starter; Main course with 2 accompaniments and dessert 17 Mystery Basket (Non -Vegetable 18 course menu (soup/salad/starter; Main course with 2 accompaniments and dessert 19 Mystery Basket (Non -Vegetable) 20 Five course menu (soup/salad/starter; Main course with 2 accompaniments and dessert	40
3	21 Scandinavia 22 Malaysian 23 Indonesian 24 Fusion menu 1 25 Fusion menu 2 26 Indian street food 27 international street food 28 finger food 29 practice menu 30 mystery basket	40

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05

	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.
- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	**Particulars for External Practical Examination**	**Marks**
1	Semester End Practical Examination	180
2	Journal	10
3	Viva	10
	Total	**200**

REFERENCE BOOKS

1. Hamlyn, Paul, (1984), *Larousse Gastronomique*, Hamlyn, London
2. Stevenson, Daniel, (1991), *Basic Cookery The Process Approach*, Stanley Thornes (Publishers Ltd., England
3. Kinsella John, & Harvey David, (1996), *Professional Charcuterie*, John Wiley & sons, Canada
4. Leto M.J.& Bode W.K.H., (2007), *The Larder Chef Food Preparation & Presentation*, Butterworth - Hinemann, UK
5. Campbell John , Foskett David, (2012), *Practical Cookery for level 2 NVQ & Apprenticeships*, Hodder Education, UK
6. Bali Parvinder S., (2012), *International Cuisine & Food Production Management*, Oxford University, New Delhi
7. Bali Parvinder S., (2011), *Quantity Food Production Operation*, Oxford University Press, New Delhi
8. Harbutt Juliet, (2009), *The World Encyclopedia of Cheese*, Hermes House , London

9. Ramesh P & Jos Wellman, (2009), *Professional Cookery -Theory & Practice*, Better Yourself Book, Mumbai
10. Basan Ghillie & Jan Terry, (2008), *A Practical Cook's Encyclopedia of Malaysia & Singapore*, Hermes House , London
11. Sheasby Anne, (2008), *New Soup Bible*, Hermes House , London
12. Chan Wynnie, (2004), *Fresh Chinese*, Hamlyn, Great Britain
13. Amiard Herve & Mouton Laurence, (2004), *A Taste of Morocco, Hachette, France*
14. Trutter Marion, (2009), *Culinaria Spain*, Konemann Publisher, Spain
15. Schlotter Katrin & Schmid Gregor, (2010), *Culinaria China; Cuisine, Country, Culture*, Hfullmann, China
16. Beazley Mitchell , (2007), *Cook Espana, Drink Espana - A Culinary Journey Around the food & Drink of Spain*, Mitchell Beazley, Great Britain
17. Foskett David & Cesrani Victor, (2007), *The Theory of Catering (with DVD)*, Book Power with Hodder, UK
18. Garlough robert & Campbell Angus, (2008), *Modern Garde Manger*, Thomson Delmer, Australia
19. France Christine, (2008), *Sauces*, Hermes House , London
20. Tubby Linda, (2008), *The Barbecue Bible*, Hermes House , London
21. Ingram Christine, (2008), *Appetizer, Starter Horsdoeures*, Hermes House , London
22. Ramesh P & Jos Wellman, 2009, *Professional Cookery -Theory & Practice*, Better Yourself Book, Mumbai
23. Gisslen Wayne, (2001), *Professional Cooking*, John Wiley & sons, New York
24. Larousssem, David, (1996), *Professional Garde Manger*, John wiley & sons, New Delhi

ADVANCED FOOD & BEVERAGE OPERATIONS MANAGEMENT (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Advanced Food & Beverage Operations Management - (USHO604B)
Course Code	**Title**	**Credits**	
USHO604B	Advanced Food & Beverage Operations Management	2+4	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	8					
Credit	2	4					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO604B	Advanced Food & Beverage Operations Management	03	08	-	45	120	-	45	120	-	165	100	200	02	04	-	06

OBJECTIVES:

At the end of semester VI the student will specialize & be able to:-

- Identify factors to create impulse buying; prepare, fillet, carve, flambé & finish food items from a Gueridon trolley.
- Plan & operate a Bar operation, Manage inventory and maintain records pertaining to beverage control.
- Understand and apply cost dynamics as related to the Food & Beverage industry.
- Demonstrate a detailed understanding of the various facets of the Food & Beverage cycle of control in the operational & post operational phase.

Contents of syllabus for USHO604B

Unit	Chapter	TOPIC	Hours	Marks

No.	No.			
01	1	Gueridon Service 1.1 Origin, history and definition 1.2 Factors to create impulse buying. 1.3 Advantages and disadvantages of Gueridon service 1.4 Principles of Gueridon service. 1.5 Flambé trolley & other trolleys (Carving, Cheese, Liqueur, Salad & Dessert). 1.6 Gueridon equipment & ingredients, Mise en place & Presentation.	15	15
	2	Food and Beverage Management. 2.1 Objectives of Food & Beverage Management. 2.2 Food and Beverage Management/ Function 2.3 Cost and Market orientation		
	3	Food and Beverage Control 3.1 Objective of F& B Control. 3.2 Obstacles of F& B Control. 3.3 Food Control checklists. 3.4 Beverage Control checklist		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	4	Bar Operations 4.1 Definition & classification. 4.2 Layout & parts for Front of the house dispense bar. 4.3 Bar Thefts and frauds. (Nature and prevention.) 4.4 Records & Licenses maintained in a Bar (Naukarnama, Permit, TPIN, Bill book, & B.O.T.).	8	15
	5	5.1 Cocktails & Mixed drinks a) Introduction, History & Definition b) Bar Equipment. (glassware, fixed & movable equipment) c) Methods of Mixing Cocktails. (Stirred, Shaken, Built-up/Layered, Blended & Muddled) d) Styles of Cocktails (Collins, cobblers, coolers, crustas, cups, e) daisies, eggnogs, flips, frappes, fixes, fizzes, Highball, juleps, f) Pick-me-ups, pousse café, smashes, sours, swizzles & toddies). g) Rules to be observed while making cocktails. 5.2 Recipes of classic & exotic cocktails. a) **Whisky:** (Godfather, Manhattan, Mint Julep, Whisky Sour	7	

		& Rusty Nail) b) **Rum:** (Daiquiri, Planters Punch, Mai-Tai, Mojito & Pinacolada) c) **Brandy:** (Between The Sheets, Grasshopper, Sidecar, Brandy Alexander & B&B) d) **Gin:** (Martini, Gimlet, Tom Collins, Singapore Sling & Pink Lady) e) **Vodka:** (Bloody Mary, Screw Driver, Harvey's Wallbanger, Blue Lagoon & Black Russian) f) **Tequila & Mezcal:** (Bloody Maria, Long Island Iced tea, Marguerita, Spanish fly, Tequila Sunrise). g) **Wine, Sparkling Wine & Beer:** (Shandy, Sangria, Buck's Fizz, Kir Royale & Black Velvet) h) **Mocktails** (fruit punch, Shirley temple, Virgin Pinacolada, Virgin Mary, Flavoured Iced tea)		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	**6**	Cycle of control. **6.1 Operational phase** 6.1.1 **Purchasing** 6.1.1.1Methods of purchasing Food / Beverage. (Contract / Daily / Weekly/ Fortnight / Cash and Carry) 6.1.1.2 Selection of a supplier 6.1.1.3 Purchase specification 6.1.1.4 Purchase order. 6.1.2 **Receiving** 6.1.2.1 Quality inspection 6.1.2.2 Quantity inspection 6.1.2.3 Receiving records Maintained 6.1.3**Storing & Issuing** 6.1.3.1Bin card 6.1.3.2Store ledger 6.1.3.3 Indent/ requisition 6.2 **Post Operational Control: Management after the event phase**. 6.2.1 Methods of Food control. 6.2.2 Methods of Beverage control 6.2.3 Detailed Daily Food cost report	**15**	**15**

ADVANCED FOOD & BEVERAGE OPERATIONS MANAGEMENT (Practical)

Unit	Practical	Hours	Marks
1	**Practice:** Demonstration & Preparation of any five (Gueridon or flambé) & tray set up for below listed Recipes. Recipes for 10 dishes. • Caesar salad. • Flambéed Consommé. • Scampi a la crème flambé • Steak Diane* • Steak* (with choice of sauces – pepper, red wine, mushroom) • Crepes suzette • Pineapple Flambé / Banana Flambé • Irish Coffee / Cafe Serpentine • Omelette au rhum. • Roast Chicken/ Turkey/Duck/Lamb (Carving only) * BEEF may be substituted	40	40
2	• Order taking Procedure and service in the Bar • Drawing the layout of Dispense Bar (Front of the house & back o house) • Compiling of Bar Menu & Wine List. • Flair bartending & Mixology (screening of videos & practice)	40	40
3	**Sommeliership:-** Advanced techniques and skills 1 The Modern Bartender – (Art of Sommeliership and advanced bartending) 1.1 Alcoholic Beverages – An overview.(Wines, Beer, Spirits, Liqueurs, Cocktails) – (Classification, Definition, Types and styles, Service procedure) 1.2 Introduction to Sommelier (Definition, Attributes of a sommelier, Job responsibilities, Scope and careers of a sommelier) 1.3 Systematic Approach to Tasting (Tasting wheel). Storage and service of different styles of wines. (Red, White, Rose, Sparkling, Fortified) Old world and new world. 1.4 Wine Menu Planning for Restaurants, Bar and Pub. (Food and wine pairing – Basic considerations, Flavour intensity of food and the Wine, Sweetness, acidity and savoury flavors in food and key flavours in food and wine). Balancing wines - countries/price/varieties on the menu card. Talk lines and selling techniques of wines. The wine Label: Reading, understanding, explaining, selling.	**40**	**40**

	1.5 Sommeliership (Guidelines for a sommelier, Sommelier as a sales person, Product knowledge – strength of drink, Storage temperature, pouring of wine, safe opening of champagne, script for describing, access the character and quality of wine in relation to food pairing, Identify the origins, distribution, growing patterns, winemaking treatments and taste profile of the world's most noble and popular grape varieties and their wines, Analyze the customer/client's requirements and recommend food and wine pairings consistent with the requirements)		

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1.	Restaurant Managerial skills (Managing Lunch service, Tea Service)	20
2.	Collection of Bar Records	20
3.	Menu Planning for a Gueridon Service restaurant.	20
4.	Setting up of Bar (Pub/ Nightclub/ Discotheque)	20

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	180
2	Journal	10
3	Viva	10
	Total	**200**

REFERENCE BOOKS

1. Andrews S, (2009), *Food & Beverage Service A Training Manual,(Second Edition),* Tata McGraw-Hill Publishing Company Limited, New Delhi
2. Fuller, John, (1992), *Advanced Food Service*, Stanley Thornes Publishers Ltd., England
3. Kivela, Jaksa, (1994), *Menu Planning for the Hospitality Industry*, Hospitality Press P Ltd., Melbourne
4. Lilicrap, Dennis & Cousins, John, (1994), *Food and Beverage Service,* Common Wealth Publication, New Delhi
5. Magris, Marzia, (1995), *An Introduction to Food & Beverage Studies*, Hospitality Press P Ltd, Melbourne
6. Singaravelavan .R, (2011), *Food and Beverage Service*, Oxford University Press, Delhi

ADVANCED HOUSEKEEPING (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Advanced Housekeeping - (USHO604C)
Course Code	**Title**	**Credits**	
USHO604C	Advanced Housekeeping	2+4	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	8					
Credit	2	4					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO604C	Advanced Housekeeping	03	08	-	45	120	-	45	120	-	165	100	200	02	04	-	06

OBJECTIVES:

At the end of semester VI:

- To plan and evaluate budgets.
- Create and evaluate the aspects of Interior Design in a Guest Room Layout.
- Plan and draw the layout of Guest Rooms to scale.
- Set up the housekeeping department of a new property and create a timeline for the countdown to the opening.
- Identify safety hazards and implement preventive and remedial measures.

Contents of syllabus for USHO604C

Unit	Chapter	TOPIC	Hours	Marks

No.	No.			
01	1	Budget and Budgetary Control 1.1 Introduction 1.2 Types of budgets 1.3 Budget planning process 1.3.1 Preparing the budget 1.3.2 Formats 1.4 Controlling expenses 1.5 Inventory control	15	15
	2	Supervisory Skills 2.1 Job Description and daily Routine of 2.1.1 Guest room Supervisor 2.1.2 Public Area Supervisor 2.1.3 Linen and Uniform Room Supervisor		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	3	Preopening Property Operations 3.1 Setting up housekeeping 3.2 Countdown to opening 3.3 Preparing snagging list	15	15
	4	Furniture and Accessories 4.1 Types 4.2 Selection 4.3 Care		
	5	Guestroom Layout 5.1 Planning room layouts (Twin / Double / Suite / Handicapped / Service Apartment) 5.2 Sizes of rooms		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	6	Risk and Environmental Management 6.1 Fire safety and accident prevention 6.1.1 Hazards 6.1.2 Prevention 6.1.3 Crisis handling 6.2 First Aid 6.3 Dealing with emergencies 6.3.1 Fire 6.3.2 Bomb threat 6.3.3 Death 6.3.4 Natural Disasters 6.4 Minimising theft 6.4.1 Guest theft	15	15

		6.4.2 Employee theft		

ADVANCED HOUSEKEEPING (Practical)

Unit	Practical	Hours
1	1 Layouts 1.1 Guest room layouts and application of colour schemes 1.1.1 Twin Room 1.1.2 Double Room 1.1.3 Suite 1.1.4 For the physically challenged 1.2 Floor Pantry 1.3 Linen and Uniform Room 1.4 HK Department 2 Interior Designing 2.1 Guest room 2.2 Bathroom	40
2	3 Case study and Role play 4 Dealing with situations requiring First Aid 4.1 Burns 4.2 Cuts 4.3 Scalds 4.4 Falls 4.5 Electric Shocks 4.6 Bandages 5 Fire fighting	40
3	6 Advanced techniques of Flower Arrangements 7 Linen Origami 8 Housekeeping Supervisors' Daily Routine	40

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1.	Suppliers in Mumbai for interiors – Furniture Soft furnishings etc.	10
2.	Samples / brochures / pictures and information for Soft Furnishings	10
3.	Preparing the HK budget for small/medium size hotels.	10

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	180
2	Journal	10
3	Viva	10
	Total	**200**

REFERENCE BOOKS

1 Raghubalan G., Raghubalan Smritee, 2007 - 2009, *Hotel Housekeeping Operations and Management*, second edition, Oxford University Press.
2 Singh Malini & George Jaya B., 2008, *Housekeeping Operations, Design and Management*, first edition, Jaico Publications.
3 Schneider Madelin, Tucker Georgina, Scoviak Mary, 1999, *The Professional Housekeeper*, 4th edition, John Wiley & Sons.
4 Kasu Ahmed A., 1992, *An introduction to Art, craft, science, technique and profession of interior design* , third edition, Ashish Book Centre, Delhi.
5 Jones Thomas J.A., 2005, *Professional Management of Housekeeping Operations,* 4th edition, John Wiley & Sons.

ADVANCED FRONT OFFICE (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Advanced Front Office - (USHO604D)
Course Code	**Title**	**Credits**	
USHO604D	Advanced Front Office	2+4	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	8					
Credit	2	4					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO604D	Advanced Front Office	03	08	-	45	120	-	45	120	-	165	100	200	02	04	-	06

OBJECTIVES:

Students will be able to understand:

- Yield management and its application in the Hotel Industry.
- Measurement of Yield for Management Decision Making.
- Passport & Visa regulations.

Contents of syllabus for USHO604D

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	1	Yield Management 1.1 Introduction 1.2 Concept of Yield Management 1.2.1 Applications(Hospitality Industry) 1.3 Various strategies to maximise yield 1.3.1 Capacity Management, Discount Allocation, Duration Control 1.4 Measuring Yield 1.4.1 Potential Average Single Rate 1.4.2 Potential Average Double Rate 1.4.3 Multiple Occupancy Percentage 1.4.4 Rate Spread/ Rate Differential 1.4.5 Potential Average Rate 1.4.6 Room Rate Achievement Factor 1.4.7 Revenue Per Available Room (RevPAR) 1.4.8 Equivalent Occupancy 1.5 Elements of Yield Management 1.5.1 Group Room Sale (Group Booking Data, Group booking pace, Anticipated Group Business, Lead Time, Displacement of Transient Business) 1.5.1.1 Transient/ FIT Room Sales 1.5.1.2 Food and Beverage Activity 1.5.1.3 Local and Area-wide activities 1.5.1.4 Special Events 1.6 Using Yield Management 1.6.1 Potential High and Low Demand Tactics 1.7 Implementing Yield Strategies 1.7.1 Hurdle rate 1.7.2 Minimum length of stay 1.7.3 Close to arrival 1.7.4 Sell-through 1.8 Key Terms		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	2	Passport and Visa 2.1 Passport 2.1.1 Definition and Types of Passport 2.1.2 Guidelines for Indian Passport Holders 2.1.3 Issue of New Passport 2.1.4 Renewal Of Passport 2.1.5 Passport for Minor		

<table>
<tr><td></td><td></td><td>2.1.6 Replacement of Lost/ Damaged Passport (Duplicate)
2.1.7 Extension of short validity passport
2.1.8 Change of Name/ Surname after marriage
2.1.9 Change of appearance
2.1.10 Change in Date of Birth/ Place of Birth
2.1.11 Emergency Travel Document
2.1.12 Fee Structure
2.2 Visa
2.2.1 Definition and types of visas
2.2.2 Requirement for visa,
2.2.3 Tourist visa,
2.2.4 Collective visa,
2.2.5 Transient visa & exemption from registration
2.2.6 Other types of Visas
2.2.7 Business visa,
2.2.8 Student visa,
2.2.9 Conference visa,
2.2.10 Employment visa,
2.2.11 Recreation visa,
2.2.12 Research visa,
2.2.13 Missionary visa,
2.2.14 Landing Permit Facilities,
2.2.15 PIO card(Person of Indian Origin)</td><td></td><td></td></tr>
<tr><td>Unit No.</td><td>Chapter No.</td><td>TOPIC</td><td>Hours</td><td>Marks</td></tr>
<tr><td>03</td><td>3</td><td>Revenue Management Terms (100 Terms)
<table><tr><td>1. 90-Day Forecast</td><td>2. Action Plan</td><td>3. Average Daily Rate (ADR).</td></tr><tr><td>4. Best Available Rate</td><td>5. Best-Rate Guarantee Program</td><td>6. Booking Pace</td></tr><tr><td>7. Brand Equity</td><td>8. Branding</td><td>9. Bundling</td></tr><tr><td>10. Cannibalization</td><td>11. Capacity</td><td>12. Central Reservation Office (CRO).</td></tr><tr><td>13. Central Reservation System</td><td>14. Channel</td><td>15. Channel Contribution Percentage</td></tr><tr><td>16. Closed Or Closed Out</td><td>17. Closed To Arrival</td><td>18. Competitive Advantage</td></tr><tr><td>19. Competitive Intelligence</td><td>20. Competitive Set</td><td>21. Customer-Centric Approach</td></tr><tr><td>22. Customer Relationship Management</td><td>23. Cut-Off Date</td><td>24. Data Mining</td></tr></table></td><td></td><td></td></tr>
</table>

25. Decline Stage	26. Demand	27. Demand Drainer
28. Demand Forecasting	29. Demand Generator	30. Denial
31. Discounting	32. Distressed Inventory	33. Dynamic Packaging
34. Elastic	35. Electronic Distribution	36. Environmental Scanning
37. Extended Stay Business	38. Fair Price	39. Fixed Costs
40. Flash Report	41. Forecasting	42. Forecasts
43. Full Pattern Length Of Stay Restriction	44. Global Distribution Systems	45. Group Business
46. Induce Trial	47. Inelastic	48. Internet Distribution System (IDS)
49. Introductory Stage	50. Inventory	51. Inventory Management
52. Law Of Demand	53. Law Of Supply	54. Long-Term Goals And Objectives
55. Long-Term Strategies	56. Lost Business	57. Loyalty Program
58. Managing Demand	59. Market Segmentation	60. Market Share
61. Market Skimming	62. Maximum Length Of Stay Restriction	63. Minimum Length Of Stay Restriction
64. Must-Stay Restriction	65. Net Rate	66. Off-Season
67. Pace	68. Peak Season	69. Perfectly Elastic
70. Perfectly Inelastic	71. Perishable	72. Pick-Up
73. Prestige Pricing	74. Price Elasticity Of Demand	75. Price Elasticity Of Supply
76. Price Leader	77. Promotional Pricing	78. Property Management System
79. Rack Rate	80. Rate Integrity	81. Regret.
82. Reservation Conversion Percentage	83. Run Of House	84. Short-Term 3 To 5-Day Forecast
85. Shortage	86. Shoulder Season	87. Stay Controls
88. Stay Pattern	89. Strategic Revenue Management Process	90. Strategy
91. SWOT Analysis	92. Tactics	93. Transient
94. Valley Season	95. Value-Based Pricing	96. Values
97. Wash Factor	98. Weak Season	99. Wholesale Rate
100. Yield Management		

ADVANCED FRONT OFFICE (Practical)

Unit	Practical	Hours
1	Role Play Activities: (Transient FIT's, Groups & Special Category Guest) • Pre-arrival stage • Arrival Stage • Occupancy • Departure	
2	Handling Guest Complaints & Situations Theft, Drunken guest & Difficult guest, Bomb Threat, Fire, Death, Guest with Health Problems, Service related complaint, Black Listed Guest, Wake up call, Discrepancy in charges, Pet Policy.	
3	Case Study (10 Case Studies)	

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1.	Itinerary Planning (Indian / International)	10

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

First Semester (Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	180
2	Journal	10
3	Viva	10
	Total	**200**

REFERENCE BOOKS

1. Andrews, Sudhir. (1995), *Hotel Front Office Training Manual*, The Tata M'cGraw Hill, New Delhi.
2. Andrews, Sudhir. (2007), *Front Office Management & Operations*, The Tata M'cGraw Hill, New Delhi.
3. Aggarwal Ravi, (2002), *Hotel Front Office*, Sublime Publications, Jaipur.
4. Bhatnagar S.K, (2002), *Front office Management*, Frank Bros & Co., New Delhi.
5. Chakravarti B.K.(1999), *Front Office Management in Hotel*, CBS Publisher, New Delhi.
6. Chakrawarti B.K., (2006), *Concept of Front Office Management*, APH Publishing, New Delhi.
7. Huyton Jeremy & Baker Sue, (2001), *Case Studies in Rooms Operations and Management*, Hospitality Press, Melbourne, Australia.
8. Singh R.K., (2006), *Front Office Management*, Aman Publication, New Delhi.
9. Tewari Jatashankar R., (2009), *Hotel Front Office Operations & Mgmt*, Oxford University Press, New Delhi.

ADVANCED BAKERY & CONFECTIONERY (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Advanced Bakery & Confectionery - (USHO604E)
Course Code	**Title**	**Credits**	
USHO604E	Advanced Bakery & Confectionery	2+4	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3	8					
Credit	2	4					

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO604E	Advanced Bakery & Confectionery	03	08	-	45	120	-	45	120	-	165	100	200	02	04	-	06

OBJECTIVES:

- To familiarize students on various aspects of bakery and confectionery management.
- To develop skilled professionals in bakery and confectionery for the hospitality industry.
- To develop students to become independent entrepreneurs.

Contents of syllabus for USHO604E

Unit No.	Chapter No.	TOPIC	Hours	Marks

01	**1**	Basic Of Bakery and Patisserie Revision 1.1 Flour 1.2 Sugar 1.3 Leavening Agents 1.4 Fats & oils 1.5 Bread terms 1.6 Bread making	**15**	**15**
	2	Cake Making 2.1 Formula Balancing 2.2 08 golden rules of cake making 2.3 Methods of cake making 2.4 Physical & chemical changes 2.5 Cake faults & Precautionary methods		
	3	Frozen Desserts 3.1 Introduction and History 3.2 Types (Ices, Ice Milk and Ice Cream)- Spuma, Granita, Sorbet, Parfait, Casatta, semi-fredo, Gelato, Bombe, Frozen Yogurt. 3.3 Manufacturing & processing of ice-cream		
Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
02	**4**	Meringues 4.1 Introduction 4.2 Types and methods 4.3 Precautions 4.4 Use and Storage	**15**	**15**
	5	Sugar Craft 5.1 Tools & Equipment 5.2 Sugar Craft Techniques 5.3 Flower making 5.4 Sugar garnishes 5.5 3D gum paste modelling 5.6 Wedding cake		
	6	Chocolate 6.1 History 6.2 Manufacturing process of chocolate & cocoa powder. 6.3 Types 6.4 Tempering 6.5 Use and storage		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
03	**7**	Icings and Toppings 7.1 Classification with advantages & disadvantages 7.2 Shelf life	**15**	**15**

		7.3 Types		
	8	Colours & Flavours 8.1 Types – (Normal & Artificial) 8.2 Rules given by FDA		
	9	International Desserts 9.1 Names & Country of Origin 9.2 Glossary terms (bakery & confectionery)		

List of Glossary Terms:

1. Angel Food Cake	34. Devil's Food Cake	67. Pate A Bombe
2. Baba	35. Dobos Torte	68. Pate brisee
3. Bagel	36. Docking	69. Pate Feuillete
4. Bagged	37. English Muffin	70. Pate Sablee
5. Baked Alaska	38. Focaccia	71. Pate Sucree
6. Baklava	39. Fougasse	72. Patisserie
7. Bloom	40. Frangipane	73. Petit Four
8. Buche De Noel	41. Frozen Mousse	74. Phyllo
9. Careme	42. Fruit Cobbler	75. Pithiviers
10. Ceme Patisserie	43. Galette	76. Pre – Ferment
11. Challah	44. Gateau St – Honore	77. Pullman Loaf
12. Charlotte	45. Gaufre	78. Quark
13. Charlotte	46. Gelato	79. Retarding
14. Charlotte Ring	47. Ice Cream	80. Sabayon
15. Chiffon Cake	48. Icebox	81. Sacher Torte
16. Chiffon Pie	49. Itilian Meringue	82. Sacristian
17. Chocolate Couverture	50. Kirschtorte	83. Savarin
18. Ciabatta	51. Kungelhopf	84. Scones
19. Cobbler	52. Langue De Chat	85. Short cakes
20. Compote	53. Lattice	86. Short Dough
21. Conching	54. Lattice Crust	87. Shortbread
22. Confectionery	55. Leavening	88. Sorbet
23. Coulis	56. Linzertorte	89. Sorbetto
24. Coupe	57. Liqueurs And Fruit Alchohols	90. St – Honore
25. Couverture	58. Marshmallow	91. Stencil Paste
26. Cream of tartar	59. Mimosa	92. Strudel
27. Crème Anglaise	60. Mousseline	93. Tablage
28. Crème Bavarois	61. Naploen	94. Tarte Tatin
29. Crème Brulee	62. Nougatine	95. Tirami-su
30. Crème Chantilly	63. Opera Cake	96. Torte
31. Crème Chiboust	64. Panna Cotta	97. Trifle
32. Crème Fraiche	65. Pannetone	98. Tunneling
33. Dacquoise	66. Paris Brest	99. Vacherin
		100. Zabaglion

ADVANCED BAKERY & CONFECTIONERY (Practical)

<table>
<tr><th>Unit</th><th>Practical</th><th>Hours</th></tr>
<tr><td>1</td><td>International Bread and Cakes
1. Foccacia, Grissini, Zuccoto
2. Panettone, Lavash, Mousse Cake
3. Pita, Epi, Cheese Cake (baked/chilled)
4. Stollen, Pretzels, Gateau Creole
5. Brioche, Ciabatta, Zebra Torte
6. Kugelhopf, Bagels, Red Velvet with cream cheese frosting
7. Cottage Loaf, Monkey Bread, Truffle cake
8. Zopf, Fougasse, Opera cake
9. Mystery Basket
10. Mystery Basket</td><td>40</td></tr>
<tr><td>2</td><td>Pastries and Cookies – (One pastry and cookie per practical)
<u>Pastry</u>
1. Quiche Lorraine
2. Mud pie
3. Mississipi Mud pie
4. Crumble
5. Key lime pie
6. Baklava
7. Strudel
8. Brandy snap
9. Tulip
10. Danish/Croissant
<u>Cookies</u>
1. Ginger bread
2. Stamped
3. Piped
4. Ice box
5. Rolled
6. Dropped
7. Sheet
8. Foam
9. Biscotti
10. Florentine</td><td>40</td></tr>
<tr><td>3</td><td><u>Desserts with plate presentation and garnishes</u>
1. Parfait/Granita
2. Chocolate lava
3. Bombe/Baked Alaska
4. Pavlova/Vacherin
5. Croque-em-bouche
6. Wedding Cake (fruit cake and Marzipan)
7. Wedding Cake (Fondant, pastillage)
8. Wedding Cake (Modeling, Moulding and flowers)
9. Wedding Cake (royal icing)
10. Wedding Cake (assembling)
<u>Plate Presentation & Artistry</u></td><td>40</td></tr>
</table>

1. Sauces 2. Coulis	3. Compotes 4. Fudge sauce	5. Caramel sauce 6. Crème anglais 7. Glaze	

Garnishes

1. Carved fruits & fruit basket 2. Tuille	3. Snaps 4. Caramel	5. Choux pastry 6. Chocolate

Wedding Cakes –Thematic –(Formal /Informal)

1. Fruit cake 2. Marzipane 3. Fondant	4. Royal Icing 5. Pastillage (modeling & Moulding)	6. Piping /Royal Icing Techniques 7. Flowers	

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

Conduct of Practical Examination

Sr.	Particulars for External Practical Examination	Marks
1	Semester End Practical Examination	180
2	Journal	10
3	Viva	10
	Total	**200**

REFERENCE BOOKS

1. Nicollelo, L. G. Dinsdale, J., (1991), *Basic Pastry Technique*, Hoddr & Stoughton, London
2. Russell, Joan, (1964), *Creative Cake Decoration*, Leonard Hill, London
3. Clements, Carole, (1994), *Beautiful Baking*, Richard Blady Pub., London
4. Gisslen, Wayne, (1997), *Professional Baking* , 2nd Ed., John Wiley & Sons, New York
5. Day, Martha, (1999), *The Practical Encyclopedia of Baking*, Lorenz Books, London
6. Berry, Mary, , *Favourite Cakes*, Weidenfeld & Nicolson , London
7. Nilsen Angela, (1994), *Complete Cake Decorating*, Lorenz Books, New York
8. Laver, Norma, (1996), *The Art of Sugar craft Piping*, Chancellor Press , London
9. Nilsen Angela & Maxwell, Sarah, (1998), *Cakes & Cake Decorating*, Hermes House , London
10. Lodge, Nichelas, (1996), *The Art of Sugar Craft Lace and Filigree*, Chancellor Press , singapore
11. Smith, Anne, (1996), *The Art of Sugar Craft Sugar Paste*, Chancellor Press , London
12. Purton, Bbrenda, (1996), *The Art of Sugar Craft Royal Icing*, Chancellor Press , London
13. Purton, Brenda & Lodge, Nicholas, (1996), *The Art of Sugar Craft Royal Icing Lace & Filigree*, London
14. Jenne, Gerhard, (1998), *Decorating Cakes and Cookies*, Ryland Peters & Small , London
15. Treuille Eric & Ferigno, Ursula, (1998), *Bread*, Dorling Kindersley, London
16. Carluccio, Antonio Carluccio, Prisulla, , *Desserts*, Quadrille Publishing Ltd., New York
17. Nilsen Angela & Maxwell, Sarah, (1998), *Cakes & Cake Decorating*, Hermes House , London
18. Wadey, Rosemary, (1996), *Cake Decorating*, Sebastian Kelly, Great Britain
19. Spencer Churchill, (1994), *Classic Decorating Details*, Paragon, London
20. Maxwell Sarah & Nilsen Angela, (1996), The complete cake Decorator, Lorenz Books, London
21. Ford Mary, (1994), *New Book of Cake Decorating*, Mary ford Publication, England
22. Stogo, Makolm, (1998), *Ice cream & Frozen Desserts*, John Wiley & Sons, New York
23. Marshall, Robert T & Arbuckle, W.S., (1996), *Ice-Cream*, (Vth ed), ITP International Chapman & Hall, New York
24. Sutherring, Jane, (1996), *Ice Creams Sorbets and Other Cool Delights*, JG press, USA
25. Day,Martha, *The Complete Book of Desserts*, Konemann,
26. Global Media, *Hot Puddings & & Frozen Desserts*-7
27. Global Media, *Pastry, Pies & Pastry Desserts-8*,

28. Lonsada, Patricia, (1997), *Ultimate Chocolate*, Metro Books, London
29. Roussel Chole, (2005), *The Chocolate Connoisseur*, Piatkus, Great Britain

REVENUE MANAGEMENT (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Revenue Management (USHO605A)
Course Code	**Title**	**Credits**	
USHO605A	Revenue Management	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO605A	Revenue Management	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

- To sensitize hospitality students on the concept of Hospitality Revenue Management.
- Strategically think to increase occupancy levels, maximize yield and revenues in the Service Industry.

Contents of syllabus for USHO605A

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	**1**	History, Definitions, Meaning, Benefits and Prospects of Revenue Management	**15**	**15**
	2	The Purpose of Business and Fallacies of the Concept of Profit and Return on Investment 2.1 The 10 principles of Revenue Management 2.2 The Revenue Manager in the Hospitality Industry – Challenges of managing Hard Constraints and Soft constraints		

		2.3 The Revenue Manager Position 2.4 The Revenue Management Team 2.5 Ethical Aspects of Revenue Management 2.6 Role of Costs in Pricing 2.7 Role of value and its link with Quality and Service		
Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
02	**3**	Market Segmentation 3.1 What is Market Segmentation and its importance in Revenue Management 3.2 Yieldable and Non Yieldable segments 3.3 Meaning of Differential Pricing 3.4 Limits to Differential Pricing 3.5 Application of Differential Pricing	**15**	**15**
	4	Forecasting 4.1 The Importance/Benefits of Forecasting Demand 4.2 Past Data, Current data and Future Data (including Group Room sales Trends and the concept of Unconstrained Demand and Last Room value) 4.3 Demand Forecasts and Strategic Pricing 4.4 Displacement Calculation 4.5 What is (Rooms) Inventory Management? 4.6 Characterizing rooms for optimum inventory management 4.7 Discounting Rack Rates 4.8 Stay Restrictions (Duration Controls) 4.9 Selective Overbooking (capacity management) as an Inventory Control strategy 4.10 Binomial Distribution, Cumulative Binomial Distribution, The Painless Binomial 4.11 Marginal Analysis-Critical Fractile Method 4.12 The Twelve Principles of Inventory and Price Management		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
03	**5**	Distribution Channel Management 5.1 Electronic channels 5.2 Non electronic channels 5.3 Principles of Distribution Channel Management 5.4 Competitive Set Analysis, Benchmarking and Rate Shopping 5.5 Market Share Analysis	**15**	**15**
	6	Formulae and Calculations 6.1 The classical measures revisited – Occupancy, Multiple Occupancy and ADR - 6.2 Hotel Key Performance Index (KPI) - REVPAR, TREVPAR, TREVPEC, GOPPAR, REVPAM and		

		REVPASH 6.3 Forecasting Calculation Aids: Percentage of walk-ins, Percentage of Under stays, Percentage of No-Shows, Percentage of overstays. 6.4 Measuring Yield and Evaluating RM Efforts: Potential Average Single Rate, Potential Average Double Rate, Rate Spread, Potential Average rate, Room Rate Achiever Factor, Yield Percentage, Occupancy Index Analysis, ADR Index Analysis, REVPAR Index Analysis and Market Share Analysis (these calculations are not a separate topic but involved with the content of the above mentioned topics. They may however be used fruitfully while setting question papers)		

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. Jatashankar Tewari , *Hotel Front Office Operations and Management*, Oxford
2. Hayes and Miller, *Revenue Management of the Hospitality Industry*, John Wiley
3. e-book located at http://www.xotels.com/en/revenue-management-solution
4. Kimberly A. Tranter, Trevor Stuart-Hill, Juston Parker, (2009), *An Introduction to Revenue Management for the Hospitality Industry*, Pearson Prentice Hall
5. Robert G. Cross, (1998), *Revenue Management*, Broadway Books, New York.

FOREIGN LANGUAGE (FRENCH) (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Foreign Language (French) (USHO605B)
Course Code	**Title**	**Credits**	
USHO605B	Foreign Language (French)	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO605B	Foreign Language (French)	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

- The objective of this course is to enable the students to read, write, comprehend and converse in basic French.
- To develop communication skills in various departments of Hospitality Industry.
- To enhance the French Vocabulary of the students in various domains such as culinary, front office, accommodations as well as food and beverage service.
- To increase the knowledge of the culinary terms and recipes in French.

Contents of syllabus for USHO605B

Unit No.	Chapter No.	TOPIC	Hours	Marks

01	**1**	Introduction to French 1.1 Les Alphabets - Majuscules, minuscules 1.2 Pronunciation du français(Les signs de Ponctuation) 1.3 Salutation- (introduction) 1.4 Formal and informal greeting 1.5 Basic conversations 1.6 Les jours de la semaine 1.7 Les mois de l'année 1.8 Les saisons 1.9 L'heure 1.10 La date 1.11 Le nom, le pluriel des noms 1.12 Articles définis/indéfinis 1.13 Les professions 1.14 Les couleurs 1.15 Les vêtements 1.16 Le visage 1.17 Le corps 1.18 La famille 1.19 Les pays avec leur nationalité	**15**	**15**
Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
02	**2**	Les Pronoms Sujets 2.1 Les verbes – être, avoir, I,II,III Groups: ending with 'er, ir, re' and irregular (acheter, aller, servir, savoir, pouvoir, venir, sortir, partir, vouloir , prendre, dire.(le present, le passé composé et le future) 2.2 Les verbes pronominaux: se lever, se laver, se doucher, s'habiller, se coucher, s'appeler (seulement au present) 2.3 Les adjectifs 2.4 Les adjectifs démonstratifs 2.5 Les adjectifs possessifs 2.6 Les prepositions 2.7 Les articles partitifs 2.8 Le négatif 2.9 Le vocabulaire de la cuisine et d'hôtel 2.10 Le menu (17 course-names only) 2.11 La cuisine française, les vins français et les fromages français.	**15**	**15**

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	**3**	Les dialogues français. 3.1 Au restaurant 3.2 Réserver une chambre	**15**	**15**

		3.3 Demander la direction 3.4 A la banque 3.5 A l' aéroport(à la douane) 3.6 Les Recettes 3.7 La Soupe à l'oignon 3.8 Quiche Lorraine 3.9 L'omelette du jambon /du fromage 3.10 Baguette 3.11 Mousse au chocolat		

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1.	Role play	10
2.	Presentations: (Any TWO) • Les vins français • Les monuments français • Le tourisme en France • Les fromages français • Les fetes françaises • Les regions en France • Degustation • Les saisons • Haute couture : la mode • Les sports • La gastronomie en France	10

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05

4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. *Nouvel En Echange*, 2012, 3rd Edition, Oxford University Press
2. *Cour de Lanngue*, 6th Edition, Paperback
3. *Dodo*, 2011, The New Yorker Public
4. Claudine Giraud, *A Votre Service* ,GDB Publication

SERVICES MARKETING (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Services Marketing (USHO605C)
Course Code	**Title**	**Credits**	
USHO605C	Services Marketing	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO605C	Services Marketing	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

- To familiarize students with marketing fundamentals
- To explain the importance of services marketing to a Hospitality Management student & to fit the subject into his or her understanding of Hospitality.

Contents of syllabus for USHO605C

Unit	Chapter	TOPIC	Hours	Marks

No.	No.			
01	1	Introduction to Marketing. 1.1 Concise Evolution of Marketing 1.2 Definitions – Marketing, Sales, Hospitality Products, Services. 1.3 Introduction to Service Marketing 1.4 Distinguish between Sales & Marketing. 1.5 Distinguish between Goods & Services. 1.6 Characteristics of Services Marketing 1.7 Service gaps 1.8 Service encounter & service chain, Moment of Truth 1.9 Service encounter Analysis – The "Six S's"	15	15
	2	Services Marketing Concept: 2.1 Segmentation (Target Market, Types of segmentation:- Demographic, geographic and psychographic). 2.2 Positioning. 2.3 Components of Marketing Plan.		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	3	P's of Service Marketing. 3.1 Product / service mix 3.1.1 Levels of a product and new product development. 3.1.2 Product life cycle 3.1.3 Marketing strategies during the Product Life Cycle 3.1.4 Branding. 3.2 Price Mix. 3.2.1 Pricing objectives (Survival, Profit, Sales Competition, Image – differentiation) 3.2.2 Factors affecting pricing decision. 3.2.3 Skimming and penetration 3.2.4 Creative pricing of hotels and restaurants 3.3 Distribution Mix / Place. 3.3.1 Different Distribution network 3.3.2 Types of distribution channels. 3.3.3 Push and pull strategies 3.3.4 Need & role of distribution channel. 3.4 Promotion / Communication mix 3.4.1 Communication process 3.4.2 Types of media & importance. 3.4.3 Public Relations and publicity 3.4.4 Stages and technique of Personal Selling 3.4.5 In house Merchandising 3.4.6 Sales Promotion types and techniques. 3.5 People	15	15

		3.5.1 Employees 3.5.2 Customers 3.6 Physical Evidence 3.6.1 Ambience 3.6.2 Facility Design 3.6.3 Equipment 3.6.4 Employee Dress 3.6.5 Other Tangibles 3.7 Process / System 3.7.1 Service Blueprint/ Service Delivery (Airlines & Hotels)		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	4	Consumer behavior : 4.1 Introduction & definition of consumer behavior 4.2 Factors influencing consumer behavior (Social, Cultural, Personal) 4.3 Stages in purchase behavior (5 stage) 4.4 Guests of tomorrow & Guest lifestyles	15	15
	5	E- Marketing for Services : 5.1 Introduction E- Marketing & Objectives 5.2 Ways to conduct on-line Marketing Activities. 5.3 Benefits of E-Marketing[customers stay updated, customers can compare online, clear product information, transparent pricing, e-commerce, online virtual tours)		

ASSIGNMENTS

Sr. No.	Topic for Assignments	Marks
1.	**<u>Any ONE</u>** 1 a) Organizational duties and responsibilities. (Any ONE) 1.1 Sales Executive. 1.2 Sales Manager. 1.3 Director of Sales. 1 b) Organizational structure. (Any ONE) 1.4 Large	10

	1.5 Medium 1.6 Small	
2	**Any ONE** a) Marketing Plan b) Project relating a hotel or restaurant (SWOT) c) Types of Sales call (Good will, damage control, promotion & confirmation). d) Ways to conduct on-line Marketing activities.	

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q – 1	1	15
Q – 2	2	15
Q – 3	3	15
Q – 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1 Kotler, P. Bowne,J., Makens, J. *Marketing for Hospitality and Tourism* (3rd Edition), Pearson Education
2 Vaz, M. , Seta,M ,(2010), *Marketing Management*, Manan Prakashan
3 Lewis, Chambers (2008), *Marketing Leadership in Hospitality*, 2nd Edition, John Wiley & Sons

4 Zeithaml, V., Jobitner, M., Grembler, D., (2008), *Service Marketing*, Mc Graw Hill
5 Kotler,P., (2009), *Marketing Management*, PH of India Pvt Ltd.

FINANCIAL MANAGEMENT (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Financial Management (USHO605D)
Course Code	**Title**	**Credits**	
USHO605D	Financial Management	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO605D	Financial Management	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

- This subject will enhance the knowledge of financial management of the hospitality students.
- It will emphasize on the students to enhance the uses of finance in various segments in hospitality industry.
- This subject will help the students in establishing their own business and also will help them in their further studies.

Contents of syllabus for USHO605D

Unit No.	Chapter No.	TOPIC	Hours	Marks
01	**1**	Financial Management 1.1 Meaning 1.2 Scope 1.3 Objectives of Financial Management	**15**	**15**
	2	Financial Planning 2.1 Meaning of Financial Planning		

		2.2 Meaning & Principles Governing a Financial Plan 2.3 Capitalization – Introduction & Meaning of Cost & Earnings Theory 2.4 Leasing – Concept And Types of Leasing 2.5 Franchising – Types, Merits and Demerits		
	3	Funds Flow & Cash Flow Analysis 3.1 Nature, Importance and Uses 3.2 Simple , Practical Problems on Funds Flow Statements Covering Following Adjustments: 3.2.1 Depreciation 3.2.2 Divided 3.2.3 Taxation 3.2.4 Sale /Purchase of Assets		

Unit No.	**Chapter No.**	**TOPIC**	**Hours**	**Marks**
02	**4**	Verticalization and Ratio Analysis 4.1 Verticalization of Income Statement and Balance Sheet 4.2 Meaning and Importance of Ratio Analysis, Limitation and Uses of Ratios. 4.3 Numerical Problems Covering the following Ratios: 4.3.1 Income Statement Ratios :- 4.3.1.1 Gross Profit Ratio 4.3.1.2 Net Profit Ratio 4.3.1.3 (Pre-Tax & After Tax) 4.3.1.4 Operating Ratio 4.3.1.5 Operating Expenses Ratio 4.3.1.6 Stock Turnover Ratio 4.3.2 Balance Sheet Ratios:- 4.3.2.1 Current Ratio 4.3.2.2 Liquid Ratio 4.3.2.3 Proprietary Ratio 4.3.2.4 Solvency Ratio 4.3.3 Combined Ratios:- 4.3.3.1 Debtors Turnover Ratio 4.3.3.2 Creditors Turnover Ratio 4.3.3.3 Stock Working Capital Ratio 4.3.3.4 Return on Investment Ratio	**15**	**15**
	5	Capital Budgeting 5.1 Importance of Capital Budgeting 5.2 Capital Budgeting Appraising Methods. 5.2.1 Payback Period and Post Payback Profitability 5.2.2 Average Rate of Return 5.2.3 Net Present Value 5.3 Merits and Demerits of Each Method		

		5.4 Practical Problems on the above Four Methods.		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	6	Cash Budget 6.1 Definition, Characteristics of Budgets & Types of budget 6.2 Practical Problems on Preparation of a Cash Budget	15	15
	7	Working Capital Management 7.1 Concept of Working Capital 7.2 Factors Determining Working Capital 7.3 Simple Practical Problems on Statement of Estimated Working Capital (No. of days working capital / operational cycle)		

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20
2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)

Questions in Examination Paper	Units	Maximum Marks
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15

Total	**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. Varsha Ainapure, (2009), *Management Accounting*, 1st Edition, Manan Prakashan
2. I. M. Pandey, (2005), *Financial Management*, 9th Edition, Vikas Publication
3. Anand Iyengar, (2008), *Hotel Finance*, 1st Edition, Oxford
4. M.Y. Khan & P. K. Jain, (2008), *Financial Management*, 5th Edition, Tata McGraw Hill
5. Prasanna Chandra, (2004), *Financial Management*, 6th Edition, Tata McGraw Hill

STRATEGIC HUMAN RESOURCE MANAGEMENT (Theory)

Name of the Programme	Duration	Semester	Course/ Course Code
B.Sc. in Hospitality Studies	Six Semester	VI	Strategic Human Resource Management (USHO605E)
Course Code	**Title**	**Credits**	
USHO605E	Strategic Human Resource Management	2	

For Course Per week 1 lecture/period is 60 minutes duration				For Subject per week 1 lecture/period is 60 minutes duration			
	Theory	Practical					
Actual Contact	3						
Credit	2						

Course Code	Subject	Class Room Instruction									Total	Total Marks		Credits			Total
		Per Week			Per Semester			Per Semester Hrs									
		L	P	T	L	P	T	L	P	T		TH	PR	L	P	T	
USHO605E	Strategic Human Resource Management	03	-	-	45	-	-	45	-	-	45	100	-	02	-	-	02

OBJECTIVES:

- To make the students aware of human resource functions in coordination with the strategic objectives of the organizations so as to enhance performance & service quality.

Contents of syllabus for USHO605E

Unit	Chapter	TOPIC	Hours	Marks

No.	No.			
01	1	Introduction to Strategic Human Resource Management 1.1 Linking Human Resource Management (HRM) & Strategic Human Resource Management (SHRM) 1.2 Evolution of Strategic Human Resource Management (SHRM) 1.3 Strategic Fit: A conceptual framework 1.4 Theoretical prospective of Strategic Human Resource Management (SHRM) 1.5 Human Resource Management Approaches: The Indian Context 1.6 Human Resource Challenges faced by the Indian Companies & Human Resource Strategies to be followed by Indian companies to overcome the challenges they face.	15	15
	2	Functional Human Resource Strategies 2.1 Human Resource Outsourcing 2.2 Technology & Strategic Human Resource Management (SHRM) 2.3 Resourcing Strategy 2.4 The Strategic Human Resource Management approach & Integration of Business & resourcing Strategy.		
	3	Employee Recruitment & Development 3.1 New approaches to Recruitment (viz head hunting, online portals, moonlighting etc) & Selection. 3.2 Coaching & Mentoring Relationship. 3.3 Work- life Integration. 3.4 Self management & Emotional Intelligence.		

Unit No.	Chapter No.	TOPIC	Hours	Marks
02	4	Development & Implementation of Human Resource Strategy 4.1 Formulation of Strategy. 4.2 Alignment to Business Strategy. 4.3 Implementing Human Resource strategies 4.4 Barriers to Strategic Human Resource.	15	15
	5	Strategic Global Human Resource Management 5.1 Cross Cultural education & training programme 5.2 Hiring a Diverse Workforce. 5.3 Flexible working. 5.4 Strategies for Managing the Global Workforce		
	6	Performance Management 6.1 Effective Performance Management Systems 6.2 Technology & Performance Management 6.3 Strategic Linkage of Performance Management		

Unit No.	Chapter No.	TOPIC	Hours	Marks
03	7	Employee Welfare 7.1 Employee Empowerment 7.2 Employee engagement 7.3 Motivation & The Glass Ceiling 7.4 Employee Health & Welfare	15	15
	8	Human Resource Strategies & Customer satisfaction 8.1 Service Quality Module (SERVQUAL) In Service Sector 8.2 Human Resource Management Good Practices		
	9	Career Planning, Development & management 9.1 Career Planning Methods & Practices 9.2 Career Stages 9.3 Career Development & Stages 9.4 Career Management System		

ASSIGNMENTS

Sr. No.	Topic for Assignments (Any Two)	Marks
1	Designing a training programme. (quick service restaurant, 5 star hotel, soft skills)	10
2	Project on Online Recruitment (hospitality sector)	
3	Project on Career Mapping or Succession Planning	
4	Report on a visit to a Human Resource Firm - understanding various functions of Human Resource.	

Scheme of Examination (Theory)

(a) Internal assessment- 40 marks

Sr.	Evaluation type	Marks
1	**ONE** class test/ case study / online examination to be conducted in the given semester	20

2	**ONE** assignment based on curriculum to be assessed by the teacher concerned	10
3	Active participation in routine class instructional deliveries	05
4	Overall conduct as a responsible learner, communication and Leadership qualities in organizing related academic actives	05
	Total	**40**

(b) Semester end examination (Pattern of Question Paper):- 60 Marks

Theory

(Duration 2 hrs.)		
Questions in Examination Paper	**Units**	**Maximum Marks**
Q - 1	1	15
Q - 2	2	15
Q - 3	3	15
Q - 4	1,2,3	15
Total		**60**

- Question 1, 2 & 3 should be from topics mentioned in the table total 3 sub questions to be attempted of 5 marks each out of the choice of 4 sub questions.

- Question no. 4 should be of short answer type questions having six sub questions (2 from each unit) of 3 marks each. Total 5 questions are to be attempted.

REFERENCE BOOKS

1. Armstrong, Baron, (2005), *Handbook of Strategic HRM* - - First Jaico Impression, Jaico Publishing
2. Mello, *Strategic HRM*, India Edition (Fifth Re-print, 2010), Cengage Learning
3. Agarwala, (2007), *Strategic HRM*, First Edition, Tenth Impression 2011 - Oxford University Press
4. Regis, (2008), *Strategic HRM and Development*, First edition, Excel Books

NOTE: TUTION FEE FOR THE SEMESTER Rs. 65,000/-

UNIVERSITY OF MUMBAI

No. UG/170 of 2017-18

CIRCULAR:-

A reference is invited to the syllabi relating to the Bachelor of Science (B.Sc.) Programme **vide** this office Circular No.UG/47 of 2012-13, dated 27th June, 2012 and the Principals of the affiliated Colleges in Science and the Heads of the recognized Science Institutions concerned are hereby informed that the proposal received from Chairperson, Board of Studies in Statistics has been accepted by the Academic Council at its meeting held on 11th May, 2017 **vide** item No.4.195 and that in accordance therewith, the revised syllabus as per the (CBCS) of S.Y.B.Sc. Statistics (Sem -III & IV), which is available on the University's website (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2017-18, accordingly.

(Dr.M.A.Khan)
REGISTRAR

MUMBAI – 400 032
8th August, 2017
To

The Principals of the affiliated Colleges in Science and the Heads of the recognized Science Institutions concerned.

A.C/4.195/11/05/2017

****

No. UG/170 -A of 2017 MUMBAI-400 032 8th August, 2017

Copy forwarded with Compliments for information to:-

1) The Co-ordinator, Faculty of Science,
2) The Chairman, Board of Studies in Statistics,
3) The Offg. Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,
6) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),

(Dr.M.A.Khan)
REGISTRAR

....PTO

UNIVERSITY OF MUMBAI

Syllabus for the S. Y. B.Sc.
Program: B.Sc.
Course : STATISTICS

(Credit Based Semester and Grading System with effect from the academic year 2017–2018)

S.Y.B.Sc. STATISTICS Syllabus
For Credit Based and Grading System
To be implemented from the Academic year 2017-2018
SEMESTER III

Course Code	UNIT	TOPICS	Credits	L / Week
USST301	I	Univariate Random Variables. (Discrete and Continuous)	2	1
	II	Standard Discrete Probability Distributions.		1
	III	Bivariate Probability Distributions.		1
USST302	I	Concepts of Sampling and Simple Random Sampling.	2	1
	II	Stratified Sampling.		1
	III	Ratio and Regression Estimation.		1
USSTP3				6
USSTP3(A)	Practicals based on USST301		1	3
USSTP3(B)	Practicals based on USST302		1	3

SEMESTER IV

Course Code	UNIT	TOPICS	Credits	L / Week
USST401	I	Standard Continuous Probability Distributions.	2	1
	II	Normal Distribution.		1
	III	Exact Sampling Distributions.		1
USST402	I	Analysis of Variance.	2	1
	II	Design Of Experiments, Completely Randomized design & Randomized Block Design.		1
	III	Latin Square Design & Factorial Experiments.		1
USSTP4				6
USSTP4(A)	Practicals based on USST401		1	3
USSTP4(B)	Practicals based on USST402		1	3

Course Code	Title	Credits
USST301	**PROBABILITY DISTRIBUTIONS**	**2 Credits (45 lectures)**
Unit I	**Univariate Random Variables (Discrete and Continuous):**	15 Lectures

Moment Generating Function(M.G.F.):

Definition

Properties:

- Effect of change of origin and scale,

- M.G.F of sum of two independent random variables X and Y ,

- Extension of this property for n independent random variables and for n i.i.d. random variables.

All above properties with proof,

- Uniqueness Property without proof.

- Raw moments using M.G.F: using expansion method and using derivative method.

Cumulant generating Function(C.G.F.):

Definition

Properties:

- Effect of change and origin and scale ,

- Additive Property of C.G.F. and cumulants

Both properties with proof.

Obtaining Cumulants using C.G.F.

Derivation of relationship between moments and cumulants upto order four.

Characteristic Function:

Definition and properties (without Proof)

Examples of obtaining raw moments and central moments up

to order four using M.G.F. and C.G.F. for continuous and

discrete distributions .

Degenerate distribution(One point distribution) P(X=c) =1

Mean, Variance, Use of Degenerate distribution . Discrete Uniform distribution. Mean, Variance, coefficient of skewness using m.g.f., Bernoulli distribution. Mean, Variance, coefficient of skewness using m.g.f. **Binomial distribution :** Mean, Variance, Measures of skewness and Kurtosis based on moments using M.G.F.and C.G.F. , Nature of probability curve, Mode, Additive property , If X follows Binomial, then to find distribution of n-X. Recurrence relation for moments with proof: $\mu'_{r+1} = npq\ \mu'_r + pq\ \frac{d}{dp}\ \mu'r$ $\mu_{r+1} = pq\ [\ nr\ \mu_{r-1} + \frac{d}{dp}\ \mu r\ ]$ Relation between Bernoulli and Binomial using m.g.f. Transformation of random Variable (Univariate) : examples based on it.		
Unit II	**Standard Discrete Probability Distributions**	15 Lectures
Poisson distribution Mean, Variance, Measures of skewness and Kurtosis based on moments using M.G.F.and C.G.F. , Nature of probability distribution with change in the values of parameters, Mode, Additive property. Recurrence relation for moments with proof for μ'_{r+1} ,μ_{r+1} If X and Y are two independent Poisson variables Conditional distribution of X given X+Y with proof Poisson distribution as limiting distribution of Binomial (with proof) Real life examples of Binomial, Poisson distribution. **Geometric Distribution** Definition in terms of No. of failures and No. of trials. Mean, Variance, M.G.F., Mean and Variance using M.G.F., C.G.F., Mean and Variance,μ_3,μ_4 using C.G.F., Coefficients of skewness and		

Kurtosis and nature of probability distribution. Lack of Memory property with proof. If X and Y are two i.i.d. Geometric variables; Conditional distribution of X given X+Y with proof Distribution of sum of k i.i.d. Geometric variables. **Negative Binomial Distribution** Definition, Mean, Variance, M.G.F., Mean and Variance using M.G.F., C.G.F., Recurrence relation for central moments, Mean, Variance,μ_3,μ_4 using C.G.F., Coefficients of skewness and Kurtosis and nature of probability distribution. Lack of Memory property with proof. Recurrence relation for probabilities, Fitting of distribution. Limiting distribution of Negative Binomial distribution (with proof) **Hyper geometric distribution** Definition,Mean,Variance,Limiting distribution of Hyper geometric distribution (with proof) If X and Y are two independent Binomial variables Conditional distribution of X given X+Y (with proof) **Truncated distribution** Definition Truncated Binomial and Truncated Poisson Distribution: (truncated at 0) Probability mass function, mean and variance. Real life situations of Geometric, Negative Binomial, Hypergeometric distributions		
Unit III	**Bivariate Probability Distributions**	**15 Lectures**
Two dimensional Discrete random variables -Joint Probability mass function and its properties -Distribution function of (X,Y) and its properties -Definition of raw and central moments, covariance, correlation coefficient, Independence and correlation between two variables -Marginal and conditional probability distributions		

-Conditional expectation, conditional variance **Continuous bivariate random variables** -Joint Probability density function and its properties -Distribution function of (X,Y) and its properties -Definition of raw and central moments, covariance, correlation coefficient, Independence and correlation between two variables -Marginal and conditional probability distributions -Conditional expectation, conditional variance - Regression Function. Transformation of Random Variables and Jacobian of transformation with illustrations.	

REFERENCES:

1. Introduction to the theory of statistics: A. M. Mood, F.A. Graybill, D. C. Boyes, Third Edition; McGraw-Hill Book Company.
2. Introduction to Mathematical Statistics: R.V.Hogg, A.T. Craig; Fourth Edition; Collier McMillan Publishers.
3. Probability and Statistical Inference: R.V.Hogg, E. A.Tannis, Third Edition; Collier McMillan Publishers.
4. John E. Freund's Mathematical Statistics: I. Miller, M. Miller; Sixth Edition; Pearson Education Inc.
5. Introduction to Mathematical Statistics: P.G. Hoel; Fourth Edition; John Wiley & Sons Inc.
6. Fundamentals of Mathematical Statistics: S.C. Gupta, V.K. Kapoor; Eighth Edition; Sultan Chand & Sons.
7. Mathematical Statistics: J.N. Kapur, H.C. Saxena; Fifteenth Edition; S. Chand & Company Ltd.
8. Statistical Methods: An Introductory Text: J. Medhi; Second edition; Wiley Eastern Ltd.
9. An Outline of Statistical Theory Vol. 1: A.M. Goon, M.K. Gupta, B. DasGupta; Third Edition; The World Press Pvt. Ltd.

Course Code	Title	Credits
USST302	**THEORY OF SAMPLING**	**2 Credits (45 lectures)**
Unit I : Concepts: Population, Population unit, Sample, Sample unit, Parameter, Statistic,Estimator, Bias, Unbi Mean square error & Standard error.Census survey, Sample Survey. Steps in conducting sample survey with examples on designing appropriate Questionnaire. Concepts of S and Non-sampling errors. NSSO, CSO and their functions.Concepts and methods of Pr and Non-Probability Sampling. **Simple Random Sampling:** (SRS). Definition, Sampling with & without replacement (WR/WOR).Lottery method & use of Random numbers to select . Simple random sample. Estimation of population mean & total. Expectation & Variance of the estimators, Unbiased estimator of variance of these estimators. (WR/WOR). Estimation of population proportion. Expectation & Variance of the estimators, Unbiased estimator of variance of these estimators. (WR/WOR). Estimation of Sample size based on a desired accuracy in case of SRS for variables & attributes. (WR/WOR).		15 Lectures
Unit II : Stratified Sampling: Need for Stratification of population with suitable examples. Definition of Stratified Sample. Advantages of stratified Sampling. **Stratified Random Sampling:** Estimation of population mean & total in case of Stratified Random Sampling (WOR within each strata). Expectation & Variance of the unbiased estimators, Unbiased estimators of variances of these estimators. Proportional allocation, Optimum allocation with and without varying costs. Comparison of Simple Random Sampling, Stratified Random Sampling using Proportional allocation and Neyman allocation.		15 Lectures
Unit III : **a. Ratio & Regression Estimation assuming SRSWOR:** Ratio Estimators for population Ratio, Mean & Total. Expectation & MSE of the Estimators. Estimators of MSE. Uses of Ratio Estimator. Regression Estimators for population Mean & Total. Expectation & Variance of the Estimators assuming known value of regression coefficient 'b'. Estimation of 'b'. Resulting variance of the estimators. Uses of regression Estimator. Comparison of Ratio, Regression & mean per Unit estimators.		15 Lectures

b. Introduction to Systematic sampling, Cluster sampling & Two Stage sampling with suitable illustrations.	

REFERENCES:

1. Sampling Techniques: W.G. Cochran; 3rd Edition; Wiley(1978)
2. Sampling Theory and methods: M.N. Murthy; Statistical Publishing Society. (1967)
3. Sampling Theory: Des Raj; McGraw Hill Series in Probability and Statistics. (1968).
4. Sampling Theory of Surveys with Applications: P.V. Sukhatme and B.V. Sukhatme; 3rd Edition; Iowa State University Press (1984).
5. Fundamentals of Applied Statistics: S. C. Gupta and V.K. Kapoor; 3rd Edition; Sultan Chand and Sons (2001).
6. Theory and Analysis of Sample Survey Designs: Daroga Singh, F.S.Chaudhary, Wiley Eastern Ltd. (1986).
7. Sampling Theory and Methods: S. Sampath, Second Edition (2005),Narosa.
8. Theory and Methods of Survey Sampling: Parimal Mukhopadhyay, (1998), Prentice Hall Of India Pvt. Ltd.

DISTRIBUTION OF TOPICS FOR PRACTICALS

SEMESTER-III

COURSE CODE USSTP3

Sr. No	Semester III .Course USSTP3(A)
1	Moment Generating Function, Moments.
2	Cumulant generating Function, Cumulants, Characteristic function.
3	Standard Discrete Distributions.
4	Fitting Standard Discrete Distributions.
5	Bivariate Probability Distributions, Marginal & Conditional distributions, Conditional Mean, Conditional Variance, Correlation.
6	Transformation of discrete & continuous random variables.

Sr. No	Semester III .Course USSTP3(B)
1	Designing of Questionnaire.
2	Simple Random Sampling for Variables.
3	Simple Random Sampling for Attributes.
4	Estimation of Sample Size in Simple Random Sampling.
5	Stratified Random Sampling.
6	Ratio Estimation.
7	Regression Estimation.

USST 303 is a new paper for any student of S.Y.B.Sc. Student must have passed 12th standard with Mathematics. If not then He/She has to complete the required bridge course.

Course Code	Title	Credits
USST303	**OPERATIONS RESEARCH 1**	**2 Credits (45 lectures)**
Unit I : Linear Programming Problem (L.P.P.) : Mathematical Formulation: Maximization & Minimization. Concepts of Solution, Feasible Solution, Basic Feasible Solution, Optimal solution. Graphical Solution for problems with two variables. Simplex method of solving problems with two or more variables. Big M method. Concept of Duality. Its use in solving L.P.P. Relationship between optimum solutions to Primal and Dual. Economic interpretation of Dual.		**15 Lectures**
Unit II : Transportation Problem: Concept, Mathematical Formulation. Concepts of Solution, Feasible Solution. Initial Basic Feasible Solution by North-West Corner Rule, Matrix Minima Method, Vogel's Approximation Method. Optimal Solution by MODI Method. Optimality test, Improvement procedure. Variants in Transportation Problem: Unbalanced, Maximization type.		**15 Lectures**
Unit III :Assignment Problem: Concept. Mathematical Formulation Solution by: Complete Enumeration Method and Hungarian method. Variants in Assignment Problem: Unbalanced, Maximization type. Travelling Salesman Problem **Sequencing :** Processing n Jobs through 2 and 3 Machines & 2 Jobs through m Machines.		**15 Lectures**

REFERENCES

1. Operations Research: Kantiswaroop and Manmohan Gupta. 4th Edition; S Chand & Sons.
2. Schaum Series book in O.R. Richard Broson. 2nd edition Tata Mcgraw Hill Publishing Company Ltd.
3. Operations Research: Methods and Problems: Maurice Sasieni, Arthur Yaspan and Lawrence Friedman, (1959), John Wiley & Sons.
4. Mathematical Models in Operations Research : J K Sharma, (1989), Tata McGraw Hill Publishing Company Ltd.
5. Principles of Operations Research with Applications to Management Decisions: Harvey M. Wagner, 2nd Edition, Prentice Hall of India Ltd.
6. Operations Research: S.D.Sharma.11th edition, Kedar Nath Ram Nath & Company.
7. Operations Research: H. A.Taha.6th edition, Prentice Hall of India.
8. Quantitative Techniques For Managerial Decisions: J.K.Sharma , (2001), MacMillan India Ltd.

PRACTICALS BASED ON USST 303

COURSE CODE USSTP3(C)

Practical Number	Title of Practical
01	Formulation and Graphical Solution of L.P.P.
02	Simplex Method
03	Duality
04	Transportation Problems
05	Assignment Problems
06	Sequencing Problems
07	Problems solving using TORA

SEMESTER IV

Course Code	Title	Credits
USST401	**PROBABILITY AND SAMPLING DISTRIBUTIONS**	**2 Credits (45 lectures)**
Unit I	**Standard Continuous Probability Distributions**	15 Lectures

Rectangular or Continuous Uniform over (a,b) Mean, Median Standard deviation,C.D.F.M.G.F., Mean ,variance,μ_3 using M.G.F., skewness of distribution.

For X following U (0,1), distribution of i) $\frac{X}{1+X}$, ii) $\frac{X}{1-X}$

Triangular distribution

Symmetric and asymmetric over(a, b) with peak at c

-M.G.F. Mean ,Variance , d.f. Median.

Exponential Distribution

Definition, M.G.F.,C.G.F. raw moments and central moments up to order four using M.G.F..and C.G.F.

- Measures of Skewness and Kurtosis ,Nature of Probability curve

- Median and Quartiles and Percentiles

-Forgetfulness Property with proof and examples based on it.

-Distribution of $X_{(1)}$,first order statistic -Distribution of ratio of two i.i.d. Exponential random variables. -Distribution of - $\frac{1}{\lambda}$ ln(1-X) ,if X follows Uniform (0,1). -Distribution of X+Y and $\frac{X}{X+Y}$,for two independent Exponential variables X and Y with mean1.(All with proof.) **Cauchy (with location and scale parameter)** -Properties with proof. Distribution of 1/ x. c.d.f. and percentiles. **Gamma (with Scale and shape parameter)** Expression for r th raw moment Mean, variance, Mode & Standard deviation. M.G.F., Additive property, C.G.F.. raw moments and central moments up to order four using M.G.F.. and C.G.F. Coefficients of skewness and Kurtosis and nature of probability curve. Distribution of sum of independent Exponential random variables. **Beta Distribution: Type I & Type II** Expression for r th raw moment, Mean, Mode and Standard deviation, H.M. If a r.v.X follows Beta of type 1, distribution of 1- X If a r.v. X follows Beta of type 2, distribution of i) $\frac{1}{1+X}$, ii)$\frac{X}{1+X}$ With proof. For two independent Gamma variables X and Y with parameters m and n respectively, distribution of U = $\frac{X}{Y}$ and V= $\frac{X}{X+Y}$ with proof.		
Unit II	**Normal Distribution**	15 lectures
Definition, Derivation of Mean, Median, Mode, Standard deviation, M.G.F. , C,G,F., Moments & Cumulants (up to fourth order). skewness & kurtosis, Nature of Normal curve, Mean absolute deviation. Properties of Normal Distribution. Expression for even order central moments and to show that odd order central moments are zero. Percentiles.		

Distribution of Standard normal variable, Percentiles.

Distribution of linear function of independent Normal variables

(i).aX, (ii). X+b, (iii). aX+bY in particular X+Y and X-Y, (iv) $\sum_{i=1}^{P} a_i x_i$ (all with proof.)

Fitting of Normal Distribution.

Central Limit theorem for i.i.d. random variables.(with proof)

Log Normal Distribution: Derivation of mean & variance.

Mode, Median and relation between them.

Distribution of product of n log normal random variables.

Unit III	**Exact Sampling Distributions**	15 lectures

Chi-Square Distribution:

Derivation of p.d.f. , Concept of degrees of freedom. Mean, Mode & Standard deviation. M.G.F.,C.G.F., Measures of skewness and Kurtosis, Additive property

Distribution of ratio of two independent Chi-square variables

Distribution of $\frac{X}{X+Y}$ if X and Y are two independent Chi-square variables

(All with proof)

Distribution of the sum of squares of independent Standard Normal variables. Sampling distributions of sample mean and sample variance and their independence for a sample drawn from Normal distribution (with proof).

Applications of Chi-Square:

Development of decision criterion with test procedures of

(i) Test of significance for specified value of variance of a Normal population

(ii) Test for goodness of fit,

Test Procedure for independence of attributes.

(i) r × c contingency table,
(ii) 2×2 contingency table, Derivation of test statistic, Yates' correction with proof

Derivation of Confidence interval for the variance of a Normal population when

(i) mean is known, ,
(ii) mean is unknown.

Student's t-distribution:

Derivation of p.d.f. **,** Mean, Median, Mean Deviation & Standard deviation. M.G.F., C.G.F. , Measures of skewness and Kurtosis and Additive property

Limiting distribution of t distribution with proof.

Applications of t:

Development of decision criterion with test procedure of Test of significance for specified value of mean of Normal population.

Test procedure of test of significance for difference between means of

(i) two independent Normal populations with equal variances

(ii) Dependent samples (Paired t test)

Derivation of Confidence intervals for

(i) Mean of Normal population,
(ii) difference between means of two independent Normal populations having the same variance

Snedecor's F-distribution:

Derivation of p.d.f. **,** Expression for r^{th} raw moment, Mean, variance, Mode & Standard deviation

Distribution of Reciprocal of F variable with proof.

Applications of F:

Test procedure for testing equality of variances of two independent Normal populations

i. Mean is known
ii. Mean is unknown

Derivation of confidence interval for ratio of variances of two independent Normal populations.

REFERENCES:

1. Introduction to the theory of statistics: A M Mood, F.A. Graybill, D C Boyes; Third Edition; McGraw-Hill Book Company.
2. Introduction to Mathematical Statistics: R.V.Hogg, A.T. Craig; Fourth Edition; Collier McMillan Publishers.
3. Probability and Statistical Inference: R.V.Hogg, E. A.Tannis, Third Edition; Collier McMillan Publishers.
4. John E. Freund's Mathematical Statistics: I. Miller, M. Miller; Sixth Edition; Pearson Education Inc.
5. Introduction to Mathematical Statistics: P.G. Hoel; Fourth Edition; John Wiley & Sons Inc.
6. Fundamentals of Mathematical Statistics: S.C. Gupta, V.K. Kapoor; Eighth Edition; Sultan Chand & Sons.
7. Mathematical Statistics: J.N. Kapur, H.C. Saxena; Fifteenth Edition; S. Chand & Company Ltd.

8. Statistical Methods- An Introductory Text: J. Medhi; Second edition; Wiley Eastern Ltd.
9. An Outline of Statistical Theory Vol. 1: A.M. Goon, M.K. Gupta, B. DasGupta; Third Edition; The World Press Pvt. Ltd.

Course Code	Title	Credits
USST402	**ANALYSIS OF VARIANCE & DESIGN OF EXPERIMENTS**	**2 Credits** **(45 lectures)**
Unit I : Analysis of Variance: Introduction, Uses, Cochran's Theorem (Statement only). One way classification with equal & unequal observations per class, Two way classification with one observation per cell. Mathematical Model, Assumptions, Expectation of various sums of squares, F-test, Analysis of variance table. Least square estimators of the parameters, Variance of the estimators, Estimation of treatment contrasts, Standard Error and Confidence limits for elementary treatment contrasts.		15 Lectures
Unit II : Design Of Experiments: Concepts of Experiments, Experimental unit, Treatment, Yield, Block, Replicate, Experimental Error, Precision. Principles of Design of Experiments: Replication, Randomization & Local Control. Efficiency of design D1 with respect to design D2. Choice of size, shape of plots & blocks in agricultural & non agricultural experiments. **Completely Randomized Design (CRD) & Randomized Block Design (RBD):** Mathematical Model, Assumptions, Expectation of various sums of squares, F-test, Analysis of variance table. Least square estimators of the parameters, Variance of the estimators, Estimation of treatment contrasts, Standard error and Confidence limits for elementary treatment contrasts. Efficiency of RBD relative to a CRD.		15 Lectures
Unit III : Latin Square Design (LSD): Mathematical Model, Assumptions, Expectation of various sums of squares, F-test, Analysis of variance table. Least square estimators of the parameters, Variance of the estimators, Estimation of treatment contrasts, Standard error and Confidence limits for elementary treatment contrasts. Efficiency of the design relative to RBD, CRD. Missing plot technique for one missing observation in case of CRD, RBD & LSD.		15 Lectures

Factorial Experiments: Definition, Purpose & Advantages. 2^2, 2^3 Experiments. Calculation of Main & interaction Effects. Definition of contrast and orthogonal contrast, Yates' method. Analysis of 2^2 & 2^3 factorial Experiments.	

REFERENCES

1. Experimental Designs: W.G. Cochran and G.M.Cox; Second Edition;John Wiley and Sons.
2. The Design and Analysis of Experiments: Oscar Kempthorne, John Wiley and Sons.
3. Design and Analysis of Experiments: Douglas C Montgomery; 6th Edition;John Wiley & Sons.
4. Design and Analysis of Experiments: M.N.Das and N.C.Giri, 2nd Edition; New Age International (P) Limited;1986.
5. Experimental Design, Theory and Application: Walter T Federer; Oxford & IBH Publishing Co. Pvt. Ltd.
6. Fundamentals of Applied Statistics: S.C.Gupta and V.K.Kapoor; 3rd Edition; Sultan Chand and Sons (2001).
7. Statistical Principles in Experimental Design: B.J. Winer, McGraw Hill Book Company.

DISTRIBUTION OF TOPICS FOR PRACTICALS

SEMESTER-IV
COURSE CODE USSTP4

Sr. No	Semester IV. Course USSTP4(A)
1	Standard Continuous distributions.
2	Normal Distribution.
3	Central Limit Theorem.
4	Chi Square distribution.
5	t distribution.
6	F distribution.

Sr. No	Semester IV .Course USSTP4(B)
1	Analysis of Variance- One Way.
2	Analysis of Variance- Two Way.
3	Completely Randomized Design.
4	Randomized Block Design.
5	Latin Square Design.
6	Missing Observations in CRD, RBD & LSD.
7	Factorial Experiments.

USST 403 is a new paper for any student of S.Y.B.Sc. Student must have passed 12th standard with mathematics. If not then He/She has to complete the required bridge course.

Course Code	Title	Credits
USST403	**Operations Research - 2**	**2 Credits (45 lectures)**
Unit I : CPM and PERT: Objective and Outline of the techniques. Diagrammatic representation of activities in a project: Gantt Chart and Network Diagram. Slack time and Float times. Determination of Critical path. Probability consideration in project scheduling. Project cost analysis. Updating.		**15 Lectures**
Unit II : GAME THEORY Definitions of Two persons Zero Sum Game, Saddle Point, Value of the Game, Pure and Mixed strategy, Optimal solution of two person zero sum games. Dominance property, Derivation of formulae for (2×2) game. Graphical solution of (2×n) and (m×2) games, Reduction of game theory to LPP		**15 Lectures**
Unit III : DECISION THEORY Decision making under uncertainty: Laplace criterion, Maximax (Minimin) criterion, Maximin (Minimax) criterion, Hurwitz α criterion, Minimax Regret criterion. Decision making under risk: Expected Monetary Value criterion, Expected Opportunity Loss criterion, EPPI, EVPI. Bayesian Decision rule for Posterior analysis. Decision tree analysis along with Posterior probabilities.		**15 Lectures**

Sr. No	Semester IV .Course USSTP4(C)
1	CPM-PERT : Construction of Network.
2	Finding Critical Path. Computing Probability of Project completion.
3	Project cost analysis.
4	Updating.
5	Game Theory 1
6	Game Theory 2
7	Decision Theory-1: Decisions Under Uncertainty
8	Decision Theory-2 : Decisions Under Risk
9	Decision Theory-3 : Decision Tree analysis.

REFERENCES

1. PERT and CPM, Principles and Applications: Srinath. 2nd edition, East-West Press Pvt. Ltd.
2. Quantitative Techniques For Managerial Decisions: J.K.Sharma, (2001), MacMillan India Ltd.
3. Mathematical Models in Operations Research: J K Sharma, (1989), Tata McGraw Hill Publishing Company Ltd.

4. Operations Research: S.D.Sharma.11th edition, KedarNath Ram Nath& Company.
5. Operations Research: Kantiswaroop and Manmohan, Gupta. 12thEdition; S Chand & Sons.
6. Schaum Series book in O.R. Richard Bronson. 2nd edition Tata Mcgraw Hill Publishing Company Ltd.
7. Bronson R. : Theory and problems of Operations research, First edition, Schaum's Outline series
8. Operations Research: Methods and Problems: Maurice Sasieni, Arthur Yaspan and Lawrence Friedman,(1959), John Wiley & Sons.
9. Operations Research: H. A.Taha., 6th edition, Prentice Hall of India.
10. Vora N. D. : Quantitative Techniques in Management, Third edition, McGraw Hill Companies.
11. Bannerjee B. : Operation Research Techniques for Management, First edition, Business Books

Semester End Examination

Theory: At the end of the semester, examination of three (3) hours duration and hundred (100) marks based on the three units shall be held for each course.

Pattern of **Theory question** paper at the end of the semester for ***each course*** will be as follows:
Total number of questions five each of twenty marks.
Question one based on all units. Ten sub-questions of two marks each.
Question two, three, four are based on unit I, unit II and unit III respectively.
Question five based on all units: solve two out of three ten marks each.

Practicals: At the end of the semester, examination of two hours duration and 40 marks shall be held for **each course**. Five marks for journal and Five marks for VIVA. (40+10=50)

Pattern of **Practical question** paper at the end of the semester for **each course**:
There shall be Four questions of ten marks each. Students should attempt all questions.
Question 1 based on Unit 1, Question 2 based on Unit II, Question 3 based on Unit III, Question 4 based on all Three Units combined.
Student should attempt **any two** sub questions out of **three** in each question.

Workload

Theory : 3 lectures per week per course.
Practicals: 3 lecture periods per course per week per batch. All three lecture periods of the practicals shall be conducted in succession together on a single day

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AC_11-5-2017

Item No._____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	**Title of Course**	**S. Y. B. Sc. Chemistry**
2	**Eligibility for Admission**	F. Y. B. Sc. Passed from this university (or with ATKT in any two courses at the F. Y. B. Sc. Level) or equivalent qualification from other universities as may have been allowed by the relevant ordinances of this university
3	**Passing marks**	**40%**
4	**Ordinances/Regulations (if any)**	
5	**No. of Semesters**	**Two**
6	**Level**	**U.G.**
7	**Pattern**	**Semester**
8	**Status**	**New**
9	**To be implemented from Academic year**	**2017-2018**

Date : 05-5-2017 **Signature:**
BoS Chairperson: **Dr. Anil V. Karnik**
Convener: Dr. Ravindra G. Deshmukh

UNIVERSITY OF MUMBAI

Essentials Elements of The Syllabus

1	**Title of Course**	Syllabus for two semester S. Y. B. Sc. course in chemistry
2	**Couse Code**	USCH301, USCH302, USCH303 USCH401, USCH402, USCH404 USCHP1 to USCHP6
3	**Preamble**	Attached
4	**Objective**	• To infuse in the learner a spirit of inquiry into the fundamental aspects of the various core areas of Chemistry. • To make the learner proficient in analysing the various observations and chemical phenomena presented to him during the course. • To make the learner capable of solving problems in the various units of this course • To give the learner an opportunity to get hands on experience of the various concepts and processes in the various branches of chemistry • To impart various skills of handling chemicals, reagents, apparatus, instruments and the care and safety aspects involved in such handling • To make the learner capable of analysing and interpreting results of the experiments he conducts or performs
5	**Eligibility**	Pass F. Y. B. Sc.
6	**Fee Structure**	As Per Guidelines issued from the University
7	**No. of Lectures**	9 lectures per week (three lectures per paper)
8	**No. of Practicals**	9 periods per week (three periods per paper)
9	**Duration of Course**	Two Semester

10	**Notional Hours**	72 hours per paper per semester Theory and 36 hours per paper per semester for laboratory sessions
11	**No of students per batch**	120 students per division (20 Students for laboratory sessions)
12	**Selection**	As per merit.
13	**Assessment**	**End of semester examination of 100 marks per paper for theory and 50 marks per paper for laboratory sessions**
14	**Syllabus Detail**	**Attached**
15	**Title of the Unit**	**As given in the Syllabus text**
16	**Title of the Sub-unit**	**As given in the syllabus text.**
17	**Semester wise Theory**	**As prescribed in the syllabus text**
18	**Semester wise Practicals**	**As prescribed in the syllabus text.**
19	**Question Paper Pattern**	**As prescribed by the Faculty of Science**
20	**Scheme of evaluation of Project**	**N.A.**
21	**List of suggested reading**	**As Attached**
22	**List of websites**	**As Attached**
23	**List of You Tube videos**	**As attached**
24	**List of MOOCs**	**As Attached**

REGULATIONS

1. Preamble and objectives of the Course :

In the first two semseters of the six semester graduation program of B. Sc.(Chemistry) the learner was introduced to some basic aspects in the various core branches of chemistry like Physical Chemistry, Organic chemistry and Inorganic chemistry. Concepts about the structure of atom, distribution of electrons, Thermodynamics, Formation of organic compounds and basic ideas in reactivity of molecules in general and organic compounds in particular were introduced to the learner. He was made inquisitive about why and how should atoms combine to give molecules or ions. The non-orbital approach to appreciating the shapes of polyatomic species in general and molecules in particular.

The story of chemistry is taken further in the coming two semesters of the second year of the B. Sc. (Chemistry) Program. However it is also realised that some students opting for the course on Chemistry may not continue with the subject subsequently as such the syllabus is designed to retain the interest of the serious learner of chemistry as well as be helpful to non-chemistry learners. With such students who would want to pursue other branches of science but would want to acquire a basic appreciation and experience of chemistry a separate paper (Paper-III) is designed. This paper along with the laboratory session unit that goes with it deals with the basics of chemical analysis, separating components from a given sample, basic concepts like pH, experimental techniques like Titrimetry, Gravimetry, using instruments to carry out analysis, the various techniques like chromatography, electrophoresis, Instrumentation in general is felt to be of interest to learners of various branches like physics, botany, zoology, and microbiology.

The major objectives of B.Sc. Chemistry course are

- To infuse in the learner a spirit of inquiry into the fundamental aspects of the various core areas of Chemistry.

- To make the learner proficient in analysing the various observations and chemical phenomena presented to him during the course.
- To make the learner capable of solving problems in the various units of this course
- To give the learner an opportunity to get hands on experience of the various concepts and processes in the various branches of chemistry
- To impart various skills of handling chemicals, reagents, apparatus, instruments and the care and safety aspects involved in such handling
- To make the learner capable of analysing and interpreting results of the experiments he conducts or performs
- To make the learner capable of acquiring or pursuing a source of livelihood like jobs in chemical industry
- To arouse the interest to pursue higher levels of learning in chemistry,

2. Condition for Admission

A candidate who has passed the F.Y.B.Sc. of Mumbai University or an examination of some other university accepted by the syndicate as equivalent there to with Chemistry, Physics, Maths, Botany, Zoology or Life Science shall be eligible for admission into S.Y.B.Sc., course in Chemistry.

To

3. Duration of the Course: one year

4. Course of study:

Draft copy of the proposed revised syllabus for
Choice Based Credit System
S.Y.B.Sc. Chemistry
To be implemented from the Academic year 2017-2018

For the subject of chemistry there shall be three papers for 45 lectures each comprising of three units of 15 L each.

Semester-III

1. Paper-I (General Chemistry) Unit-I Physical Chemistry
   Unit-II Inorganic Chemistry
   Unit-III Organic Chemistry.
2. Paper-II (General Chemistry) Unit-I Physical Chemistry
   Unit-II Inorganic Chemistry
   Unit-III Organic Chemistry.
3. Paper III Basics of Analytical Chemistry

Semester-IV

1. Paper-I (General Chemistry) Unit-I Physical Chemistry
   Unit-II Inorganic Chemistry
   Unit-III Organic Chemistry.
2. Paper-II (General Chemistry) Unit-I Physical Chemistry
   Unit-II Inorganic Chemistry
   Unit-III Organic Chemistry.
   Basics of Analytical Chemistry
3. Paper III

Choice Based Credit System
S. Y. B. Sc.
Chemistry Syllabus
To be implemented from the Academic year 2017-2018

Course Content
Semester III

Course Code	Unit	Topics	Credits	L/Week
USCH301	I	Chemical Thermodynamics-II, Electrochemistry	2	1
	II	Chemical Bonding		1
	III	Reactions and reactivity of halogenated hydrocarbons, alcohols, phenols and epoxides		1
USCH302	I	Chemical Kinetics-II, Solutions	2	1
	II	Selected topics on p block elements		1
	III	Carbonyl Compounds		1
USCH303	I	Intorduction to Analytical Chemistry and Statistical Treatment of analytical data-I	2	1
	II	Classical Methods of Analysis.		1
	III	Instrumental Methods-I		1
USCHP1		Chemistry Practicals I	1	3
USCHP2		Chemistry Practicals II	1	3
USCHP3		Chemistry Practicals III	1	3

Semester IV

Course Code	Unit	Topics	Credits	L/Week
USCH401	I	Electrochemistry-II, Phase Equilibria	2	1
	II	Comparative Chemistry of the transition metals & Coordination Chemistry		1
	III	Carboxylic acids and their derivatives, Sulphonic acids		1
USCH402	I	Solid state, Catalysis	2	1
	II	Ions in aqeous medium & Uses and Environmental Chemistry of volatile Oxides and oxo-acids		1
	III	Amines, Diazonium salts, Heterocyclic compounds		1
USCH403	I	Separation Techniques in Analytical Chemistry	2	1
	II	Instrumental Methods-II		1
	III	Statistical Treatment of analytical data --II		1
USCHP4		Chemistry Practicals I	1	3
USCHP5		Chemistry Practicals II	1	3
USCHP6		Chemistry Practicals III	1	3

Semester III
Paper I
Theory: 45 Lectures

Unit I:Physical Chemistry

1.1 Chemical Thermodynamics-II(8L)

1.1.1 Free Energy Functions: Helmholtz Free Energy, Gibb's Free Energy, Variation of Gibb's
free energy with Pressure and Temperature.
1.1.2 Gibbs-Helmholtz equation, van't Hoff reaction isotherm and van't Hoff reaction isochore.
(Numericals expected).
1.1.3 Thermodynamics of Open System: Partial Molal Properties, Chemical Potential and its variation with Pressure and Temperature, Gibb's Duhem equation.
1.1.4 Concept of Fugacity and Activity

1.2 Electrochemistry: (7L)

1.2.1 Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes.
1.2.2 Kohlrausch law of independent migration of ions.
1.2.3 Applications of conductance measurements: determination of degree of ionization and ionization constant of weak electrolyte, solubility and solubility product of sparingly soluble salts, ionic product of water. (Numericals expected).
1.2.4 Transference number and its experimental determination using Moving boundary method. (Numericals expected). Factors affecting transference number.

Unit-II
Chemical Bonding

2.1 Non-Directional Bonding (4L)

2.1.1 Ionic Bond: Conditions for the Formation of Ionic Bond.
2.1.2 Types of Ionic Crystals
2.1.3 Radius Ratio Rules
2.1.4 Lattice Energy, Borne-Lande Equation
2.1.5 Kapustinski Equation
2.1.6 Born-Haber Cycle and its Application

2.2. Directional Bonding: Orbital Approach. (6L)

2.2.1 Covalent Bonding The Valence Bond Theory- Introduction and basic tenets.

2.2.2 Interaction between two hydrogen atoms and the Potential energy diagram of the resultant system.

2.2.3 Corrections applied to the system of two hydrogen atoms- Formation of H_2

2.2.4 Homonuclear diatomic molecules from He_2 to Ne_2

2.2.5 Resonance and the concept of Formal Charge; Rules for Resonance or Canonical structures.

2.2.6 Bonding in Polyatomic Species: The role of Hybridization. And types of hybrid orbitals-*sp, sp^2, sp^3, sp^3d, $sp^2d^2$and sp^2d sp^3d^2*.

2.2.7 Equivalent and Non-Equivalent hybrid orbitals

2.2.8 Contribution of a given atomic orbital to the hybrid orbitals (with reference to sp^3 hybridisation as in CH_4, NH_3 and H_2O and series like NH_3, PH_3, AsH_3, BiH_3)

2.3 **Molecular Orbital Theory (5L)**

2.3.1. Comparing Atomic Orbitals and Molecular Orbitals.

2.3.2. Linear combination of atomic orbitals. to give molecular orbitals LCAO-MO approach for diatomic homonuclear molecules).

2.3.4. Wave mechanical treatment for molecular orbitals (H_2^+ and H_2)

2.3.4 Molecular orbital Theory and Bond Order and magnetic property: with reference to O_2,O_2^+ O_2^-,O_2^{2-}

(Problems and numerical problems expected wherever possible)

Unit III: Organic Chemistry

3.1.1. Reactions and reactivity of halogenated hydrocarbons: [4L]

3.1.1.**Alkyl halides:** Nucleophilic substitution reactions: S_N1, S_N2 and S_Ni mechanisms with stereochemical aspects and factors affecting nucleophilic substitution reactions-nature of substrate, solvent, nucleophilic reagent and leaving group.

3.1.2.**Aryl halides:** Reactivity of aryl halides towards nucleophilic substitution reactions. Nucleophilic aromatic substitution (S_NAr) addition-elimination mechanism and benzyne mechanism.

3.1.2.**Organomagnesium and organolithium compounds: [3L]**

Nomenclature, nature, type and reactivity of carbon-metal bond. Preparation using alkyl / aryl halide. Structure, stability and reactions with compounds containing acidic hydrogen, carbonyl compounds, CO2, cyanides and epoxides.

3.2 Alcohols, phenols and epoxides: [8L]

3.2.1. **Alcohols:** Nomenclature, Preparation: Hydration of alkenes, hydrolysis of alkyl halides, reduction of aldehydes and ketones, using Grignard reagent. Properties: Hydrogen bonding, types and effect of hydrogen bonding on different properties. Acidity of alcohols, Reactions of alcohols

3.2.2. **Phenols: Pr**eparation, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols.

3.2.3. **Epoxides:** Nomenclature, methods of preparation and reactions of epoxides: reactivity, ring opening reactions by nucleophiles (a) In acidic conditions: hydrolysis, reaction with halogen halide, alcohol, hydrogen cyanide. (b) In neutral or basic conditions: ammonia, amines, Grignard reagents, alkoxides.

Semester III
Paper II

Unit I: Physical Chemistry

1.1 Chemical Kinetics-II (7L)

1.1.1 Types of Complex Chemical reactions: Reversible or opposing, consecutive and parallel reactions (No derivations, only examples expected),

Thermal chain reactions: H. and Br. reaction. (only steps involved, no kinetic expression expected).

1.1.2 Effect of temperature on the rate of reaction, Arrhenius equation, Concept of energy of activation (Ea). (Numericals expected).

1.1.3 Theories of reaction rates: Collision theory and activated complex theory of bimolecular reactions. Comparison between the two theories

(Qualitative treatment only)

1.2 Solutions: (8 L)

1.2.1 Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law–non-ideal solutions. Vapour pressure-composition and temperature -composition curves of ideal and non-ideal solutions. Distillation of solutions.Lever rule.Azeotropes.

1.2.2 Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids with respect to Phenol-Water , Triethanolamine – Water and Nicotine – Water systems

1.2.3 Immiscibility of liquids- Principle of steam distillation.

1.2.4 Nernst distribution law and its applications, solvent extraction.

Unit-II

2. Selected topics on p block elements (15L)

2.1 Chemistry of Boron compounds

2.1.1 Electron deficient compounds – BH_3, BF_3, BCl_3 with respect to Lewis acidity and applications.
2.1.2 Preparation of simple boranes like diborane and tetraborane.
2.1.3 Structure and bonding in diborane and tetraborane (2e-3c bonds)
2.1.4 Synthesis of Borax.

2.2 Chemistry of Silicon and Germanium

2.2.1 Silicon compounds: Occurrence , Structure and inertness of SiO_2
2.2.2 Preparation of structure of $SiCl_4$
2.2.3 Occurrence and extraction of Germanium
2.2.4 Preparation of extra pure Silicon and Germanium

2.3 Chemistry of Nitrogen family

2.3.1 Trends in chemical reactivity - Formation of hydrides, halides, oxides with special reference to oxides of nitrogen.
2.3.2 Oxides of nitrogen with respect to preparation and structure of NO, NO_2, N_2O and N_2O_4.
2.3.3 Synthesis of ammonia by Bosch – Haber process.

Unit III: Organic Chemistry

Carbonyl Compounds: [15L]

3.1 Nomenclature of aliphatic, alicyclic and aromatic carbonyl compounds. Structure, reactivity of aldehydes and ketones and methods of preparation; Oxidation of primary and secondary alcohols using PCC, hydration of alkynes, action of Grignard reagent on esters, Rosenmund reduction, Gattermann – Koch formylation and Friedel Craft acylation of arenes

3.2 General mechanism of nucleophilic addition, and acid catalyzed nucleophilic addition reactions.

3.3 Reactions of aldehydes and ketones with $NaHSO_3$, HCN, RMgX, alcohol, amine, phenyl hydrazine, 2,4-Dinitrophenyl hydrazine, $LiAlH_4$ and $NaBH_4$.

3.4 Mechanisms of following reactions: Benzoin condensation, Knoevenagel condensation, Claisen-Schmidt and Cannizzaro reaction.

3.5 Keto-enol tautomerism: Mechanism of acid and base catalysed enolization

3.6 Active methylene compounds: Acetylacetone, ethyl acetoacetate diethyl malonate, stabilised enols. Reactions of Acetylacetone and ethyl acetoacetate (alkylation, conversion to ketone, mono- and dicarboxylic acid)

Semester IV
Paper I

Unit I: Physical Chemistry

1.1Electrochemistry-II: (8 L)

1.1.1 Electrochemical conventions, Reversible and irreversible cells.

1.1.2 Nernst equation and its importance, Types of electrodes, Standard electrode potential, Electrochemical series (Numericals expected).

1.1.3 Thermodynamics of a reversible cell, calculation of thermodynamic properties: ΔG, ΔH and ΔS from EMF data. (Numericals expected)

1.1.4 Calculation of equilibrium constant from EMF data. (Numericals expected)

1.1.5 Concentration cells with transference and without transference. Liquid junction potential and salt bridge.

1.1.6 pH determination using hydrogen electrode and quinhydrone electrode.(Numericals expected)

1.2 Phase Equilibria: (7L)

1.2.1 Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs Phase Rule and its thermodynamic derivation.

1.2.2 Derivation of Clausius – Clapeyron equation and its importance in phase equilibria. (numericals expected)

1.2.3 Phase diagrams of one-component systems (water and sulphur).

1.2.4 Two component systems involving eutectics, congruent and incongruent melting points (lead-silver system).

Unit-II

2.1 Comparative Chemistry of the transition metals (9 L)

2.1.1 Position in the periodic table; Natural occurrence principal ores and minerals;

2.1.2 Significance of special stability of d^0, d^5 and d^{10} leading to variable oxidation states; Unusual oxidation states and their stabilities in aqueous solutions (with special reference to vanadium, and chromium.)

2.1.3 Origin of colour for transition metals and their compounds: such as reflectivity, surface coatings, particle size, packing density for metals and nature of d-orbitals, number of electrons in the d-orbitals, geometry, and ability for charge transfer).

2.1.4 Magnetic properties of transition metal compounds: Origin of magnetism-spin and orbital motion of electrons; equation for spin only and spin-orbital magnetism in terms of Bohr magnetons (No derivation of relevant equations expected); Reasons for quenching of orbital moments.

2.1.5 Chemistry of Titanium and vanadium: properties of Oxides and chlorides; use in titrimetric analysis

2.1.6 Qualitative tests for transition metal ions: General considerations in devising tests (with reference to Chromium, Manganese, iron, Cobalt Nickel and Copper)

2.2 Coordination Chemistry : (6 L)

2.2.1 Introduction to Chemistry of Coordination Compounds

i. Historical perspectives: Early ideas on coordination compounds
ii. Basic terms and nomenclature.
iii. Types of ligands
iv. Isomerism :General Types with special reference to stereoisomerism of coordination compounds (C.N=6)
v. Evidence for the formation of coordination compounds,

2.2.2. Theories of coordination compounds

i. Werner's Theory of coordination compounds,
ii. Effective atomic number rule.
iii. Eighteen electron Rule

2.2.3. Nature of the Metal-Ligand Bond:

i. Valence Bond Theory; Hybridisation of the central metal orbitals-sp^3, sd^3/d^3s sp^3d^2/d^2sp^3, sp^2d,
ii. Inner and outer orbital complexes of .(suitable examples of Mn(II) Fe(II),Fe(III),Co(II)/Co(III),Ni(II), Cu(II) Zn(II) complexes with ligands like aqua, ammonia CN^- and halides may be used)
iii. Limitations of V.B.T

2.2.4. Application of coordination compounds.

Unit III: Organic Chemistry

3.1 Carboxylic Acids and their Derivatives :(11 Lectures)

3.1.1. Nomenclature, structure and physical properties, acidity of carboxylic acids, effects of substituents on acid strength of aliphatic and aromatic carboxylic acids.

3.1.2. Preparation of carboxylic acids: oxidation of alcohols and alkyl benzene, carbonation of Grignard and hydrolysis of nitriles.

3.1.3. Reactions: Acidity, salt formation, decarboxylation, Reduction of carboxylic acids with $LiAlH_4$, diborane, Hell-Volhard-Zelinsky reaction,Conversion of carboxylic acid to acid chlorides, esters, amides and acid anhydrides and their relative reactivity.

3.1.4. Mechanism of nucleophilic acyl substitution and acid-catalysed nucleophilic acyl substitution. Interconversion of acid derivatives by nucleophilic acyl substitution.
3.1.5. Mechanism of Claisen condensation and Dieckmann condensation.

3.2 Sulphonic acids: [4L]

Nomenclature, preparation of aromatic sulphonic acids by sulphonation of benzene (with mechanism), toluene and naphthalene, Reactions: Acidity of arene sulfonic acid, Comparative acidity of carboxylic acid and sulfonic acids. Salt formation, desulphonation.Reaction with alcohol, phosphorous pentachloride, IPSO substitution.

Semester IV
Paper II

Unit I: Physical Chemistry

1.1 Solid State: (7L)

1.1.1 Recapitulation of laws of crystallography and types of crystals

1.1.2 Characteristics of simple cubic, face centered cubic and body centered cubic systems, interplanar distance in cubic lattice (only expression for ratio of interplanar distances are expected)

1.1.3 Use of X-rays in the study of crystal structure, Bragg's equation (derivation expected), X-rays diffraction method of studying crystal lattice structure, structure of NaCl and KCl. Determination of Avogadro's number (Numericals expected)

1.2 Catalysis: (8 L)

1.2.1 Types of catalysis, catalytic activity, specificity and selectivity, inhibitors, catalyst poisoning and deactivation

1.2.2 Mechanisms and kinetics of acid-base catalyzed reactions, effect of pH.

1.2.3 Mechanisms and kinetics of enzyme catalyzed reactions (Michaelis-Menten equation)

1.2.4 Effect of particle size and efficiency of nanoparticles as catalyst.

Unit-II

2 Ions in aqeous medium

2.1. Acidity of Cations and Basicity of Anions

i. Hydration of Cations; Hydrolysis of Cations predicting degree of hydrolysis of Cations-effect of Charge and Radious.

ii. Latimer Equation. Relationship between pKa, acidity and z^2/r ratios of metal ions graphical Presentation

iii. Classification of cations on the basis of acidity category – Non acidic, Moderately acidic, strongly acidic, very strongly acidic with pKa values range and examples

iv. Hydration of Anions; Effect of Charge and Radius; Hydration of anions-concept, diagram classification on the basis of basicity

2.2. Uses and Environmental Chemistry of volatile Oxides and oxo-acids

i. Physical properties of concentrated oxo-acids like sulfuric, Nitric and Phosphoric acid

ii. Uses and environments aspects of these acids

Unit III: Organic Chemistry

Nitrogen containing compounds and heterocyclic compounds:

3.1 Amines: Nomenclature, effect of substituent on basicity of aliphatic and aromatic amines;

3.1.1. Preparation: Reduction ofaromaticnitro compounds using catalytic hydrogenation,chemical reduction using Fe-HCI, Sn-HCl, Zn-acetic acid, reduction of nitriles, ammonolysis of halides, reductive amination , Hofmann bromamide reaction.

3.1.2. Reactions- Salt Formation, N-acylation, N-alkylation, Hofmann's exhaustive methylation (HEM),Hofmann-elimination reaction, reaction with nitrous acid, carbylamine reaction, Electrophilic substitution in aromatic amines: bromination, nitration and sulphonation.

3.2 Diazonium Salts: **(7 Lectures)**

Preparation and their reactions/synthetic application - Sandmeyer reaction, Gattermann reaction, Gomberg reaction, Replacement of diazo group by -H,-OH. Azo coupling with phenols, naphthols and aromatic amines, reduction of diazonium salt to aryl hydrazine and hydroazobenzene

3.3 Heterocyclic Compounds: (8 Lectures)

3.3.1. Classification, nomenclature, electronic structure, aromaticity in 5-numbered and 6-membered rings containing one heteroatom;

3.3.2. Synthesis of Furan, Pyrrole (Paal-Knorr synthesis, Knorr pyrrole synthesis, and Hantzsch synthesis), Thiophene, Pyridine (Hantzsch synthesis),

3.3.3. Reactivity of furan, pyrrole and thiophene towards electrophilic substitution reactions on the basis of stability of intermediate and of pyridine on the basis of electron distribution. Reactivity of pyridine towards nucleophilic substitution on the basis of electron distribution.

3.3.4. Reactions of furan, pyrrole and thiophene: halogenation, nitration, sulphonation, Vilsmeier-Haack reaction, Friedel-Crafts reaction. Furan: Diels-Alder reaction, Ring opening. Pyrrole: Acidity and basicity of pyrrole. Comparison of basicity of pyrrole and pyrrolidine.

3.3.5. Pyridine: Basicity. Comparison of basicity of pyridine, pyrrole and piperidine. Sulphonation of pyridine (with and without catalyst), reduction and action of sodamide (Chichibabin reaction).

Semester III
Chemistry Practicals:

Unit I: Physical Chemistry

1. To verify Ostwald's dilution law for weak acid conductometrically.
2. To determine dissociation constant of weak acid conductometrically.
3. To determine the critical solution temperature (CST) of phenol - Water System.
4. Determination of energy of activation of acid catalyzed hydrolysis of methyl acetate.
5. To investigate the reaction between $K_2S_2O_8$ and KI with equal initial concentrations of the reactants
6. To determine solubility of sparingly soluble salts (anytwo) conductometrically.

Unit II: Inorganic Chemistry

1. Identification of cations in a given mixture and Analytically separating them [From a mixture containing not more than two of the following: Pb(II), Ba(II), Ca(II), Sr (II), Cu(II), Cd(II), Mg(II), Zn(II), Fe(II), Fe(III), Ni(II), Co(II) Al(III), Cr(III)]
2. Crystallisation of potassium iodate and to estimate its purity before and after the separation.
3. Estimation of total hardness
4. Investigation of the raction between Copper supfate and Sodium Hydroxide (Standard EDTA solution to be provided to the learner).

Unit III: Organic Chemistry

Short organic preparation and their purification: Use 0.5-1.0g of the organic compound. Purify the product by recrystallization. Report theoretical yield, percentage yield and melting point of the purified product.

Preparation of:

1. Cyclohexanone oxime from cyclohexanone.
2. Glucosazone from dextrose or fructose
3. Tribromoaniline from aniline.
4. β-Naphthylbenzoate
5. m-Dinitrobenzene from nitrobenzene

6. Phthalic anhydride from phthalic acid by sublimation
7. Acetanilide from aniline
8. p-Bromoacetanilide from acetanilide
9. Iodoform from acetone

(Any eight preparations)

Semester IV
Chemistry Practicals:

Unit I: Physical Chemistry

1. To determine standard EMF and the standard free energy change of Daniel cell potentiometrically .
2. To determine the amount of HCl in the given sample potentiometrically.
3. Compare the strengths of HCl and H_2SO_4 by studying kinetics of acid hydrolysis of methyl acetate.
6. Industrial visit report.

Unit II: Inorganic Chemistry

1. Inorganic preparation – Nickel dimethyl glyoxime using microscale method.
2. Complex cation – *Tris* (ethylene diamine) nickel (II) thiosulphate.
3. Complex anion – Sodium Hexanitrocobaltate (III) The aim of this experiment is to understand the preparation of a soluble cation (sodium)and a large anion hexanitrocobaltate(III) and its use to precipitate a large cation (potassium)
4. Inorganic salt – Calcium or magnesium oxalate using PFHS technique

Unit III: Organic Chemistry

Qualitative Analysis of bi-functional organic compounds on the basis of

1. **Prelimenary examination**
2. **Solubility profile**
3. **Detection of elements C, H, (O), N, S, X.**
4. **Detection of functional groups**
5. **Determination of physical constants (M.P/B.P)**

Solid or liquid Compounds containing not more than two functional groups from among the following classes may be given for analysisto be given: Carboxylic acids, phenol, carbohydrates, aldehydes, ketones, ester, amides, nitro, anilides, amines, alkyl and aryl halides.

Students are expected to write balanced chemical reactions wherever necessary. (Minimum 6 compounds to be analyzed)

Reference Books for Practicals:

Unit I:

1. Khosla B.D., Garg V.C. and Gulati A., Senior Practical Physical Chemistry, R. Chand and Co., New Delhi (2011).
2. Garland C. W., Nibler J.W. and Shoemaker D.P., Experiments in Physical Chemistry, 8th Ed., McGraw-Hill, New York (2003).
3. Halpern A.M. and McBane G.C., Experimental Physical Chemistry, 3rd Ed., W.H. Freeman and Co., New York (2003).
4. Athawale V.D. and Mathur P., Experimental Physical Chemistry, New Age International, New Delhi (2001)

Unit II:

1. *Practical Inorganic Chemistry* by G. Marr and B. W. Rockett van Nostrand Reinhold Company (1972)

Unit III:

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
3. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5^{th} Ed., Pearson (2012)
4. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996

Reference Books:

Unit I:

1. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
2. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry CengageLearning India Pvt.Ltd., New Delhi (2009).
4. Mahan, B.H. University Chemistry 3rd Ed. Narosa (1998).
5. Petrucci, R.H. General Chemistry 5th Ed. Macmillan Publishing Co., NewYork (1985).
6. K.L.Kapoor A textbook of Physical Chemistry3rd Ed. vol.1,2Macmillan Publishing Co., NewDelhi(2001)

Unit II:

1. *Practical Inorganic Chemistry* by G. Marr and B. W. Rockett van Nostrand Reinhold Company (1972)
2. Inorganic Chemistry – Gary Wulfsberg, Viva Book, First Indian Edition 2002
3. Quantitative Analysis – R.A.Day, A.L. Underwood, sixth edition
4. Vogel's Textbook of quantitative chemical analysis – J Mendham, R C Denny, J D Barnes, M Thomas, B Sivasankar
5. **References.**
6. Bruce H. Mahan, University Chemistry, Narosa publishing house pg. 611 to 683.
7. R. Gopalan , Universities Press India Pvt.Ltd. Inorganic Chemistry for Undergraduates.
8. Chemistry of Transition Elements Pg.- 608 – 679 .
9. J. D. Lee, 4th Edn., Concise Inorganic Chemistry, ELBS, The group III elements Pg. 359- 648.
10. D. F. Shriver and P. W. Atkins, Inorganic chemistry, 3rd edition, Oxford University Press (1999) page 325-446.
11. Ramesh Kapoor and R.S. Chopra, Inorganic Chemistry, R. Chand publishers, New Delhi.
12. CNR Rao edited, University General Chemistry, 513-578.
13. James E. Huheey, Inorganic Chemistry: Principles of Structure and Reactivity,
14. Emeleus and Anderson, Modern Aspects of Inorganic Chemistry, page no. 435-463.
15. Cotton and Wilkinson, Advanced Inorganic Chemistry, 3rd. Edition.
16. Gary Wulfsberg, Inorganic chemistry, Viva Books Pvt,. Ltd. (2002).
17. Puri, Sharma and Kalia, Milestone publishers, Principles of Inorganic Chemistry, page 416-628.
18. Bruce H. Mahan, University Chemistry, Narosa publishing house.
19. R. Gopalan , Universities Press India Pvt.Ltd. Inorganic Chemistry for Undergraduates.
20. J. D. Lee, 4th Edn., Concise Inorganic Chemistry, ELBS
21. D. F. Shriver and P. W. Atkins, Inorganic chemistry, 3rd edition, Oxford University Press (1999)
22. Ramesh Kapoor and R.S. Chopra, Inorganic Chemistry, R. Chand publishers, New Delhi.
23. CNR Rao edited, University General Chemistry
24. James E. Huheey, Inorganic Chemistry: Principles of Structure and Reactivity,

25. Emeleus and Anderson, Modern Aspects of Inorganic Chemistry
26. Cotton and Wilkinson, Advanced Inorganic Chemistry, 3rd. Edition.
27. Gary Wulfsberg, Inorganic chemistry, Viva Books Pvt,. Ltd. (2002).
28. Puri, Sharma and Kalia, Milestone publishers, Principles of Inorganic Chemistry

Unit III:

1. Morrison, R. T. and Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).2012
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education)
4. Mc Murry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
5. Clayden, J.; Greeves, N.; Warren, S.; Wothers, P.; Organic Chemistry, Oxford University Press.
6. Graham Solomons, T.W. Organic Chemistry, John Wiley & Sons, Inc.
7. Comprehensive Organic Chemistry- The synthesis and reactions of Organic Compounds, Derek barton ,W. David Ollis.
8. Kalsi, P. S. Textbook of Organic Chemistry 1st Ed., New Age International (P) Ltd. Pub.
9. Eliel, E. L. and Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.
10. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005

Semester III
Paper III
Basics in analytical Chemistry
Theory: 45 Lectures

The Role of Analytical chemistry in various fields including non-chemistry fields such as Environmental Science, Pharmacy, Medicine, Life Sciences, Petrochemicals, Arts (like Painting) Forensic sciences and so on can never be underestimated. This course is expected to introduce the learner to this interesting field of Analytical Chemistry.

It is expected to provide the learner an overview of this very important branch of chemistry. After successful completion of this course the learner is expected to be familiar with the question of what is analysis, why it is required and the methods, techniques, procedures and protocols that may be used or required in the course of a given problem of analysis. The learner is also expected to appreciate the role of an Analytical Chemist and a Chemical Analyst.

Correctness or acceptability of the results of a given analysis and how to deal with wrong or erroneous results: when to reject them and when and how to retain them to be meaningful and/or acceptable are some other attributes expected as outcomes of learning this paper.

As such it is felt that this paper will be a subject of choice and interest for learners preferring a specialisation in Chemistry as well as to those who may have interests in other science fields as Physics, Botany, Zoology, Microbiology, Geochemistry and so on.

Goal:

To introduce the learner to an area of learning that is vital for the inherent nature of the subject itself but also is important and irreplaceable irrespective of the long term interest of specialisation or subject of interest of the learner.

Unit **I- Intorduction to Analytical Chemistry and Statistical Treatment of analytical data-I (15 L)**

Scope/ Objectives:

Learners should be able to

1. Select a method of analysis
2. Decide how to identify a sample and prepare it for analysis
3. Select a procedure for analysis
4. Identify sources of possible errors in the results obtained.

(Problems including numericals expected wherever necessary)

1.1. Role of Analytical Chemistry (9 L)

1.1.1. Language of analytical chemistry: important terms and their significance in Analytical Chemistry.

1.1.2. Purpose of Chemical Analysis; Analysis Based (i) On the nature of information required: (Proximate, Partial, Trace, Complete Analysis) and (ii) On the size of the sample used (Macro, semi-micro and micro analysis)

1.1.3. Classical and Non-Classical Methods of Analysis; their types and importance.

1.2. Significance of Sampling in Analytical Chemistry

1.2.1. Terms involved in Sampling

1.2.2. Types of Sampling

1.2.3. Sampling techniques

1.3. Results of Analysis. (6L)

1.3.1. Errors in Analysis and their types

1.3.2. Precision and Accuracy in Analysis

1.3.3. Corrections for Determinate Errors

(Problems including Numericals expected wherever required)

References:

1. Instrumental Analysis by Douglas A. Skoog, F. James Holler, Stanley R. Crouch

2. Instrumental methods of analysis by Willard, H.H.; Merritt, L.L. Jr.;
Dean, J.A.; Settle,7th Edition

3. Fundamental of Analytical Chemistry by Douglas A. Skoog, West, F. James Holler,
S. R. Crouch

4. Modern Analytical Chemistry by David Harvey, McGraw-Hill Higher Education

Unit II- Classical Methods of Analysis(15 L)

Objectives:

The main objectives of this unit is to

- Introduce classical methods of chemical analysis.
- Appreciate the various terms and types of titrimetric analysis.
- Ability to select proper titrimetric method
- Appreciate the usefulness of the gravimetric method of analysis
- Identify a suitable gravimetric method
- Perform the required calculations involved in the analysis by titrimetry as well as gravimetry.

2. Classical Methods of Analysis. (04L)

2.1. Titrimetric Methods

2.1.1. Terms involved in Titrimetric methods of analysis. Comparing volumetry and Titrimetry

2.1.2. The Conditions suitable for titrimetry

2.1.3. Types of titrimetry – Neutralisation (Acidimetry, alkalimetry), Redox, (Iodometry, Iodimetry,) Precipitation and Complexometric titrations and indicators used in these titrations

2.1.4. Tools of Titrimetry: Graduated glasswares and Callibration

2.2. Standard solutions (Primary and Secondary standards in Titrimetry) and Calculations in Titrimetry.

2.3. Neutralisation Titrations (04L)

2.3.1. Concept of pH and its importance in Neutralisation Titrations

2.3.2. End point and Equivalence point of Neutralisation titrations

2.3.3. Determination of End point by using

i. Indicators causing colour change
ii. Change in potential, (by potentiometry)
iii. Change in conductance (by conductometry)

2.3.4. Construction of titration curve (on the basis of change in pH)of a titration of

i. Strong acid-weak base
ii. Strong base-weak acid

2.4. Gravimetric analysis (06 L)

2.4.1. General Introduction to Gravimetry.

2.4.2. Types of Gravimetric Methods –

2.4.3. Precipitation Gravimetry:

i. Steps involved in precipitation gravimetry analysis
ii. Conditions for precipitation
iii. Completion of precipitation,
iv. Role of Digestion, Filtration, Washing, Drying Ignition of precipitate.

v. Applications of Gravimetric Analysis: Determination of sulfur in organic compounds; Estimation of Nickel in Cu-Ni alloy using dimethyl glyoxime; Determination of Aluminum by converting it to its oxide.

References:

1) Skoog et al. “Fundamentals of Analytical chemistry" Cengage Learning, Eight Edition, chapter 13, 14 and 15
2) Day and Underwood, “Quantitative analysis" prentice hall 1991, chapter3
3) S.M. Khopkar, “ Basic Concepts of Analytical Chemistry”, IInd Edition NewAge International Publisher
4) Gary D. Christan,” Analytical Chemistry”, VIth Edition, Wiley Students Edition, Chapter No 8,9,10
5) Fundamental of Analytical Chemistry by Douglas A. Skoog, West, F. James Holler, S. R. Crouch
6) Modern Analytical Chemistry , David Harvey (page numbers 232 -265)

Unit III: Instrumental Methods-I [15 L]

Objectives:

On completing the learning of this unit the learner is expected to

- Know the various instrumental methods of analysis
- Advantages of using instruments to make measurements
- The various observable properties of a given analyte and the stimulus best suited for its analysis
- Know about a generalized diagram of an analytical instrument
- Select a suitable instrumental method for analysis
- Appreciate the basic terms in spectrometry
- Use the relationship between absorbance (and its variations) and concentration of the analyte.
- Chose a suitable method foe photometric titrations.

3. Basic Concepts in Instrumental methods (03)

3.1. Relation between the Analyte, Stimulus and measurement of change in the observable property.

3.2. Block Diagram of an Analytical instrument.

3.3. Types of Analytical Instrumental methods based on

i. Optical interactions (eg. Spectrometry: uv-visible, Polarimetry)
ii. Electrochemical interactions (eg. Potentiometry, Conductometry,)
iii. Thermal interactions (eg. Thermogravimetry)

3.4. Spectrometry (07 L)

3.4.1. Interaction of electromagnetic radiation with matter: Absorption and Emission spectroscopy

3.4.2. Basic Terms: Radiant Power, Absorbance, Transmittance, Monochromatic

light, Polychromatic light, Wavelength of maximum absorbance, Absorptivity and Molar Absorbtivity

3.4.3. Statement of Beer's Law and Lambert's Law, Combined Mathematical Expression of Beer -Lambert's Law, Validity of Beer-Lambert's Law, Deviations from Beer-Lambert's Law ((Real deviations, Instrumental deviations and Chemical deviations)
(Numerical problems based on Beer-Lambert's Law)

3.4.4. Instrumentation for absorption spectroscopy: Colorimeters and Spectrophotometers

3.4.5. Block Diagrams for Single beam and Colorimeter, and Spectrophotometer (Principles, Construction and working-Details of Components expected i.e , source ,Sample holder , Filters/Monochromators, Detectors such as Photomultiplier tube)

3.4.6. Applications of UV-Visible Spectrophotometry **(02 L)**

(a) Qualitative analysis such as Identification of functional groups in Organic compounds ,Chromophores and Auxochrome,*cis* and *trans* isomers

(b) Quantitative analysis by Calibration curve method and

3.4.7. Photometric Titrations: Principle ,Instrumentation, Types of Photometric titration Curves with examples. **(03L)**

References:

1.Instrumental Methods of Chemical Analysis by Gurdeep R. Chatwal , Sham K.Anand pp 2.107-2.148

2.Principles of Instrumental Analysis by Skoog, Holler, Nieman, 5th Edition pp 143-172.

3. Instrumental Methods of Analysis by Willard, Merritt, Dean, Settle 7th Edition pp 118-181.

Semester III
Chemistry Practicals:
Paper III
Basics in Analytical Chemistry

1. **Tools of Analytical Chemistry-I:**
   a) Analytical glass wares like burettes, pipettes, Standard flasks, Separating funnels.
   b) Weighing tools such as two pan balance and monopan balance, digital balances:
   c) Incineration devices: Burners, Electrical Incinerators, Muffle Furnace,
   d) Drying Devices: Hot Air Oven, Microwave Oven, Descicators, Vacuum descicators
   e) Monochromators, Filters, Sample holders, Prisms, Diffraction Gratings, Photoemissive cells, Photomultiplier tubes

(The learner should draw diagrams and write-ups providing uses, care and maintenance of the items mentioned in (a) and principle, construction and uses of items (b) to (e) in his journal.

2. Gravimetric estimation of Nickel (II) as Ni-DMG and calculation of % error.
   (The learner is expected to know the role of the various reagents/chemicals used In the estimation, various steps involved. They should write the complete and Balanced chemical reaction for the formation of the $Ni(DMG)_2$ complex.
3. Colorimetric Determination of Copper Ions in given Solution by using calibration curve method and calculation of % error.
   (The learner is expected to learn the relation between concentration and Absorbance, to draw a calibration curve, use the slope of the calibration curve and compare it with the calculated slope. They are also expected to state the error estimate of their results).
4. Determination of buffer capacity of acid buffer and basic buffer.
   (The learner is expected to learn the use pH meter, standardization of pH meter, use of Henderson's equation and calculation of buffer capacity)
5. Estimation of Aspirin
6. Gravimetric estimation of barium ions using K_2CrO_4 as precipitant calculation of % error.
   (The learner is expected to learn the skills of using the counterpoise technique used in this gravimetric estimation; Using counterpoise method whatman No.42 for filtration. In such a case no incineration or use of silica crucible is required. They are also expected to state the error estimate of their results)

Semester IV

Paper III Basics in Analytical Chemistry -II

Theory: 45 Lectures

Unit –I -Methods of separation (15 L)

Objectives:

The learner is expected to understand

- The importance of separation in sample treatment
- Various methods of separations
- How to select a method of separation of an analyte from the matrix
- How a solute gets distributed between two immiscible phases
- Principle of solvent extraction and various terms involved therein
- Effect of various parameters on solvent extraction of a solute
- Classification of Chromatographic methods
- Paper and thin layer chromatography and using them in practice.

1. Separation Techniques in Analytical Chemistry (02 L)

1.1. An Introduction to Analytical Separations and its importance in analysis.

1.2. Estimation of an analyte without effecting separation.

1.3. Types of separation methods

1.3.1. Based on Solubilities (Precipitation, Filtration Crystallisation)

1.3.2. Based on Gravity- Centrifugation

1.3.3. Based on volatility-Distillation ;

1.3.4. Based on Electrical effects-Electrophoresis
1.3.5. Based on retention capacity of a Stationary Phase -Chromatography;
1.3.6. Based on distribution in two immiscible phases-Solvent Extraction;
1.3.7. Based on capacity to exchange with a resin-Ion Exchange;

1.4. **Electrophoresis:** Principles, Basic Instrumentation, Working and Application in separation of biomolecules like enzymes and DNA. (02L)

1.5. Solvent extraction (06 L)

1.5.1. Introduction, Nernst distribution Law, Distribution Ratio, Partition Coefficient.
1.5.2. Conditions of extraction: Equilibration time, Solvent volumes, temperature, pH.
1.5.3. Single step and multi step extraction, Percentage extraction for single step and multistep extraction. Separation factor.
1.5.4. Batch and continuous extraction

1.6. Chromatography : **(05L)**

1.6.1. Introduction to Chromatography
1.6.2. Classification of chromatographic methods based on stationary and mobile phase
1.6.3. Paper Chromatography: Principle, techniques and applications of Paper Chromatography in separation of cations.
1.6.4. Thin layer Chromatography Principle, technique and Applications in determining the purity of a given solute; Following progress of a given reaction .

References :

1. D.A. Skoog, D.M. West, F.J. Holler and CX.R. Crouch – Fundamentals of Analytical chemistry, 8th edition
2. G.H. Morrison and H. Freiser , Solvent extraction in analytical chemistry
3. P. G. Swell and B. Clarke, Chromatographic separations , Analytical chemistry by open Learning , John Wiley and sons, 1987
4. Modern Analytical Chemistry , David Harvey (page numbers 596 -606)
5. Modern Analytical Chemistry , David Harvey (page numbers 215 -217)

Unit –II - Instrumental Methods-II (15 L)

Objectives
On completing this unit the learner is

- Expected to appreciate the nature of interaction between applied electrical potential and the concentration of the analyte.
- The nature of chemical reactions that influence potential of a given cell.
- Familiar with the various types of electrodes or half cells.
- Appreciate the nature, need and importance of pH
- Expected to know the applications of the various instrumental methods dealt with in this unit.

2. Instruments based on the electrochemical properties of the analytes

2.1. Potentiometry: **(05 L)**

2.1.1. Principle.
2.1.2. Role of Reference and indicator electrodes

2.1.3. Applications in Neutralisation reactions with reference to the titration of a Strong acid against a Strong Base (using quinhydrone electrode)

2.1.4. Graphical methods for detection of end points

2.2. pHmetry: **(04 L)**

2.2.1. Principle

2.2.2. Types of pH meters.

2.2.3. Principle, Construction Working and Care of Combined Glass electrode

2.2.4. Applications in Titrimetry (Strtong acid-Strong Base) biological and environmental analysis.

2.3. Conductometry: **(06 L)**

2.3.1. Principle

2.3.2. Conductivity cell its construction and care

2.3.3. Applications in Neutralisation Titrimetry with respect to

i. Strong Acid-Strong Base
ii. Strong Acid-Weak Base
iii. Strong Base-weak Acid
iv. Weak Acid- Weak Base**.**

2.3.4. Advantages & limitations of conductometric titrations.

References:

1) Principles of Instrumental analysis, D. A. Skoog, 3rd edition, Saunders college publishing. Chapters: 20, 23 Page nos: 600 - 605, 631, 704 - 711.
2) Vogel's Text book of quantitative inorganic analysis, 4th edition, ELBS/ Longman. Chapters: XIV, XV Page nos: 566 - 601, 615 – 625.
3) Instrumental methods of analysis, B. K. Sharma, Goel publishing house. Miscellaneous methods: Chapters: 1, 3, 4 Page nos: 1 - 14, 21 - 57.

Unit III- Statistical Treatment of analytical data --II (15 L)

Objectives:

On completing this unit the learner is expected to understand

i) The use of statistical methods in chemical analysis.
ii) The nature of indeterminate errors
iii) The randomness of such errors and its distribution around a correct or acceptable result
iv) Computation of Confidence limits and confidence interval
v) Test for rejection of doubtful result
vi) Method to draw best fitting straight line

3.1.**Nature of Indeterminate Errors: (03L)**

3.1.1. The true and acceptable value of a result of analysis

3.1.2. Measures of central tendency: mean, median. mode, average

3.1.3. Measures of dispersion: Absolute deviation, relative deviation, relative average deviation, standard deviation,(s,sigma) variance, coefficient of variation

3.2.**Distribution of random errors: (02L)**

3.2.1. Gaussian distribution curve.

3.2.2. Equation and salient features of Gaussian distribution curve

3.3.Concept of Confidence limits and confidence interval and its computation using (03 L)

(i) Population standard deviation

(ii) Student's *t* test

(iii) Range

3.4.Criteria for rejection of doubtful result (02 L)

(i) 2.5 d rule

(ii) 4.0 d rule

(iii) Q test

3.5.Test of Significance (02 L)

(i) Null hypothesis

(ii) F-test (variance ratio test)

3.6. Graphical representation of data and obtaining best fitting straight line (03 L)

(a) For line passing through origin

(b) For line not passing through origin

[Numerical problems wherever possible, expected]

References:

1. Modern Analytical Chemistry , David Harvey (page numbers 53 -84)
2. Fundamentals of analytical chemistry – Skoog and West

Semester IV
Chemistry Practicals:
Paper III Elective
(Basics in analytical Chemistry)

1. Tools of Analytical Chemistry-II

a. Filtration Flasks, Funnels, Separating Funnels, Distillation apparatus, Vacuum Distillation assembly, Centrifuge machine, Electrophoresis apparatus.

b. Development chamber for chromatography

c. Electrodes like Reference Electrodes and Indicator Electrodes (with respect to care and maintenance.)

d. Conductivity cell (with respect to care and maintenance.)

e. Combined Glass electrode (with respect to care and maintenance.)

f. Types of Salt Bridges and preparation of any one or use of salt bridge, its effect on the potential of a given electrode/cell

(The learner should draw diagrams and write-ups providing uses of the items mentioned in (a and b) and Principle, Construction care and Uses of items (c) to (f) in his journal.)

2. **Paper chromatography:** Separation of cations like Fe(III), Ni(II) and Cu(II) in a sample.

3. Separation of a solute between two immiscible solvents to determine the distribution ratio and/or extraction efficiency. (Solutes could be as their aqueous solutions and the organic solvent ethyl acetate) Suggested solute for the distribution study: Fe (III) in aqueous solutions.
   (The learner is expected to learn the technique of solvent extraction by using separating funnel, method to estimate the concentrations of the solute distributed in the two immiscible phases, determination of the extraction efficiency)
4. Conductometric titration: Estimation of given acid by conductometric titration with strong base and calculation of % error. (The learner is expected to learn the handling of the conductometer and the conductivity cell, determination of end point by plotting a graph. They are also expected to state the error estimate of their results).
5. Estimation of Fe(II) in the given solution by titrating against $K_2Cr_2O_7$ potentiometrically and calculation of % error. (The learner is expected to learn the handling of the potentiometer, use of Platinum electrode and reference electrode like SCE. They will learn to determine end point by plotting a graph. They are also expected to state the error estimate of their results).
6. Gravimetric estimation of Sulfate as $BaSO_4$ and calculation of % error. (The learner is expected to write a balanced chemical reaction, need for digestion of the precipitate and the skill required to carry out the incineration and to estimate the % error.)
   (The learner is expected to write a balanced chemical reaction, need for digestion of the precipitate and the skill required to carry out the incineration and to estimate the % error.)

REFERENCES:

***F*or paper III**

1. **D. A. Skoog, D. M. West, F. J. Holler, and S. R. Crouch, Analytical Chemistry: An Introduction, 7th ed., Chapter 15, pp. 345-381.**
2. **A.I. Vogel. "Textbook of Quantitative Inorganic Analysis," Longman, London (1961).**
3. **R.V. Dilts. "Analytical Chemistry. Methods of Separation," van Nostrand, N.Y. (1974).**
4. **Some Experiments for B. Tech in Chemistry & Chemical Technology compiled by Prof. J.B.BARUAH, Mrs. Abhilasha Mohan Baruah and Mr. Parikshit Gogoi**

AC - 11th May, 2017
Item No. 4.282

AC Item No.

UNIVERSITY OF MUMBAI

Program: B.Sc.

(Credit Based Semester and Grading System)

Course: Fishery Biology

(Applied Component)

Syllabus for Semester V & VI

(with effect from the academic year 2017-18)

AC - 11th May, 2017
Item No. 4.282

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AC - 11th May, 2017
Item No. 4.282

PREFACE

Applied Component was introduced for T. Y. B. Sc. class in the academic year 1979-80 with a view to enhance the essence for employability. The syllabus is a blend of concepts with four electives. It gives me immense pleasure to present these four applied component courses namely Marine Science, Fishery Biology, Economic Entomology and Environmental Science under the umbrella of BOS in Zoology.

In the syllabi of these applied components, applied topics having commercial propositions have been incorporated that further ads to the enhancement of entrepreneurial potential and skills amongst the learners. In the past our syllabus focused mainly on theory as a way of providing knowledge base and preparation for students. We have attempted to go beyond this tradition, while doing so, equal emphasis is laid on theory and corroborative practicals. From the academic year 2011-12, the University has introduced Credit Based Semester and Grading System (CBSGS). Accordingly the existing syllabi of these applied components were restructured to fit into the CBSGS pattern. The concept of flexi syllabus was introduced offering opportunity to learners to study any four out of a total of eight units in each course. Now that the syllabus is restructured and to be introduced from the academic year 2017-2018, we have included a novel concept of open unit and case studies. This approach, I'm sure will enhance the critical and analytical thinking abilities of the students.

I take this opportunity to thank the experts in various field for giving valuable, beneficial and constructive suggestions during framing of the syllabus. The syllabus committee under the convenorship of Mr. Vinayak Dalvie has done a commendable job of timely framing the syllabus with a highest degree of precision and accuracy. While appreciating the efforts, I also express my thanks and heartfelt gratitude to the entire team.

– Dr. Anita Jadhav
Chairperson
Ad-hoc, BOS in Zoology

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PREAMBLE

As a convener when I mooted the concept of flexi-syllabus, first of its kind, in the academic year 2009-10 it was grossly misconstrued. To add to it I also placed an idea of including case studies and introducing a new concept of "Open Unit". Both were rejected then. I had also proposed a new subject "Entrepreneurial and Industrial Biology" in place of the existing Applied Components usually offered by the students of Biological Sciences. 20 workshops in different districts with teachers and students of various subjects were conducted to explain these four concepts. A twenty one days refresher course for teachers, sponsored by UGC was also conducted in the new subject of "Entrepreneurial and Industrial Biology" which was much appreciated by the then Director of NAAC, Prof H. A. Ranganath, who is from Biological Sciences, understanding the potential of the subject. However, implementation was postponed for technical reasons thus permitting innovation limited to the flexi-syllabus, implemented in 2010-11, which has inherent capacity to cater to the diverse needs of the region and the industry by allowing students and teachers to choose a desired capsule of eight topics, with various permutations and combinations from the menu of sixteen based on the interest, resources, expertise and need. It took care of a range of students by also providing learners' space to high IQ students. Yet the possibility of exclusion of some important topics cannot be ruled out apart from some new avenues developed during the lag phase of revision of syllabi. Open unit will permit a good teacher to keep pace with the development and adopt latest topics instantly without waiting till it becomes obsolete in the gap of 5 years that the University generally takes to revise the syllabus. It may also allow students to learn the existing topic in more details and depth under the open unit thus making them specialized in need based areas enhancing employability. Assignments would add to their understanding of Government schemes, regulations and market, while projects will augment Business Sense or Scientific Acumen, as the case may be. Case studies and simulations, introduced for the first time in Zoology, would pose challenge for true application of knowledge to real life situations with thought provoking questions demanding analytical solutions. Pedagogy of such dynamic syllabus will range from use of ICT in the class to teaching directly in the field with a blend of participative and experiential learning with group dynamics gaining true knowledge apart from developing personality of the students and above all making them apply ‘Common Sense’ which is the essence of life. I am sure dedicated team of Zoologists which has placed the subject on top in the past 5 years is poised to make it a success in every college befitting the purpose of introducing applied component by the University in the academic year 1979-80.

– VINAYAK DALVIE
Convenor,
Syllabus Committee

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Pedagogy

Applied Component Syllabus of Fishery Biology is flexi-syllabus designed in such a way that students can carve their future in Fishery Biology. To understand the potential of this flexi-syllabus it is important to select four units in each semester systematically in such a way that they have relevance with each other. Different capsules may be developed through permutations and combinations and each capsule being a subject in itself. For example selecting units III, IV, VII and VIII in semester V and Units III, IV V and VII in semester VI will ensure specialization in Freshwater Fishery. Of course teacher is at liberty to choose any four units in each semester in consultation with students based on the need, expertise and resources available.

It is recommended to use ICT, films, YouTube clippings, etc., regularly in the classroom. However, field trips, study tours and industrial visits both short and long are recommended relevant to the units prescribed, whether selected for teaching or not, to provide desired outcome. It is highly recommended that units such as III and V in semester V and Unit VII of semester VI are to be taught in field for experiential learning and not in the classroom. Case studies are to be taught through group discussion, each group consisting of ten students for each case, which will be developed and presented by the teacher with thought provoking approach. The students are expected to do analytical thinking deriving solutions after critical evaluation in the group.

For a creative teacher the open unit can be a most effective tool. The teacher can coin topics giving further in-depth knowledge on need-based topics covered in the syllabus. Teacher also has the liberty to include newly developed area or arriving need in the vicinity under open unit with consent of the Head and the Principal of the Institution.

This syllabus has a few theoretical topics, though most of the topics otherwise are applied.

With Fishery Biology Syllabus focused both on Freshwater and Marine fisheries, a student can choose his or her stream accordingly to ensure better prospects in the career.

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Co-Convenors,
Syllabus Committee.

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T. Y. B.Sc.

(Credit Based Semester and Grading System)
Fishery Biology (Applied Component)
(to be implemented from the Academic Year 2017-2018)

Semester V
Oceanography, Aquaculture Practices, Marketing and Finance

Theory (Any four units to be opted)				
Course	**Unit**	**TOPIC**	**Credits**	**L/Week**
USACFBIO501	1	Oceanography	2	4
	2	Crafts and Gear		
	3	Farming of Major Carps		
	4	Introduction to other Commercial Aquaculture Practices in Fresh Water		
	5	Culture of Shell fishes and Fin-Fish		
	6	Quality Control and Packaging		
	7	Marketing and Finance		
	8	Case Study and Simulation		
Practical				
USACFBIO5P1		Practicals based on Course **USACFBIO501**	2	4

Semester VI
Marine resources, Post-harvest and Farm Engineering

Theory (Any four units to be opted)				
Course	**Unit**	**TOPIC**	**Credits**	**L/Week**
USACFBIO601	1	Marine Fin-fish of India	2	4
	2	Marine Shellfish of India		
	3	Nutrition		
	4	Diseases		
	5	Preservation and Processing		
	6	Byproducts and Value added Products		
	7	Farm Engineering		
	8	Open Unit		
Practical				
USACFBIO6P1		Practicals based on Course **USACFBIO601**	2	4

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Semester V: Theory
Oceanography, Aquaculture Practices, Marketing and Finance
Course code: USACFBIO501

(Any four units to be opted)

Lectures 60
Credits 2

Unit 1: Oceanography

***Objective*:**

- *To study different instruments and equipments in navigation and oceanography*
- *To introduce physical, chemical and biological oceanography*

Desired *outcome:*

- *Learner shall understand and learn about the use of sea safety, navigational equipments and oceanographic instruments*
- *Learner shall understand basic physical, chemical and biological oceanography*

1.1 Navigational and sea safety equipments
i) Life saving devices
ii) Global Positioning System (GPS)
iii) Rudder
iv) Signaling devices

1.2 Oceanographic Instruments
i) Niskin water sampler
ii) Peterson's grab
iii) Dredges
iv) Fish finding instruments / Methods
v) Remote sensing

1.3 Introduction to basic physical, chemical and biological oceanography

Unit 2: Crafts and Gear

Objective:

- *To study the process of boat building, materials used and various types of diesel engines*
- *To study various types of nets used in fishery*

Desired *outcome:*

- *Learner shall comprehend boat building techniques and design of engines used in mechanized boats*
- *Learner shall understand the operations of various types of nets and fishing method*

2.1 Basic boat building (parts, design, material used), methods of protection from foulers and borers

2.2 Basic studies of marine engines:

i) Outboard and Inboard Engines
ii) Sectional View of 2-stroke and 4-stroke Diesel engines
iii) Winch and Deck Side Equipment

2.3 Operations:
i) Gill, Trawl, Purse seine Nets
ii) Hooks and Lines
iii) Non-conventional Fishing Methods such as
- Light Fishing
- Hose Pipe Fishing
- Electric Fishing

Unit 3: Farming of major carps

***Objective*:**
- *To study and develop skills in breeding techniques, hatchery, nursery and management of various carps*
- *To study and explore various techniques used in fishery and poly culture practices*

Desired *outcome*:
- *Learner will understand breeding techniques and skills for culture of major carps*
- *Learner will comprehend hatchery and nursery management of major carps*

3.1 Breeding techniques of major carps and common carp
3.2 Hatchery and nursery management of:
- Major carps:

i) IMCs: *Labeo rohita* (Rohu), *Catla catla* (Catla), *Cirrhinus mrigala* (Mrigal)
ii) Exotic carps: *Hypophthalmichthys molitrix* (Silver carp), *Ctenopharyngodon idella* (Grass carp)
iii) *Cyprinus carpio* (Common carp)

3.3 Mono-culture and polyculture practices:
i) Extensive
ii) Semi-intensive
iii) Intensive

Unit 4: Introduction to other commercial aquaculture practices in fresh water

***Objective*:**
- *To develop skills and understanding of breeding and rearing of sewage-fed fishery, Basa cat fish and Tilapia by novel ways*

Desired *outcome:*
- *Learner will be equipped to carry out entrepreneurial operations or gain confidence to work in freshwater prawn unit*
- *Learner will gain knowledge about how to breed and rear ornamental fishes and commercially viable fish species*

4.1 *Macrobrachium rosenbergii* (Freshwater prawn)

i) Breeding, life cycle, hatchery management
ii) Monoculture of *Macrobrachium rosenbergii*
iii) Composite culture of major carps and *Macrobrachium rosenbergii*

4.2 Ornamental fishes – breeding and rearing:

i) Egg layers:
- *Danio spp.* (Danio)
- *Pterophyllum spp.* (Angel)
- *Symphysodon spp.* (Discus)
- *Paracheirodon innesi* (Neon tetra)
- Flower horn (Hybrid variety)
- *Betta splendens* (Siamese fighter)

ii) Live bearers:
- *Poecilia reticulate* (Guppy)
- *Xiphophorus hellerii* (Swordtail)
- *Poecilia velifera* (Tangerine)
- *Poecilia sphenops* (Molly)
- *Xiphophorus maculatus* (Platy)

4.3 Breeding and rearing of:

- Sewage-fed fishery of air breathing fish: *Pangasianodon hypophthalmus* (Striped catfish), *Clarius spp.*, *Heteropneustes spp.* and *Anabas spp.*
- *Pangasius bocourti* (Basa Catfish)
- All meal (Less bones) *Tilapia* – GIFT (Genetically Improved Farmed *Tilapia)*

Unit 5: Culture of shell fishes and fin-fish

***Objective*:**

- *To study breeding techniques, hatchery and management of fin-fish and shell fishes*
- *To study rearing practices of fin-fish and shell fishes*
- *To study culture of brackish water shrimp*

Desired *outcome:*

- *Learner shall understand breeding techniques, hatchery and management of fin-fish and shell fishes*
- *Learner shall understand the rearing techniques*

5.1 Breeding, hatchery, nursery management and rearing (extensive, semi-intensive, intensive)

i) Fin-fish – *Lates calcarifer* (Sea bass)
ii) *Litopenaeus vannamei* (Brackish water prawn or Pacific white shrimp)
iii) *Scylla serrata* (Giant mud Crab)
iv) *Pinctada vulgaris* (Pearl)

Unit 6: Quality control and packaging

***Objective*:**

- *To comprehend various aspects of quality control and packaging involved in fish processing and marketing*

Desired *outcome:*

- *Learner will be oriented towards understanding the various stages of quality control*
- *Learner will gain knowledge about the postmortem changes, spoilage mechanisms and methods involved in evaluating the freshness and quality of fishes and prawns / shrimps*
- *Learner shall comprehend the value of maintaining and taking sanitary precautions during the processing and packaging operations*

6.1 Post mortem changes and mechanism of spoilage:

i) Hyperaemia
ii) Rigor mortis
iii) Autolysis
iv) Rancidity

6.2 Brief methods for evaluating freshness and quality of fish and prawns / shrimps

i) Organoleptic
ii) Microbial
iii) Chemical

6.3 Sanitary operations

i) Maintenance of hygiene of food contact surfaces, storage and equipment
ii) Water quality, ice, sewage and waste water disposal and effluent treatment plant

6.4 Various packaging materials used in freezing and canning industry

i) Polyolefin
ii) Wax duplex carton
iii) Master carton
iv) Can
v) Lacquered can
vi) Retort
vii) Freezing procedures including hygienic washing, dressing

6.5 Quality Policy and Quality Analysis: ISO 22000/HACCP/ BRC/IFS

Unit 7: Marketing and finance

***Objective*:**

- *To acquaint and instill knowledge of the fundamentals of marketing and finance required for entrepreneurship in fishery related enterprises and co-operatives*

Desired outcome:

- *Learner shall acquire knowledge about traditional marketing practices and role of co-operatives in selling fish*
- *Learner shall be exposed to the avenues and procedure for raising funds for*

fishery related entrepreneurial practices

7.1 Traditional marketing vis-a-vis role of fishery co-operatives with reference to operations at Satpati, Sasoon dock and Karanja
7.2 Global marketing and Export-Import procedures and role of Marine Products Exports Development Authority (MPEDA)
7.3 i) Fund raising:

- Financial institutions
- Schemes and subsidies
- Basic accounting
- Costing and feasibility report

ii) Role of NABARD (National Bank for Agriculture and Rural Development) for refinancing and NFDB (National Fishery Development Board, Hyderabad) for funding through the State Government

Unit 8: Case Study and Simulation

Case Study and Simulation is one of the eight units and hence may or may not be opted by the college. If opted, teachers in consultation with the students shall select the case studies for this unit every year, if required, and shall seek endorsement of the Head and the Principal.
Colleges/ Institutes have to select the topics as per their needs and available resources. It is pertinent to note that the case studies and simulations shall be operational and available in the syllabus only till it comes under the scope of internal assessment.

Objective:

- *To inculcate entrepreneurial abilities and skills so as to make the learner confident and prepare them to raise new projects and venture in the realm of fishery biology*
- *To understand the concepts and to develop the acumen of the learner in a better way*
- *To assess varying dimensions while taking decisions in fishery biology*

Desired outcome:

- *Learner will gain technical and financial knowledge in fishery biology business ventures*
- *Learner will develop better acumen so as to take wise and necessary decisions while participating in fishery biology related projects*

(Any eight from suggested below or more, developed by teacher)

a) Sawantwadi New Fish Market developed through NFDB funding
b) Trilok foods, an RTE industry established as PPP through DST funding
c) Sewage-fed fishery; Kolkata model
d) Pancham Aquaculture
e) Naik Oceanic
f) Aquaponics, Hydroponics
g) Mahseer Ranching at Dehu

h) Integrated fish farm goatery, piggery, poultry, dairy, etc.
i) Juchandra Village

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Semester V Practicals
Course code: USACFBIO5P1

2 Credits

1) Identification and functioning of oceanographic instruments:
    - Niskin water sampler
    - Peterson's Grab
    - Dredge

2) Layout of fishing vessels and sectional view of 2 stroke and 4 stroke diesel engines, lifesaving equipment, winch and deck side equipment.

3) Identification of various stages of development of carps and study of sexual dimorphism in adults.
   Indian major carps:
    - *Labeo rohita* (Rohu)
    - *Catla catla* (Catla)
    - *Cirrhinus mrigala* (Mrigal)

   Exotic carps:
    - *Cyprinus carpio* (Common Carp)
    - *Hypophthalmichthys molitrix* (Silver Carp)
    - *Ctenopharyngodon idella* (Grass Carp)

4) a) Identification of *Litopenaeus vannamei* (Pacific white shrimp) and *Macrobrachium rosenbergii* (Freshwater prawn)
   b) Study of sexual dimorphism in adults.

5) Identification of fishes:
    - *Anabas testudineus* (Climbing perch)
    - *Clarius batrachus* (Walking catfish)
    - *Boleophthalmus spp.* (Mudskipper)
    - *Pangasianodon hypophthalmus* (Iridescent shark)
    - *Pangasius bocourti* (Basa catfish)
    - *Tilapia*(GIFT)

6) Identification of:
   A) Ornamental fishes:
        - *Pterophyllum spp.* (Angel)
        - *Xiphophorus hellerii* (Swordtail)
        - *Paracheirodon innesi* (Neon tetra)
        - *Betta splendens* (Siamese fighter)
        - *Danio spp.* (Danio)
        - *Symphysodon spp.* (Discus)

- Flower Horn (Hybrid variety)

B) Aquatic plants:
- Ludwigia
- Cabomba
- Corkscrew *Vallisneria*
- Aquarose
- Amazon Sword plant

C) Aquarium accessories:
- Aerator
- Under Gravel Filter
- Internal Filter
- External / Canister Filter
- Food dispensers

7) Study of models and functioning of D 81 hatchery, Shirgur's hatcheries and Chinese hatchery.

8) Microbial studies:
   i. Dilution of sample
   ii. Gram staining technique
   iii. Identification of Bacilli, Cocci, Vibrio bacteria

9) Organoleptic tests for fish and prawn / shrimp

10) Total Plate Count (TPC) of bacteria from fish.

11) Identification of packaging materials:
- Waxed duplex carton
- Master carton
- Simple cans
- Coated [Lacquered] cans
- Polyolefin
- Retort

12) Estimation of toxins and moulting retardant
- H_2S (qualitative)
- Ammonia (qualitative)
- Ca (quantitative)
- Mg (quantitative)

13) Photographic documentation of fishery biology related topics.

Submission of ~~5~~ hard and soft copies of 5 original photographs taken by the learner (exif details required).

14) Assignment (may be submitted in a group not exceeding three students)

Please refer the Annexure I for the suggested topics for assignment for Course code USACFBIO5P1.

***Note – The practicals may be conducted by using specimens authorized by the wild life and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/simulations/ models etc. as recommended by the UGC and as envisaged in the regulation of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practicals mentioned here-in above.**

N.B:

I) It is pertinent to note that we have to adhere strictly to the directions as given in the UGC Circular F14-4/2006 (CPP-II).

II) Apart from the Institutional Animal Ethics Committee (IAEC) and any other Committee appointed by a Competent Authority / Body from time to time, every college should constitute the following Committees:

1) A Committee for the Purpose of Care and Supervision of Experimental Animals (CPCSEA) and

2) A Dissection Monitoring Committee (DMC) to ensure that no dissections or mountings are done using animals.

Composition of DMC shall be as follows:

i) Head of the Concerned Department (Convener / Chairperson)
ii) Two Senior Faculty Members of the concerned Department
iii) One Faculty of related department from the same College
iv) One or two members of related department from neighbouring colleges.

USE OF ANIMALS FOR ANY EXPERIMENT /DISSECTION /MOUNTING IS BANNED. SIMULATIONS, AUTHORIZED PERMANENT SPECIMENS/SLIDES, CHARTS, MODELS AND OTHER INNOVATIVE METHODS ARE ENCOURAGED.

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Semester VI: Theory
Marine resources, Post-harvest and Farm Engineering
Course code: USACFBIO601

(Any four units to be opted)

Lectures 60
Credits 2

Unit 1: Marine Fin-fish of India

***Objective*:**

- *To study coastal and deep sea fishes*
- *To study commercial potential and major landing centres*

Desired *outcome:*

- *Learner shall understand deep sea and coastal fishes.*
- *Learner shall understand commercial potential and know about the major landing centres of the fishes*

1.1 Coastal fisheries:

i) *Stromateus cinereus* (Silver pomfret)
ii) *Stromateus niger* (Black pomfret)
iii) *Polynemus tetradactylus* (Threadfin)
iv) *Pseudosciaena diacanthus* (Two-spined Jewfish or Ghol)
v) *Synagris japonicus* (Blackmouth splitfin)
vi) *Scomber microlepidotus* (Mackerel)
vii) *Cybium guttatum* (Seerfish or Surmai)
viii) *Sardinellal ongiceps* Indian Oil Sardine

1.2 Deep sea fisheries (more than 45 fathoms) of Indian exclusive economic zone

- *Thunnus alalunga* (Longfin tuna)
- *Sarda orientalis* (Striped bonito)

1.3 Commercial potential and major landing centres of the above fishes

Unit 2: Marine shell fish of India

***Objective*:**

- *To develop an in-depth understanding of crustacean and molluscan fisheries*

Desired outcome:

- *Learner shall understand crustacean and molluscan fisheries*
- *Learner shall understand the performance of landing centres of above fisheries*

2.1 Crustacean fisheries

i) *Penaeus monodon* (Giant tiger prawn)
ii) *Penaeusn ndicus* (Indian prawn)
iii) *Metapenaeus affinis* (Jinga shrimp)
iv) *Parapenaeopsis stylifera* (Kiddi shrimp)

v) Acetes indicus (Jawala paste shrimp)
vi) Panulirus polyphagus (Mud spiny lobster)
vii) Scylla serrata (Giant mud crab)

2.2 Molluscan fisheries
i) Crassostrea spp. (Oyster)
ii) Sepia pharaonis (Pharaoh cuttlefish)
iii) Loligo duvaucelii (Indian squid)

2.3 Commercial potential and major landing centres of the above shell fishes

Unit 3: Nutrition

***Objective*:**

- *To study, acquaint and discover the growing market for fish nutrition*

Desired *outcome:*

- *Learner will get acquainted with basics of nutritional requirements at various developmental stages of fish and crustaceans*

3.1 Nutritional requirements at various stages of development of fish and crustaceans
3.2 Culture of natural feed:
i) *Chaetoceros*
ii) *Infusoria*
iii) Artemia
iv) Brachionus
v) Daphnia / *Moina spp.*
3.3 Algology – Identification and culture of commercially important nutritious algae and its products
3.4 Formulated / Pelleted feed – Understanding the composition and use of formulated feed for fish and prawns / shrimps at various stages

Unit 4: Diseases

***Objective*:**

- *To acquire knowledge of the various aspects of diseases affecting fishes*

Desired *outcome:*

- *Learner will be oriented towards understanding causes, pathogenicity, prophylaxis and preventive measures of various fish diseases and physiological disorders*

4.1 Viral diseases, prophylaxis and preventive measures
4.2 Bacterial, fungal, protozoan infections and treatment
4.3 Crustacean infections and treatment
4.4 Physiological disorders (Dropsy) / diseases and treatment

Unit 5: Preservation and Processing

***Objective*:**

- *To derive knowledge about various fish preservation and processing methods*

Desired *outcome:*

- *Learners will acquire the knowledge and would put in to practice the preservation and processing techniques for commercial ventures*

5.1 Traditional methods and their modifications:
i) Icing
ii) Drying
iii) Salting
5.2 i) Introduction to refrigeration: Types and properties of refrigerants
i) Types of freezers:
a. Brine
b. Air blast
c. Tunnel
d. Contact plate
e. Cryo-quick
f. IQF: Individual Quick Freezing
ii) Freezing Procedures:
a. PUD (Peeled and Un-deveined)
b. DV (Deveined)
5.3 Principle and steps involved in can reform and canning of fish and shrimp in various media.
5.4 Equipment and utensils used in seafood processing

Unit 6: By-products and Value Added Products

***Objective*:**

- *To acquire knowledge of fish by-products, value-added products and good manufacturing practices*

Desired *outcome:*

- *Learner will gain sound knowledge about the fish by-products and value-added products*
- *Learner will explore good manufacturing practices while manufacturing these products*

6.1 Proximate composition of fish meat and products
6.2 Introduction to by-products
i) Fish protein concentrate
ii) Fish maws / Isinglass
iii) Fish hydrolysates
iv) Chitin, Chitosan
v) Glucosamine hydrochloride
vi) Gelatin
vii) Fish silage

viii) Surimi and imitation products
ix) Pearl essence

6.3 Different types of value added products from fish and shell fish
i) Fish / Prawn / Shrimp pickle
ii) Fish wafers
iii) *Acetes indicus* (Prawn) chutney
iv) Fish soup powder
v) Fish / Crab steaks
vi) RTE (Ready To Eat)
vii) Battered and breaded products
viii) Marinated tandoori prawns
ix) Prawn curry

6.4 Good manufacturing practices: Health and training of personnel, hygiene

Unit 7: Farm engineering

***Objective*:**

- *To acquire knowledge about farm engineering and novel fish culture practices*

Desired *outcome:*

- *Learner will understand the selection process of hatchery sites and various types of designs and construction of aquaculture farm practices*
- *Learners will comprehend the uses of equipment and accessories involved in aquaculture farms*

7.1 Site selection, designing and construction of hatchery and farms for extensive, semi-intensive and intensive freshwater / brackish-water aquaculture

7.2 i) Raft culture
ii) Rope culture
iii) Pen culture
iv) Cage culture with special reference to *Rachycentron canadum* (Cobia)

7.3 Equipment and accessories used in various aqua farms

Unit 8: Open Unit

Open unit is one of the eight units which may or may not be opted by the college. Teachers in consultation with the students shall define syllabus under this unit every year, if required, and shall seek endorsement of the Head and the Principal.

Colleges/institutes have to select the topics as per their needs and available resources. It is pertinent to note that the open unit shall be operational and available in the syllabus only till it comes under the scope of internal assessment.

Objective:

- *To teach any one of the units prescribed in the syllabus with more details and in-depth knowledge leading to specialization in the capsule of units selected.*
- *To incorporate the topics of special need of the area which are otherwise not covered in the syllabus.*

- *To give scope to creativity and wisdom of a teacher who wants to deal with the latest developments in the subject without waiting for the university to revise the syllabus.*

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Semester VI Practicals
Course code: USACFBIO6P1

Credits 2

1) Identification of marine fishes.
    - *Stromateus cinereus* (Silver pomfret)
    - *Stromateus niger* (Black pomfret)
    - *Polynemus tetradactylus* (Threadfin)
    - *Pseudosciaena diacanthus* (Two-spinned jewfish or Ghol)
    - *Trichiurus haumela* (Ribbon fish)
    - *Synagris japonicus* (Blackmouth splitfin)
    - *Scomber microlepeidotus* (Mackerel)
    - *Cybium guttatum* (Seerfish or Surmai)
    - *Sardinella longiceps* (Indian Oil Sardine)
    - *Thunnus alalunga* (Longfin tuna)

2) Identification of Crustaceans and Molluscs.
    - *Penaeus monodon* (Giant Tiger Prawn)
    - *Metapenaeus affinis* (Jinga shrimp)
    - *Parapenaeopsis stylifera* (Kiddi shrimp)
    - *Acetes indicus* (Jawala paste shrimp)
    - *Panulirus polyphagus* (Mud spiny lobster)
    - *Scylla serrata* (Giant mud crab)
    - *Crassostrea spp.* (Oyster)
    - *Sepia pharaonis* (Pharaoh cuttlefish)
    - *Loligo duvaucelii* (Indian squid)

3) Preparation of formulated feed for fish and prawn.

4) Identification of parasitic infections in aquatic organisms.
    - Fungal – Dermatomycosis
    - Bacterial – Fin/Tail rot and Dropsy
    - Protozoan – Costiasisand White Spot
    - Crustacean – Argulosis

5) Fish dressing, filleting, prawn peeling – PUD, DV and grading.

6) Fish morphometry – Length weight relationship of a suitable fish.

7) Preparation of Surimi, Fish protein concentrate.

8) Preparations of fish burger, fish fingers, fish/prawn pickle, fish chutney, fish curry.

9) Preparation of Chitin – Chitosan, Pearl essence.

10) Identification of various farm equipment such as:
- Feeding cups / Trays
- Paddle wheel aerator
- Fountains
- Sluice gate models
- Elbow pipe outlets

11) Study of models of raft, pen, cage culture and materials used in rope culture.

12) Project – Feasibility / Scientific.

13) Field Visit Report.

Please refer the Annexure II for the suggested field visits and Annexure – III for suggested topics for projects for Course code USACFBIO6P1.

***Note – The practicals may be conducted by using specimens authorized by the wild life and such other regulating authorities though it is strongly recommended that the same should be taught by using photographs/audio-visual aids/simulations/ models etc. as recommended by the UGC and as envisaged in the regulation of the relevant monitoring bodies. No new specimens, however, shall be procured for the purpose of conducting practical mentioned here-in above.**

N.B:
I) It is pertinent to note that we have to adhere strictly to the directions as given in the UGC Circular F14-4/2006 (CPP-II).
II) Apart from the Institutional Animal Ethics Committee (IAEC) and any other Committee appointed by a Competent Authority / Body from time to time, every college should constitute the following Committees:

1) A Committee for the Purpose of Care and Supervision of Experimental Animals (CPCSEA) and
2) A Dissection Monitoring Committee (DMC) to ensure that no dissections or mountings are done using animals.

Composition of DMC shall be as follows:

i) Head of the Concerned Department (Convener / Chairperson)
ii) Two Senior Faculty Members of the concerned Department
iii) One Faculty of related department from the same College
iv) One or two members of related department from neighbouring colleges.

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USE OF ANIMALS FOR ANY EXPERIMENT /DISSECTION /MOUNTING IS BANNED. SIMULATIONS, AUTHORIZED PERMANENT SPECIMENS/SLIDES, CHARTS, MODELS AND OTHER INNOVATIVE METHODS ARE ENCOURAGED.

References and Additional Reading
USACFBIO501 & USACFBIO601

1) A Text Book of Marine Ecology by Nair M.B. and Thumpy D.H. – Tata MacGraw Hill Pub. – New Delhi.
2) An Introduction to Fishes by Khanna S.S. – Central Book Depot, Allahabad (1993).
3) Aquaculture, Principles and Practices by Pillay T.V.R. – Fishing New Books (1988).
4) Course Manual in Fishing Technology by Latha Shenoy, CIFE, Versova, Mumbai.
5) Crafts and Gear of India by Y. Shrikrishnan and Latha Shenoy – ICAR Pub.
6) Ecological Methods for Field and Laboratory Investigations by P. Michael. The Oceans By Svedrup H.V. – et.al. - Asian Pub. House.
7) Financial management by Prasanna Chandra- Seventh Edition.
8) Financial management by Khan and Jain.
9) Financial management by I. M. Pandey.
10) Fish Biology by C.B.C. Srivastava – Narendra Pub. House.
11) Fish and Fisheries by Chandy – National Book Trust.
12) Fish and Fisheries in India – by Jhingran V.G. – Hindustan Pub. Corporation – New Delhi.
13) Fisheries Biology, Assessment and Management by Michael King – Fishing News Publishers (1995).
14) Fishery Science by Samtharam R. – Daya Pub. House – 1990.
15) Fisheries Bioeconomics – Theory, Modelling and Management – FAO Fisheries Technical Paper 368 – FAO, 2001.
16) General and Applied Ichthyology by Gupta and Gupta, S Chand Publishers.
17) Handbook of Fish Biology and Fisheries Edited By J.B. Hart and John Reynold.
18) Hand Book of Fresh Water Fishes of India by Beaven C.R. – Narendra Pub. House.
19) Introductory Oceanography by Harold Thurman – Printis Hall Pub. London – 8th Edition.
20) Marine Ecology by Tait R.B. – Oxford Press.
21) Marine Fish and Fisheries by Dr. D. V. Bal and K.V. Rao - Tata MacGraw Hill Pub. – New Delhi.
22) Marketing Management by Philip Kotler.
23) Modern Fishing Gear Technology by N. Shahul Hameed, Boopendranath – Daya Pub. House – 2000.
24) Prawn and Prawn Fisheries by Kurian and Sebestian.
25) Project Management by Prasanna Chandra.
26) Refrigeration and air conditioning By C. P. Arora published in 1981.
27) Technology for forming of Pacific White Shrimp *Litopenaeus vannamei* in inland saline soils using ground saline water by Lakra, Reddy and Harikrishna, CIFE and ICAR.
28) Text Book of Fish Biology and Indian Fisheries by Dr. R. P. Parihar, Central Pub. House, Allahabad.
29) The Book of Indian Shells by Deepak Apte – Oxford Uni. Press.
30) Wealth of India – Vol. IV – CSIR Pub.

For Additional and Latest Information on the topics, various Web Sites can be visited.

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SCHEME OF EXAMINATION (THEORY & PRACTICAL)

a) Internal assessment of twenty five (25) marks per course per semester should be conducted according to the guidelines given by University of Mumbai vide circular number UG/04 of 2014 Dated 5th June 2014 to be implemented from academic year 2014-15.

b) External assessment of seventy five (75) marks per course per semester should be conducted as per the following skeleton question paper pattern.

c) One practical examination of one hundred (100) marks per course each should be conducted at the end of every semester.

Modality of Assessment:
Theory Examination Pattern:

A) Internal Assessment - 25% **25 marks**
Internal Assessment: Theory 25 marks

Sr No	Evaluation type	Marks
1	Class test to be conducted as per following pattern a) Match the column/Fill in the blanks/Multiple Choice Questions(1/2 mark each) (5 marks) b) Five questions of answer in 1 or 2 lines(Concept based questions) (5 marks) c) Answer in brief (Attempt any 2 out of the 3) (10 marks)	20
2	Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05

B) External examination - 75 %
Semester End Theory Assessment - 75% **75 marks**

1) Duration - These examinations shall be of two and half hours duration.
2) Theory question paper pattern:
   i. Q. 1 shall comprises 16 short notes (14 if case studies/open unit is not opted) representing all the units in the syllabus equally, of which students are expected to solve any five.
   ii. All questions carry equal marks i.e. 15 marks each with an internal option of 30 marks.
   iii. Each question from Q2 to Q9 (Q8 if case studies/ open unit is not opted) shall have the following pattern.

Q2 to Q9 A) **(15)**

OR

Q2 to Q9 B)
i) **(7)**
ii) **(8)**

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Practical Skeleton Paper Course code: USACFBIO5P1

Time: 4 hours **Total Marks: 100**

Q. 1 Identification **20**

Identify spots 'a' to 'e' as per instructions

a) Identify and describe the oceanographic instrument / 2-stroke / 4-stroke engine.
b) Identify and describe lifesaving equipment / deck side equipment
c) Identify and describe accessory respiratory organ / ornamental fish / aquarium plant.
d) Identify and describe the aquarium accessory.
e) Identify and describe the packaging material.

Major Experiment

Q. 2 Perform organoleptic tests to differentiate fresh and stale fish and prawn. **25**

Minor Experiment

Q. 3 Prepare various dilutions of the given sample of bacteria. **15**
OR
Q. 3 Quantitative estimation of Calcium / Magnesium from the given water sample. **15**
OR
Q. 3 Qualitative estimation of NH_3 and H_2S from the given water sample. **15**
OR
Q. 3 Identify the given bacteria with the help of Gram's Staining technique. **15**

Q. 4 a. Submission of five photographs on relevant topics of fishery biology. **10**
b. Submission of assignment and viva based on it. **20**

Q. 5 Certified journal. **10**

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Practical Skeleton Paper Course code: USACFBIO6P1

Time: 4 Hours **Total Marks: 100**

Q.1Identification **20**

Identify spots ‘a’ to ‘e’ as per instructions

a) Identify and describe the given fish w.r.t. fishery
b) Identify and describe the given crustacean / mollusc w.r.t. fishery
c) Identify and describe the pathogen and its prevention and treatment of the given specimen.
d) Identify and describe farm equipment / model / material.
e) Identify and describe byproducts chitosan / chitin / pearl essence.

Major Experiment

Q. 2 Prepare the marked by-product / value-added product with suitable method: Surimi / Fish Protein Concentrate / Fish Burger / Fish or Shrimp Pickle / Chitin / Chitosan. **25**

Minor Experiment

Q. 3 Determine the fish morphometry – Length weight relationship of a suitable fish. **15**

OR

Q. 3 Demonstrate the technique of fish dressing and filleting. **15**

Q. 4 Project and viva based on it. **20**

Q. 5 Field report **10**

Q. 6 Certified journal **10**

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Annexures
Annexure -I

Suggested Topics for Assignment USACFBIO5P1 (Teachers are expected to develop additional innovative topics, varying every year, to be assigned to the students)

1) Market survey for various preserved and processed fish / prawns.
2) Observation on handling of fish on board, at landing centre, in secondary market and at consumer level.
3) Survey of the local market for the availability of various by-products / value added products and its price.
4) Comparative study of the shelf life of various fishes / fish by-products / value added products in relation to their cost.
5) Study of economics of brackish water pond culture.
6) Study of working of fisheries co-operative societies in your area.
7) Study of cost of construction of fishing vessel and subsidies available for the same.
8) Study of cost of gear manufacturing with different materials and subsidies available for the same.
9) Study of cost and profit analysis of any one of the following methods – Trawler / Gill netter / Purse seiner /hooks and lines and Non-mechanized fishing units.
10) Survey of various packaging materials used in fish processing industries.
11) Survey of various feeds used in local aqua farms.
12) Study of economics of pond culture from nearby area.
13) Comparative cost analysis of fingerlings of major carps from your area.
14) Setting up of marine / fresh water aquarium with various accessories and its costing.
15) Survey of costing of aquaria of different sizes and shape.
16) Study of various courses run by Institutes in your area in relation to fisheries.
17) Survey of aquarium shops to compare the costs of various aquarium fishes.
18) Study of economics involved in breeding / rearing of aquarium fishes.
19) Review of different marketing strategy (w.r.t. attracting target clients) used by manufacturers of fish products / byproducts / value added products.

20) Survey of target clients of manufacturers of fish products / byproducts / value added products.
21) Study of working of financial institutions involved in funding fishing industry.
22) Review of export import procedures followed by the fishing industry in your area.

All the topics mentioned above are suggestive in nature and more creative and innovative topics are expected from the students under the able guidance of concerned teachers, to suit the expertise, human resources, infrastructure and local needs as also the interest of the students.
The assignment may be submitted in a group not exceeding three students.

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Annexure - II

Suggested Field Visits USACFBIO6P1

- There shall be various short and long excursions / study tours / field visits / industrial visits in every semester, at least one of which shall be financially affordable to every student in the class; and that assessment and marks of field trips shall be solely based upon such where no student was restrained for financial limitations.

- Field visits are to be organized to facilitate students to have firsthand experience and exposure to technology / production / functioning of an organization / unit or witness a relevant activity.

- Each student must make at least 01 (one) such visits to the units/markets/sea shores out of 2 to 3 such visits organized by the college.

- **The list is suggestive and not exhaustive**

I) Visit to one of the units with one or multiple activities such as:
- Ornamental / Brackish water / Fresh water fish farm / hatchery

II) Visit to witness one of the activities such as
- Fish angling / trawling / purse seining / gill netting
- Fish finding operations, etc. (Echo Sounder / Sonar / Fish Magnifier)

III) Visit any production units such as
- Food / Fish processing and preservation
- Ornamental articles

IV) Hi-tech and multinational total export oriented units such as
- IQF plant
- Surimi plant
- Fishery plant
- Microbiological units
- Hi–tech fish / prawn / chick hatcheries
- Fish consumer product industries

V) Others –
- Self-Sale Groups
- Co-operative Societies

VI) Govt. Offices such as
- Fishery Department
- MPEDA
- Wild-life Authority

- CITES
- JDEI (Jt. Director-Export and Import)
- Sales Tax
- Income Tax
- Excise Department
- Customs Authority of India
- Local Self Govt. (BMC)
- Clearing Agencies / Agents
- FDA
- ISI
- Agmark, etc.

VII) Visit any ancillary unit such as

- Ice plant
- Can reforming
- Packaging
- Cold storage

VIII) Visit to National Laboratories, National Research Labs and Training Institutes such as NIO, CIFE, CMFRI, CIFT, FSI, IFP, CIFI, CIFNET, NBFGR, etc.

IX) Following places may be considered for short/long excursions:

MUMBAI DISTRICT:

- Versova Beach/Fish landing centre
- Girgaum Chowpatty
- Sassoon Dock, Colaba
- Ferry Wharf (Bhaucha Dhakka)
- Taraporevala Marine Biological Research Station, Bandra (East)
- Manori beach

THANE DISTRICT:

- Uttan

PALGHAR DISTRICT:

- Arnala Beach and Fishermen co-op. society
- Satpati (also multipurpose fisherman co-operative society)
- Kelwa beach (Datiware / Tembhi)
- Rangaon fish landing centre (Vasai)
- Dahanu (Narpad / Varor fish landing centre)

RAIGAD DISTRICT:

- Alibaug
- Karanja
- Shriwardhan

- Uran creek
- NhavaSheva Port (JNPT) / Jawaharlal Nehru Custom House

RATNAGIRI DISTRICT:

- Ganpatipule beach
- Dapoli (Harnai / Harne Port Fish Auctioning)/ Dabhol / Burondi
- Mirkarwada Harbour (Major fish landing and assembling centre, Ratnagiri)
- Rajiwada (Satellite landing centre, Ratnagiri town)
- Guhagar beach (Use of Solunar Clock for fishing)
- Karla (Ratnagiri) – First Fisherman co-operative society of India (Estd. 1913)
- Marine Biological Research Station, Zadgaon, Ratnagiri (Aquarium Management Training Programme)
- Sangameshwar, Lanja, Rajapur

SINDHUDURG DISTRICT:

- Vengurla
- Malvan
- Deogad
- Anandwadi fish landing centre
- Sawantwadi
- Kankavali
- Sarjekot
- Tarkarli beach

Outside Maharashtra:

- Pirotan Island Marine Park (Jamnagar, Gujarat)
- Lakshwadeep Islands
- Andaman and Nicobar Islands
- The Cochin Fisheries Harbour (Cochin, Kerala)
- Veraval
- Maldives

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Annexure III

Suggested Topics for Project USACFBIO6P1 (Teachers are expected to develop additional innovative topics, varying every year, to be assigned to the students)

1) Feasibility report of the maintenance of aquarium fishes in high profile residences.
2) Feasibility report of fresh water / brackish water fish / prawn culture for extensive, semi intensive and intensive.
3) Probability report of maintenance of a culture of *Chaetopteros*and*Artemia* by the fish farmers.
4) Project report for the establishment of small / medium / large scale ice factory, freezing and canning industry.
5) Feasibility report of various packaging materials in freezing / canning industry.
6) Feasibility report for establishing an aquarium shop.
7) Feasibility report for establishing a fish feed industry.
8) Monitoring various physico-chemical parameters of an aquarium / pond / lake / river / sea.
9) Feasibility report for establishing value added products of fish / shell fish.
10) Project report for culture of commercially important nutritious algae and its products.
11) Project report on survey of fish markets for fluctuation in the availability and price of fishes.

The project may be submitted in a group not exceeding three students.

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Annexure IV
Learners' space

When education system today has identified special needs of slow learners we are still silent about needs of high IQ students. Teachers are therefore recommended to identify and encourage such students to undertake research with a view to publish paper/s in peer reviewed International Indexed Journals with high impact factor thus providing 'learners' space'.

Some of the suggestive avenues are listed below which can certainly be not exhaustive since the said students under the guidance of teachers can identify latest areas of research. Needless to say that 'learners' space" is optional additional activity which may not be undertaken by college if not befitting.

1. Developing statistical model for forecasting fish landing of prominent fishes.
2. Undertaking physicochemical oceanographic research at the established centres in the deep sea preferably in collaboration with reputed research institutes.
3. Addressing issues of marine oil pollution.

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Annexure – V
Play and Ponder

While learner's space is for high IQ Students, play and ponder could be a general activity creating interest in the subject and could also be a part of pedagogy wherein it may be considered as innovative teaching methodology.

Following are some of the suggestive activities though of course teachers can creatively develop more in the years to develop.

1. Making different fishery gears (nets).
2. Setting up an aquarium in laboratory.
3. Preparation of Prawn pickle and Fish pickle and obtaining feedback from 10 students and 5 teachers.
4. Preparation of fish poultry feed using waste from fish market (fish scales, crab shell, prawn shell, viscera, gills, operculum etc.)

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Model Question Paper USACFBIO501

Duration: 2.5 Hours **Total marks: 75**

N.B.: 1) Question No. 1 is compulsory.
2) Attempt any four questions from question No. 2 to question No. 9.
3) Draw neat and labelled diagrams wherever necessary.

Q. 1] Write notes on <u>any 5</u> of the following (Mixed questions from all units): 15

a) Niskin water sampler
b) Dredges
c) Gill net
d) Hooks and lines
e) IMC
f) Advantages of induced breeding in carps
g) Monoculture of Giant freshwater prawn
h) GIFT
i) Physical features of *Lates calcarifer*
j) Pearl bank in India
k) Master carton
l) Polyolefin
m) Feasibility report.
n) Major export markets of sea-food
o) _____ (if case study is opted)
p) _____ (if case study is opted)

Q. 2 Question based on Unit 1

Q. 2 A] With reference to oceanography describe working of GPS. Add a note on Life Saving Devices. **15**

OR

Q. 2 B] Explain the following:

(i) Rudder **7**
(ii) Peterson's grab **8**

Q. 3 Question based on Unit 2

Q. 3 A] Give an account on Wood as a Boat-Building material. Add a note on 4-stroke engine. **15**

OR

Q. 3 B] Explain the following:

(i) Structure and operation of trawl net **7**
(ii) Non-conventional methods of fishing **8**

Q. 4 Question based on Unit 3

Q. 4 A] Write an account on Semi intensive polyculture practice in India. Add a note on extensive fish farming. **15**

OR

Q. 4 B] Explain:

(i) Nursery management of *Cirrhinus mrigala* **7**

(ii) Breeding techniques in Indian Major Carps **8**

Q. 5 Question based on Unit 4

Q. 5 A] Describe the Breeding of Neon tetra and Flower Horn. **15**

OR

Q. 5 B] Describe breeding and rearing of:

(i) Air breathing fishes **7**

(ii) *Macrobrachium rosenbergii* **8**

Q. 6 Question based on Unit 5

Q. 6 A] Discuss the following w.r.t. commercial aquaculture cultures of *Litopenaeus vannamei and Scylla serrata* **15**

OR

Q. 6 B] Discuss the following:

(i) Food and Feeding habit of *Lates calcarifer* **7**

(ii) Pearl culture **8**

Q. 7 Question based on Unit 6

Q. 7 A] Explain Organoleptic tests to detect quality of fish along with Chemical methods to detect freshness of fish **15**

OR

Q. 7 B] Explain the following:

(i) Autolysis and Hyperaemia **7**

(ii) Rigor mortis in fish **8**

Q. 8 Question based on Unit 7

Q. 8 A] With reference to marketing and finance discuss operation of fishery cooperative society in your district. Add a note on basic accounting and costing in fisheries. **15**

OR

Q. 8 B] With reference to fishery sector describe:

(i) Global fish marketing strategies **7**

(ii) Role of MPEDA **8**

Q. 9 Question based on Unit 8

Q. 9 A] Question based on case study / simulation (if opted).
15

Case Study: Cage Culture of *Tor khudree in* River Indrayani at Dehu, Pune, India.

Dehu is an ancient town located near Pune, on the banks of the Indravati River and is famous as the birth place of the poet Saint Tukaram. At Dehu just behind the Gatha

Mandir there was a *Matsya doha.* It was like a fish sanctuary where pilgrims enjoyed feeding the Mahseer.

Mahseer is a world famous, outstanding game fish found all along the Himalayan Belt inhabiting different rivers throughout the length and breadth in India, Pakistan, Bangladesh, Sri Lanka and even Thailand. Despite of their abundance at one time, the Mahseer population has been declining in number and size in natural waters and is in serious danger of extinction in India. Six valid species and three subspecies of Mahseer are found in various river systems of India. Out of these, three species are declared as endangered by IUCN. Due to water pollution and river valley projects in Maharashtra, the Deccan Mahseer (*Tor khudree and T. musselah*) have been decimated from Bhima, Krishna and Koyna river systems.

Mahseer fish has religious touch. The villagers of Dehu call Mahseer as ~~a~~ God-fish. In 1982, because of decreased water levels due to indiscriminate pumping and illegal release of obnoxious industrial effluents into the river, the entire population of fish in the river got wiped out. According to villagers in one week 17 truckloads (Approx. 25.5 tonnes) of dead Mahseer were taken in procession and their last rites were performed according to Hindu tradition. According to the local fishermen at Dehu, the dead Mahseer fish were about the size of a buffalo. It was one of the fish species which supported the livelihood of tribals in that area. Therefore, there was an urgent need of restoration and conservation of Mahseer in this stretch of Indrayani River.

Friends of Nature Association (FoNA), an NGO made efforts and ultimately succeeded in bringing the fish back from the brink of extinction. Shashank Ogale, a senior fisheries scientist and head of corporate social responsibility and environment at Tata Power gave expert advice on the project. It was funded by the Central Institute of Fisheries Education and sanctioned by the National Fisheries Development Board. The fish were bred in artificial tanks, till they were two-three inches long. They were then put in cages and immersed in the river. When they were acquainted with the pressure and temperature of the polluted waters, they were released. The process ~~is~~ was repeated periodically.

Culture of *Tor khudree* in cages was carried out in the Indrayani River. Initially, a survey of the water quality parameters and flow of the river from Dehu to downtown to ascertain its suitability was conducted. Based on the survey and availability of water level, the site was finalized behind the Gatha Mandir at Dehu (18.72°N 73.77°E), where the cages could be installed. This experiment was conducted in floating net cages made up of HDPE with 3m X 3m X 3m dimensions having mesh size of 15 mm. In the beginning two cages were installed. The number of cages was raised to 10 in a span of six months in the year 2011 where in all 34508 *Tor khudree* were raised in 24 batches. The cages were suspended in river by air tight floating plastic barrels and frames were supported with angles of iron and wooden blocks. Cages were stocked with the fingerlings ranging from 3 cm to 5 cm in length; & weighing 20 g to 70 g of *Tor khudree* at a stocking density of 50 nos/m^2 of surface. The fish were supplemented twice a day at 2-5% body weight, with a formulated diet containing 34% protein. The experiment lasted for 3 years and periodic samples were taken every month for fish growth.

The fish generally does not breed naturally in captivity and requires to be stripped. Being an endangered species the risk of releasing the spawn enhances mortality and

hence even as an attempt of conservation, rearing in cages for six months for acclimatizing and training for survival in the natural habitat became essential allowing them to be a sizable fish sustaining the challenges of the natural habitat. Mr. Rohit Nagalgaon has continued the work with more scientific approach under the guidance of Vinayak Dalvie, Academic Coordinator of Sindhu Swaddhyay Sanstha where Mr. Ogale is the Co-guide. Rohit under the guidance of Vinayak Dalvie recently got second prize in poster presentation at the National Youth Science Congress organised by the University of Mumbai in collaboration with Swaminarayan Foundation. Today about 35,000 fully grown Mahseer are seen in the River Indrayani near Gatha Mandir and are breeding naturally.

1) What research aspects Rohit can consider in this work?
2) Can this attempt of ex-situ conservation be commercially explored in future?
3) If so how?

OR

Q. 9 B] Questions based on case study / simulation.

Simulation: Development of Integrated Fish Farm

Village Juchandra is located in between Naigaon station on Western Railway and Western Express Highway each at a distance of 2.5 km. Juchandra has Bhayander Creek in the south with the backwaters flowing in the fields at high tides. Bhayander Creek is one of the last creeks in the vicinity of Mumbai which has fairly good water quality supporting brackish water ecosystem. Evident from the salt pans which exists on its northern side though domestic pollution of Mira-Bhayander townships is imposing increasing load from the south. The Creek is divided into two by some islands one having inhabited called 'Panju bet' a village having no road access. By virtue of this breadth and depth water quality is sustained to some extent though with the rapid urbanization it is being challenged.

Government of Maharashtra State Department of Fisheries has a scheme to lend a land on lease for promoting prawn culture. Accordingly five hectares land can be allotted to an individual while up to 50 hectares to Private Limited Company for 30 years at a lease rent of Rs. 1000/- per hectare per year (with an increase in Rs. 1000/- every five years per hectare) and Rs. 2000/- per hectare (with an increase in Rs. 2000/- every five years per hectare) respectively.

1) As budding entrepreneur how do you assess this opportunity? **7**
2) Provide your plans for developing integrated aquafarm. **8**

Note: Questions of the model question paper are not exhaustive, but suggestive, and teachers have liberty to reframe, modify and add other questions as deemed fit.

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Model Question Paper USACFBIO601

Duration: 2.5 Hours **Total marks: 75**

N.B.: 1) Question No. 1 is compulsory.
2) Attempt any four questions from question No. 2 to question No. 9.
3) Draw neat and labelled diagrams wherever necessary.

Q. 1] Write notes on <u>any 5</u> of the following (Mixed questions from all units): 15

a) Commercial importance of ribbon fish
b) Major fish landing centers of oil sardine
c) Economic importance of *Crassostrea spp*.
d) Economic importance of lobsters
e) Preservatives used in feed.
f) Nutritional requirement at larval stage of crustaceans
g) Costiasis
h) White spots.
i) Packaging of fishes
j) Fish dressing
k) Prawn chutney
l) Chitin
m) Paddle wheels
n) Feeding cups
o) _____ (if open unit is opted)
p) _____ (if open unit is opted)

Q. 2 Question based on Unit 1

Q. 2 A] Discuss the fisheries of *Stromateus cinereus* and *Cybium guttatum* **15**

OR

Q. 2 B] Give an account of the following:

(i) Major fish landing centers of deep sea fishes **7**
(ii) *Polynemus tetradactylus* fishery **8**

Q. 3 Question based on Unit 2

Q. 3 A] Discuss the fisheries of *Sepia* and *Penaeus monodon*. **15**

OR

Q. 3 B] Explain the following:

(i) Major landing centers for shell fishes. **7**
(ii) *Scylla serrata* fishery **8**

Q. 4 Question based on Unit 3

Q. 4 A] Write an account on Nutritional requirements at various stages of development of fish and add a note on formulated feeds. **15**

OR

Q. 4 B] Describe the following:

(i) Culture of natural feed: *Artemia* **7**
(ii) Major constituents of pelleted feed **8**

Q. 5 Question based on Unit 4
Q. 5 A] Discuss diseases caused by bacteria and crustacean. Add a note on their treatment. **15**

OR

Q. 5 B] Give an account of the following w.r.t. fish pathology:
(i) Physiological disorders and diseases in fishes **7**
(ii) Fungal diseases and their treatment **8**

Q. 6 Question based on Unit 5
Q. 6 A] Describe the following w.r.t. preservation and processing –Salting method and Freezing method**.** **15**

OR

Q. 6 B] Explain the following w.r.t. preservation and processing:
(i) Types of freezers **7**
(ii) Icing method **8**

Q. 7 Question based on Unit 6
Q. 7 A] Describe the following fishery by-products **–**Fish Protein Concentrate, Pearl Essence and Gelatin **15**

OR

Q. 7 B] Write elaborate notes on the following:
(i) Proximate composition of fish meat **7**
(ii) Prawn pickle and fish wafers **8**

Q. 8 Question based on Unit 7
Q. 8 A] Write an account on pen culture and rope culture. **15**

OR

Q. 8 B] Describe the following fishes w.r.t. farm engineering:
(i) Site selection criterion for semi-intensive freshwater **7**
(ii) Construction of hatchery for semi-intensive freshwater fishes **8**

Q. 9 Question based on Unit 8
Q. 9 A] Question based on open unit.(if opted)
15

OR

Q. 9 B] Questions based on open unit.
(b) _____ **7**
(b) _____ **8**

Note: Questions of the model question paper are not exhaustive, but suggestive, and teachers have liberty to reframe, modify and add other questions as deemed fit.

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

S.Y.B.Com. (Investment Management)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	**Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Information Technology in Investment Management - I	**03**	4	Information Technology in Investment Management - II	**03**
2B	***Skill Enhancement Courses (SEC)***		**2B**	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Security Analysis and Portfolio Management – I	**03**	6	Security Analysis and Portfolio Management – II	**03**
7	Mutual Fund Management	**03**	7	Business Economics-II	**03**
	Total Credits	**20**		**Total Credits**	**20**

List of Skill Enhancement Courses (SEC) for Semester III (Any One)		****List of Skill Enhancement Courses (SEC) for Semester IV (Any One)***	
1	Foundation Course – III (An Overview of Investment Management)	1	Foundation Course – IV (An Overview of Banking & Insurance)
2	Foundation Course-Contemporary Issues- III	2	Foundation Course-Contemporary Issues-IV
3	Foundation Course in NSS - III	3	Foundation Course in NSS – IV
4	Foundation Course in NCC - III	4	Foundation Course in NCC – IV
5	Foundation Course in Physical Education - III	5	Foundation Course in Physical Education -IV

List of Elective Courses (EC) for Semester III (Any Three)		****List of Elective Courses (EC) for Semester IV (Any Three)***	
1	Financial Management - I	1	Financial Management –II
2	Cost and Management Accounting	2	Direct Taxation
3	Fundamentals of Capital Market	3	Fundamentals of Equity Market
4	Financial Services	4	Financial Derivatives
5	Marketing of Investment Products	5	Introduction to Equity Research
Note: Course selected in Semester III will continue in Semester IV			

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Programme at Semester III
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1. Elective Courses (EC)

Financial Management - I
Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Finance and Financial Management	15
2	Financial Goal Setting & Time value of Money	10
3	Investment Decisions: Capital Budgeting	15
4	Financial Decisions	20
	Total	60

Sr. No.	Modules / Units
1	**Introduction of Finance and Financial Management**
	A) Introduction to Finance • Meaning and definition of finance • Importance of finance • Types of Finance: Public and Private • Sources of finance Long term Sources : Term Loans, Debentures, Bonds, Zero Coupon bonds, Convertible Bonds, Equity shares, Preference shares, CD, CP, Public Deposits Short Term sources**:** Bank Finance, Trade Credit ,Other Short Term Sources Venture Capital and Hybrid Financing **B) Financial Management** • Meaning and Importance of Financial Management • Scope of Financial Management • Functions and Objectives of Financial Management • Primary Objective of Corporate Management • Agency Problem • Organization of Finance Function Emerging role of Finance Managers in India **C) Objectives of the Firm** • Profit Maximization and Shareholders Wealth Maximization • Profit V/s Value Maximization
2	**Financial Goal Setting & Time value of Money**
	A) Financial Goal Setting • Introduction • Financial Forecasting – Meaning, Techniques, Benefits • Approaches to Financial Planning • Economic Value Added (EVA)– Measurement & Components • Free Cash Flow (FCF) **B) Time Value of Money** • Concept • Present Value • Annuity • Techniques of Discounting • Techniques of Compounding.
3	**Investment Decisions**: **Capital Budgeting**
	A) Capital Budgeting • Nature of Capital Budgeting • Purpose of Capital Budgeting • Capital Budgeting Process • Types of Capital Investment • Basic Principle of Measuring Project Cash Flows • Increment Principle, Long Term Funds Principle, Exclusion of Financial Cost Principle, Post Tax Principle • Probability technique for measurement of cash flow • Capital Budgeting Techniques: Net Present Value Profitability Index and Discounted Pay Back Method. • A Comparison; Project Selection Under Capital Rationing (Note: Problems on computation of cash flow, ranking of projects on various

	techniques, selection and analysis with / without capital rationing)
Sr. No.	**Modules / Units**
4	**Financial Decisions**
	A) Cost of Capital : • Introduction and Definition of Cost of Capital • Measurement of Cost of Capital • Measurement of WACC using book value and market value method. • Measuring Marginal Cost of Capital **B) Capital Structure Decisions**: • Meaning and Choice of Capital Structure • Importance of Optimal Capital Structure • EBIT -EPS Analysis • Capital Structure Theories • Dividend Policies (Walter & Gordon)

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1. Elective Courses (EC)

Cost and Management Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Unit Costing and Reconciliation of cost and financial accounts	15
2	Job Costing and Process Costing	15
3	Marginal Costing	15
4	Introduction to Standard Costing	15
	Total	60

Sr. No.	Modules / Units
1	**Unit Costing and Reconciliation of cost and financial accounts**
	A) Introduction to Costing • Meaning, Nature, Scope, Objective of Cost Accounting • Financial Accounting v/s Cost Accounting • Advantages and Disadvantages of Cost Accounting • Elements of Costs-Cost classification • Installation of Cost Accounting System **B) Unit costing and Reconciliation of cost and financial accounts.** Note- Practical problems based on preparation of cost sheet reconciliation of cost and financial accounts.
2	**Job Costing and Process Costing**
	A) Job Costing • Job cost cards and databases • Collecting direct costs of each job • Attributing overhead costs to jobs • Applications of job costing **B) Process Costing** • Introduction, Meaning, Scope and Objectives • Measurement of Process loss, Abnormal gains and losses • Joint products and by products. **(**Excluding Equivalent units and Inter-process profit)
3	**Marginal Costing**
	A) Marginal Costing • Meaning, Application, Advantages, Limitations • Calculation of Contribution, Breakeven analysis , Profit-Volume Ratio, Margin of Safety and Required Sales to earn desired Profits. Note Simple Practical problems based on Marginal Costing excluding decision making
4	**Introduction to Standard Costing**
	A) Introduction to Standard Costing • Various types of standards and Setting of standards • Basic concepts of Material and Labour variance analysis. Note:-Simple Practical problems based on Material and Labour variances excluding sub variances and overhead variances

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1. Elective Courses (EC)

Fundamentals of Capital Market

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Capital Market	15
2	Market Infrastructure for Capital Markets	15
3	Introduction to Collective Investment Scheme	15
4	Resource Mobilization in International Market.	15
	Total	60

Sr. No.	Modules / Units
1	**Introduction to Capital Market**
	A) Overview of Capital Market - Indian Capital Market, Authorities Governing Capital Markets in India, Profile of Securities Market, Securities Market Reforms and Regulatory Measures to Promote Investor Confidence, Features of Developed Capital Market: IOSCO , Overview of Depository System in India. **B) Capital Market Instruments and Rating**- Capital Market Instruments: Equity, Debentures, Preference Shares, Sweat Equity, Non-Voting Shares, Share Warrants, Derivatives and Hybrid Instruments. **C) Rating and Grading of Instruments**: Concept, Scope, Significance and Factors influencing Ratings of Instruments.
2	**Market Infrastructure for Capital Markets**
	A) Introduction to Stock exchange – Functions and significance, Operation and Trading Mechanisms of Stock exchanges , Types of Delivery , Margins, Margin Trading , Book Closure and Record Date, Trading of Partly Paid Shares and Debentures ,Trend Line, Trading Volume, Turnover and Outstanding Position, Market Making, Short Selling, Securities Lending and Borrowing, Straight Through Processing and Direct Market Access (DMA)
3	**Introduction to Collective Investment Scheme**
	A) Introduction to SEBI (Collective Investment Schemes) Regulations, 1999 – An Overview, Application fee to accompany the application, Furnishing of information , Conditions for eligibility, Grant of certificate, Terms and conditions, Procedure where registration is not granted, Restrictions on business activities, Obligations of collective investment management company(CIMC), Submission of information and documents, Trustees and their obligations, Contents of trust deed, Eligibility for appointment as trustee, Termination of trusteeship, Termination of the agreement with the collective investment management company(CIMC), Procedure for launching of schemes, Disclosures in the offer document , Allotment of units and refunds of money, Unit certificates, Transfer of units, Investments and segregation of funds, Listing of scheme and Winding up of scheme
4	**Resource Mobilization in International Market.**
	A) Introduction to Global Finances – Introduction to Depository Receipts, ADR & GDR, Depositary Receipts Scheme 2014 , Pricing of securities, Sponsored ADR/GDR issue, Two-way Fungibility scheme , Provisions of Companies Act, 2013 relating to issue of GDRs, Companies (Issue of Global Depository Receipts) Rules, 2014, Procedure for issuance of GDR/FCCBs , Approvals required , Appointment of Intermediaries, Principal Documentation, Pre and Post Launch – Additional Key Actions **B) Foreign Currency Exchangeable Bonds** – An introduction, Difference between FCCB and FCEB, Issue of Foreign Currency Exchangeable Bonds (FCEB) Scheme,2008, Foreign Currency Convertible Bonds and Ordinary Shares (Through Depository Receipt Mechanism) Scheme, 1993 and External Commercial Borrowings (ECB) - Forms and Features

1. Elective Courses (EC)

Financial Services

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Traditional Financial Services	15
2	Securitization	15
3	Financial Services - I	20
4	Financial Services - II	10
	Total	60

Sr. No.	Modules / Units
1	**Introduction to Traditional Financial Services**
	A) Financial Services:- Concept, Objectives, Functions, Characteristics, Introduction to Financial Service Market, Growth of Financial Services in India, Problems in Financial Services Sector, Introduction to Banking and Non-Banking Companies. **B) Factoring and Forfaiting:** Introduction, Types of Factoring, Theoretical Framework, Factoring Cost, Advantages and Disadvantages of Factoring, Factoring in India, Factoring v/s Forfaiting, Working of Forfaiting, Benefits and Drawbacks of Forfaiting. **C) Bill Discounting:** Introduction, Framework, Bill Market Schemes, Factoring V/s Bill Discounting in Receivable Management.
2	**Securitization**
	A) Issue Management and Intermediaries: Introduction, Merchant Bankers/ Lead Managers, Underwriters, Bankers to an Issue, Brokers to an Issue **B) Stock Broking:** Introduction, Stock Brokers, Sub Brokers, Foreign Brokers, Trading and Clearing/Self Clearing Members, Stock Trading (Cash and Normal) Derivative Trading **C) Securitization:** Definition, Securitization v/s Factoring, Features of Securitization, Pass Through Certificates, Securitization Mechanism, Special Purpose Vehicle, Securitisable Assets, Benefits of Securitization.
3	**Financial Services - I**
	A) Lease and Hire-Purchase: Meaning, Types of Lease - Finance Lease, Operating Lease, Advantages and Disadvantages of Leasing, Leasing in India, Legal Aspects of Leasing. Definition of Hire Purchase, Hire Purchase and Instalment Sale Characteristics, Hire, Purchase and Leasing, Advantages of Hire Purchase, Problems of Hire Purchase. **B) Housing Finance:** Introduction, Backgroud of Housing Finance Industry, Housing Finance Policy Aspect, Sources of Funds, Market of Housing Finance, Housing Finance in India- Major Issues, Housing Finance in India – Growth Factors, Introduction to Housing Finance Institutions in India, National Housing Bank (NHB), Guidelines for Asset Liability Management System in HFC, Fair Trade Practice Code for HFC's, Housing Finance Agencies **C) Venture Capital:** Introduction, Features of Venture Capital, Types of Venture Capital , Financing Stages, Disinvestment mechanisms, Venture Capital Investment process.
4	**Financial Services - II**
	A) Credit Rating Services - Meaning, Origin, Features, Advantages of Rating, Regulatory Framework, Credit Rating Agencies, Credit Rating Process, Credit Rating Symbols. Credit Rating Agencies in India, Limitations of Rating **B) Consumer Finance** - Introduction, Sources, Types of Products, Consumer Finance Practice in India, Terms, Pricing, Marketing and Insurance of Consumer Finance, Consumer Credit Scoring, Case for and against consumer Finance.

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Marketing of Investment Products

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Marketing	15
2	Introduction to Financial Products	15
3	Buying Behaviour	10
4	E- Marketing	20
	Total	60

Sr. No.	Modules / Units
1	**Introduction to Marketing**
	A) Introduction to Marketing - Meaning, Definition of Marketing, Marketing concept and its evolution, Difference between marketing and selling, Concept of services- Difference between goods and services, Goods service continuum, Service marketing triangle- Characteristics of services- Marketing mix elements(4 and 7 Ps)- Environmental analysis-Macro and Micro Environment
2	**Introduction to Financial Products**
	A) Introduction to Financial Products- Financial service products meaning and Features, Investment related products- concepts and features- classification. **B) Marketing fundamentals** - Market segmentation, Distribution channels- pricing, Decision-factors affecting pricing-pricing policies, Role of regulators in pricing-structure and Marketing of financial products based on client requirements. **C) CRM** - Importance of CRM in Marketing of Financial Services-CRM and Relationship, Marketing-CRM, Concept-CRM implementation and evaluation.
3	**Buying Behaviour**
	A) Consumer's buying behavior-Factors affecting buying behavior, Need and importance of competition analysis, Porters five force model. **B) Marketing Strategies** - Market entry strategies Recent trends in marketing of investment products, Marketing though social networking channels.
4	**E- Marketing**
	A) Introduction to E- Marketing – Meaning, Objectives, Features, Scope, Benefits, Problems and Techniques **B) E-Marketing Tools** – Introduction, Objectives, E-mail Marketing, Creating a website, Social Media Marketing, Pay per Click Advertising, Search Engine Optimization, Blogging and Classified Advertising **C) Application of E- Marketing**- Introduction, Objectives, Online Advertising, Direct Response Medium, Role of Distribution in E-Marketing, Lead Generation Platform, Customer Service Mechanism and Relationship Building Medium.

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2A. Ability Enhancement Courses (AEC)

Information Technology in Investment Management- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	E-Commerce	10
2	Support Systems	15
3	E-Payments	15
4	MS-Office: Packages for Institutional Automation	20
	Total	60

Sr. No.	Modules / Units
1	**E-Commerce**
	A) Introduction to Electronic Commerce - E-Commerce Framework, E-Commerce and media convergence, Anatomy of E-Commerce Applications, E-Commerce Consumer and Organization Applications **B) The network Infrastructure for Electronic Commerce** - Market forces influencing the I-way, Components of I-way, Network Access Equipment **C) E-Commerce and World Wide Web** - Architectural framework of E-Commerce, WWW and its architecture, hypertext publishing, Technology behind the web, Security and the Web
2	**Support Systems**
	A) Management Information System (MIS) - Definition of MIS, Role and Impact of MIS, MIS and Users, MIS as a Control System, MIS –a support to the Management, Management Effectiveness and MIS, Organization as a System, MIS: Organization Effectiveness **B) Enterprise Resource Planning(ERP) -** Definition of ERP, Need of ERP, History of ERP, Benefits of ERP, ERP applications and Emerging trends, ERP –A Subset of Enterprise Applications **C) E-CRM: -** Customer Relationship Management, Typical Business Touchpoints, Orbitz
3	**E-Payments:**
	A) E-payment systems – An overview, B2C payments, B2B payments. Types of E- payment system – Credit card payment, debit cards, accumulating balance, online stored value payment systems, digital cash, digital (electronic) wallets, agile wallet, smart cards and digital cheques, plastic money, Secure Electronic Transaction (SET) Protocol
4	**MS-Office: Packages for Institutional Automation**
	A) Ms-Word: Usage of smart art tools, bookmark, cross-reference, hyperlink, mail merge utility and converting word as PDF files. **B) Ms-Excel**: Manipulating data, Working with charts, Working with PIVOT table and what-if analysis; Advanced excel functions-Vlookup(), hlookup(),pv(),fv(), pvschedule(),goal seek(), confidence(),AVERAGE(), averagea(),averageif(), averageifs(),MIN(), MAX(), COUNT(),COUNTA(), countif(), countifs(), ROUND(), INT(), avedev(), nested functions, name ,cells/ranges/constants, relative, absolute & mixed cell reA) ferences, >,<,=operators, Logical functions using if, and, or, not, date and time functions & annotating formulae. **C) Macros**: Creating and executing VBA macros embedded in an excel sheet.

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2B. Skill Enhancement Courses (SEC)

Foundation Course – III
(An Overview of Investment Management)

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Security Contract Act	10
2	Risk management	10
3	Fundamentals of Investments and its avenues	15
4	Financial literacy and Individual Investing	10
	Total	**45**

Sr. No.	Modules / Units
1	**Security Contract Act**
	A) Security Contract Act – Important Terms, Objectives, Types of Contract, Stock Exchange Recognition, Refusal of Recognition, Listing and Delisting of Security, Byelaws, Functions, Appellate Authority, Cancellation, Fines and penalties.
2	**Risk management**
	A) Risk management: - Concept of Risk, Type of Risk –systematic risk unsystematic risk, Risk management process, Risk identification, Risk evaluation, Risk mitigation, Risk handling. **B) Risk Governance -** Importance and Scope of Risk Governance, Risk and Three lines of Defense, Risk Management and Corporate Governance **C) Risk Assurance** – Purpose and Sources of Risk Assurance, Nature of Risk Assurance Reports and Challenges of Risk **D) Risk and Stakeholders Expectations** – Identifying the range of stakeholders and responding to stakeholders expectations.
3	**Fundamentals of Investments and its Avenues**
	A) Fundamentals of Investments:- Meaning and definition, Need and importance of investment, Investment objectives, Elements of Investment, Investment avenues, Taxes and investments, Place of liquidity in investment decisions, Importance of investment management. **B) Sources and Avenues of Investments: -** Bank Products, Banks and credit unions, Bonds, Stocks, Investment Funds, Annuities. Features of Equity Share & Preference Share, Features of Debenture, Valuation of Equity Shares and its Techniques, Valuation of Debentures and its Techniques. Valuation of bullion Gold and Silver, Characteristics and Important features of Investment in bullion, Bullion Market and its operations, Factor influencing demand and supply of bullion, Gold ETF, Linkage with foreign exchange and currency.
4	**Financial literacy and Individual Investing**
	A) Introduction to Financial literacy: Meaning, need and importance of financial literacy, Components of financial literacy, Individual economic system, personal finance planning, RBI initiatives in financial literacy. **B) Individual Investing** - Getting ready to invest - Saving versus investing - Getting started – discipline and planning are key - Define your goals and investment time frame - Decide if you need income, growth or both - Understand the risks - Diversify to minimize risk - Recognize the importance of cost and tax.

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2B. Skill Enhancement Courses (SEC)

Foundation Course- Contemporary Issues- III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Human Rights Provisions, Violations and Redressal	12
2	Dealing With Environmental Concerns	11
3	Science and Technology I	11
4	Soft Skills for Effective Interpersonal Communication	11
	Total	**45**

Sr. No.	Modules / Units
1	**Human Rights Violations and Redressal**
	A. Scheduled Castes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **B.** Scheduled tribes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **C.** Women- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **D.** Children- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **E.** People with Disabilities, Minorities, and the Elderly population- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(4 Lectures)**
2	**Dealing With Environmental Concerns**
	A. Concept of Disaster and general effects of Disasters on human life- physical, psychological, economic and social effects. **(3 Lectures)** **B.** Some locally relevant case studies of environmental disasters. **(2 Lectures)** **C.** Dealing with Disasters - Factors to be considered in Prevention, Mitigation (Relief and Rehabilitation) and disaster Preparedness. **(3 Lectures)** **D.** Human Rights issues in addressing disasters- issues related to compensation, equitable and fair distribution of relief and humanitarian approach to resettlement and rehabilitation. **(3 Lectures)**
3	**Science and Technology – I**
	A. Development of Science- the ancient cultures, the Classical era, the Middle Ages, the Renaissance, the Age of Reason and Enlightenment. **(3 Lectures)** **B. Nature of science**- its principles and characteristics; Science as empirical, practical, theoretical, validated knowledge. **(2 Lectures)** **C. Science and Superstition**- the role of science in exploding myths, blind beliefs and prejudices; Science and scientific temper- scientific temper as a fundamental duty of the Indian citizen. **(3 Lectures)** **D. Science in everyday life**- technology, its meaning and role in development; Interrelation and distinction between science and technology. **(3 Lectures)**
4	**Soft Skills for Effective Interpersonal Communication**
	Part A **(4 Lectures)** I) Effective Listening - Importance and Features. II) Verbal and Non-Verbal Communication; Public-Speaking and Presentation Skills. III) Barriers to Effective Communication; Importance of Self-Awareness and Body Language. **Part B** **(4 Lectures)** I) Formal and Informal Communication - Purpose and Types. II) Writing Formal Applications, Statement of Purpose (SOP) and Resume. III) Preparing for Group Discussions, Interviews and Presentations. **Part C** **(3 Lectures)** I) Leadership Skills and Self-Improvement - Characteristics of Effective Leadership. II) Styles of Leadership and Team-Building.

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Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

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2B. Skill Enhancement Courses (SEC)

Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Value System & Gender sensitivity	12
2	Disaster preparedness & Disaster management	10
3	Health, hygiene & Diseases	13
4	Environment & Energy conservation	10
	Total	**45**

Sr. No.	Modules / Units
1	**Value System & Gender sensitivity**
	UNIT - I – Value System Meaning of value, Types of values- human values and social responsibilities- Indian value system- the concepts and its features **UNIT - II - Gender sensitivity and woman empowerment** Concept of gender- causes behind gender related problems- measures Meaning of woman empowerment- schemes for woman empowerment in India
2	**Disaster preparedness & Disaster management**
	UNIT - I - Basics of Disaster preparedness Disaster- its meaning and types Disaster preparedness- its meaning and methods **UNIT - II - Disaster management** Disaster management- concept- disaster cycle - role of technology in disaster response- role of as first responder – the study of 'Avhan' Model
3	**Health, hygiene & Diseases**
	UNIT - I - Health and hygiene Concept of complete health and maintenance of hygiene **UNIT - II - Diseases and disorders- preventive campaigning** Diseases and disorders- preventive campaigning in Malaria, Tuberculosis, Dengue, Cancer, HIV/AIDS, Diabetes
4	**Environment & Energy conservation**
	UNIT - I Environment and Environment enrichment program Environment- meaning, features , issues, conservation of natural resources and sustainability in environment **UNIT - II Energy and Energy conservation program** Energy- the concept, features- conventional and non- conventional energy Energy conservation- the meaning and importance

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2B. Skill Enhancement Courses (SEC)

Foundation Course in NCC - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training and Environment Awareness and Conservation	05
4	Personality Development and Leadership	10
5	Specialized subject (ARMY)	10
	Total	**45**

Sr. No.	Modules / Units
1	**National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. The students shall enrich themselves about the history of our beloved country and will look forward for the solutions based on strengths to the challenges to the country for its development. • Freedom Struggle and nationalist movement in India. • National interests, Objectives, Threats and Opportunities. • Problems/ Challenges of National Integration. • Unity in Diversity
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Side pace, pace forward and to the rear • Turning on the march and whiling • Saluting on the march • Marking time, forward march and halt in quick time • Changing step • Formation of squad and squad drill
3	**Adventure Training, Environment Awareness and Conservation**
3A	**Adventure Training**
	Desired outcome: The students will overcome fear & inculcate within them the sense of adventure, sportsmanship, espirit-d-corp and develop confidence, courage, determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing, Scuba Diving etc.
3B	**Environment Awareness and Conservation**
	Desired outcome: The student will be made aware of the modern techniques of waste management and pollution control. • Waste management • Pollution control, water, Air, Noise and Soil
4	**Personality Development and Leadership**
	Desired outcome: The student will inculcate officer like qualities with desired ability to take right decisions. • Time management • Effect of Leadership with historical examples • Interview Skills • Conflict Motives- Resolution

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** It will acquaint, expose & provide knowledge about Army/ Navy/ Air force and to acquire information about expanse of Armed Forces ,service subjects and important battles **A. Armed Force** • Task and Role of Fighting Arms • Modes of Entry to Army • Honors and Awards **B. Introduction to Infantry and weapons and equipments** • Characteristics of 5.56mm INSAS Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning • Organization of Infantry Battalion. **C. Military history** • Study of battles of Indo-Pak War 1965,1971 and Kargil • War Movies **D. Communication** • Characteristics of Walkie-Talkies • Basic RT Procedure • Latest trends and Development (Multi Media, Video Conferencing, IT) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • Organization of Ship- Introduction on Onboard Organization • Naval Customs and Traditions • Mode of Entry into Indian Navy • Branches of the Navy and their functions • Naval Campaign (Battle of Atlantic, Pearl Harbour, Falkland War/Fleet Review/ PFR/ IFR)s **B. Ship and Boat Modelling** • Types of Models • Introduction of Ship Model- Competition Types of Model Prepare in NSC and RDC • Care and handling of power-tools used- maintenance and purpose of tools

Sr. No.	Modules / Units
	C. Search and Rescue • Role of Indian Coast Guard related to SAR **D. Swimming** • Floating and Breathing Techniques- Precautions while Swimming ***OR*** **AIR** **A. General Service Knowledge** • Organization Of Air Force • Branches of the IAF. **B. Principles of Flight** • Venturi Effect • Aerofoil • Forces on an Aircraft • Lift and Drag **C. Airmanship** • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Types of Engines • Piston Engines • Jet Engines • Turboprop Engines

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2B. Skill Enhancement Courses (SEC)

Foundation Course in Physical Education - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Nutrition	10
2	Evaluation of Health, Fitness and Wellness	10
3	Prevention and Care of Exercise Injuries	10
4	Sports Training	15
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Nutrition**
	• Introduction to nutrition & its principles • Role of Nutrition in promotion of health • Dietary Guidelines for Good Health • Regulation of water in body and factors influencing body temperature.
2	**Evaluation ofHealth, Fitness and Wellness**
	• Meaning & Concept of holistic health • Evaluating Personal health-basic parameters • Evaluating Fitness Activities – Walking & Jogging • Myths &mis-conceptions of Personal fitness
3	**Prevention and Care of Exercise Injuries**
	• Types of Exercise Injuries • First Aid- Importance & application in Exercise Injuries • Management of Soft tissues injuries • Management of bone injuries
4	**Sports Training**
	• Definition, aims & objectives of Sports training • Importance of Sports training • Principles of Sports training • Drug abuse & its effects

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3. Core Courses (CC)

Security Analysis and Portfolio Management – I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Portfolio Management – An Introduction	10
2	Portfolio Analysis and Selection	20
3	Portfolio Revision and Evaluation	15
4	Bond Valuation	15
	Total	**60**

Sr. No.	Modules / Units
1	**Portfolio Management – An Introduction**
	A) Investment- Meaning, Characteristics, Objectives, Investment V/s Speculation, Investment V/s Gambling and Types of Investors **B) Portfolio Management** – Meaning, Evolution, Phases, Role of Portfolio Managers, Advantages of Portfolio Management. **C) Investment Environment**- Investment Environment in India and factors conducive for investment in India.
2	**Portfolio Analysis and Selection**
	A) Portfolio Analysis – Meaning and its Components, Calculation of Expected Return and Risk, Calculation of Covariance, Risk – Return Trade off. **B) Portfolio Selection** – Meaning, Feasible Set of Portfolios, Efficient Set of Portfolios, Selection of Optimal Portfolio, Markowitz Model, Limitations of Markowitz Model, Measuring Security Return and Portfolio Return, Risk under Single Index Model and Multi Index Model.
3	**Portfolio Revision and Evaluation**
	A) Portfolio Revision – Meaning, Need, Constraints and Strategies. **B) Portfolio Evaluation** – Meaning, Need, Measuring Returns (Sharpe, Treynor and Jensen Ratios) and Decomposition of Performance
4	**Bond Valuation**
	A) Bond Valuation – Meaning, Measuring Bond Returns – Yield to Maturity, Yield to call **B) Bond Pricing** – Introduction, Bond Pricing Theorems, Bond Risks and Bond Duration.

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3. Core Courses (CC)

Mutual Fund Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Mutual Fund	15
2	Classification of Mutual Fund	15
3	Fund Selection Criteria	10
4	Financial Planning in Mutual fund	20
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Mutual Fund**
	A) Introduction to Mutual Fund - History & Origin, Definition, Meaning, Characteristics, Advantages, Disadvantages, Limitations of Mutual Funds, Ethics in Mutual Fund. Entities involved – Sponsor, Trust, Trustee, Asset Management Company, Registrar and Transfer Agent (RTA) and Fund Houses in India. **B) Legal Framework** - Role of regulatory agencies for Mutual funds – SEBI, RBI, AMFI, Ministry of Finance, SRO, Company Law Board, Department of Company's affairs, Registrar of Companies MF guidelines on Advertisement , Accounting , Taxation and Valuation norms, Guidelines to purchase Mutual Funds, Investor protection and MF regulations, Grievance mechanism in India
2	**Classification of Mutual Fund**
	A) Types of Mutual Funds - (Introduction and Characteristics) • Functional/Operational – Open ended, close ended, Interval, • Portfolio-Income, Growth, Balanced, MMMF • Geographical/ Location-Domestic, Offshore • Miscellaneous - Tax Saving Funds, Exchange Traded Funds, Balance Funds, Fixed Term Plan, Debt Funds, Systematic Investment Plan and Systematic Transfer Plan. **B)** Introduction to Portfolio Maturity, Calculations of NAV, Entry Load, Exit Load
3	**Fund Selection Criteria**
	A) Fund Rating and Ranking – Its need and importance. Basis of Ratings, Interpretation of Funding Rating by CRISIL, CARE and ICRA, Selection Criteria (Size, Stability, Credit Portfolio, Performance)Performance Measurement – Rolling Returns and Benchmarking
4	**Financial Planning in Mutual fund**
	A) Basics of Financial Planning – Financial Planning Steps, Life Cycle, Wealth Cycle, Risk Profiling, Asset Allocation, Contingency Funds. **B) Investors Guide towards Financial Planning** – Eligibility for investment in MF, KYC (Individuals, Micro SIPs, Institutional Investors, Fund Category Guidance (Long Bond Funds, Short Bond Funds, Ultra Short Bond Funds) , Need for financial Advisor, Difference between advisor and Distributor, Colour Coding MF products, Bank FD's V/s Mutual Funds, Dividend V/s Growth Option **C) Developing Model Portfolio for Investors** – Model Portfolios meaning, Step by Step Approach of Building Model Portfolio

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1. Elective Courses (EC)

Financial Management -II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Working Capital Management	10
2	Management of Components of Working Capital	15
3	Financial Planning	15
4	Financial Policy and Corporate Strategy	15
	Total	60

Sr. No.	Modules / Units
1	**Working Capital Management**
	A) Introduction to Working Capital Management – Meaning, Need, Importance, Scope, Types of working capital, Operating cycle and Estimating working capital needs of an organization. **B) Financing Working Capital Requirements** – Sources of short term finances – Trade credit, Certificate of deposits, Commercial Papers, Bank Credit
2	**Management of Components of Working Capital**
	A) Management of Cash and Marketable Securities: Motives for Holding Cash; Objectives of Cash Management; Factors Determining Cash Needs; Basic Strategies of Cash Management; Cash Management Techniques / Processes; Marketable Securities; and Cash Management Practices in India. **B) Receivable Management**: Objectives; Credit Policies; Credit Terms; and Collection Policies. **C) Inventory Management**: Objectives and Techniques.
3	**Financial Planning**
	A) Introduction to Budgetary Control - Meaning and Essentials of Budget, Types of Budget, Advantages of Budgeting, Zero Based Budgeting and Master Budget. **B)** Introduction to Sales Budget, Production Budget, Material Budget, Cash Budget and Flexible Budget.
4	**Financial Policy and Corporate Strategy**
	A) Introduction to Strategic Financial Management - Meaning of Strategic Financial Management, Strategic financial decision making framework and Functions of Strategic financial management **B) Business Risk and Financial Risk** - Introduction, Debt v/s Equity Financing , Types of Leverages, Investment Objective/Criteria for Individuals/Non-business Purpose

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1. Elective Courses (EC)

Direct Taxation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Direct Taxation	10
2	Heads of Income – I	20
3	Heads of Income – II	10
4	Computation of Total Income and Taxable Income of an Individual	20
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Direct Taxation**
	A) Basic Terms (S. 2,3,4) Assesse, Assessment, Assessment Year, Annual Value, Business, Capital Assets, Income, Previous Year, Person, Transfer. **B)** Determination of Residential Status of Individual, Firm, HUF and Company **C)** Scope of Total Income (S.5)
2	**Heads of Income – I**
	A) Salary (S.15-17) **B)** Income from House Property(S. 22-27) **C)** Profit & Gain from Business and Profession(S. 28, 30,31,32, 35, 35D,36,37, 40, 40A and 43B)
3	**Heads of Income- II**
	A) Capital Gain (S. 45, 48, 49, 50 and 54) **B)** Income from other sources (S.56- 59) **C)** Exclusions from Total Income (S.10) (Exclusions related to specified heads to be covered with relevant heads of income)
4	**Computation of Total Income and Taxable Income of an Individual**
	A) Deductions from Total Income S. 80C, 80CCC, 80D, 80DD, 80E, 80U, 80TTA **B)** Computation of Taxable Income

Notes

1. The Syllabus is restricted to study of particular sections, specifically mentioned rules and notifications only.
2. All modules / units include Computational problems / Case Study**.**
3. The Law in force on 1st April immediately preceding the commencement of Academic year will be applicable for ensuing Examinations.

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1. Elective Courses (EC)

Fundamentals of Equity Market

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Equity Market	10
2	Components of Equity Market	20
3	Law relating to Issue of Shares	15
4	Evolving Role of Equity Market	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Equity Market**
	A) Meaning and Definition of equity shares, Growth of corporate sector and the simultaneous growth of equity shareholders, Trade-off between ownership and management in companies, Development of equity culture in India
2	**Components of Equity Market**
	A) Basics of Primary Market - IPO , Book building, Red-Herring Prospectus -it's unique features, Green Shoe option, Sweat equity, ESOP, Right issue of shares, Non-voting shares and Role of merchant bankers in fixing the price **B) Market For Equity** – Secondary Markets- Definition and functions of Stock Exchanges, Evolution and Growth of Stock Exchanges, Stock Exchanges in India, NSE, BSE, OTCEI and Overseas Stock Exchanges, Recent Development in Stock Exchanges and Stock Market Indices. **C) Dealings in Stock Exchanges -** Role of Brokers, Stock Market Quotations, Procedure for buying & selling shares, BOLT - On Line Trading/ NEAT System, Clearing & Settlement systems
3	**Law relating to Issue of Shares**
	A) Issue and Listing of Securities - Listing of Securities, Issue of Capital and Disclosure Requirements (ICDR), Procedure for issue of various types of shares and debentures, Employee Stock Option Scheme and Employee Stock Purchase Scheme, Delisting of Securities.
4	**Evolving Role of Equity Market**
	A) Role of Equity Markets in economic development - Need for attracting more investors towards equity, Need for strengthening secondary markets, Link between primary Market and secondary market. **B)** Developments in the Indian Equity Market, Channelizing domestic savings & investments, Role of FDI & Foreign Institution Investment, Role of Retail Investors and Role of SEBI in promoting equity markets

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1. Elective Courses (EC)

Financial Derivatives

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Derivatives market	10
2	Introduction to Trading Systems	15
3	Introduction to Forwards and Futures	20
4	Introduction to Options	15
	Total	**60**

Sr. No.	Modules/ Units
1	**Introduction to Derivatives market**
	A) Derivatives – Meaning, Elements of a derivative contract**,** Factors driving growth of derivatives market**,** Types of derivatives**,** Types of underlying assets**,** Participants in derivative market**,** Advantages & Disadvantages of trading in derivatives market**.**
2	**Introduction to Trading Systems**
	A) Basics of Index- Introduction to index, Significance of index, Types of stock market indices, Attributes of an index, Index management, Major indices in India and Application of indices. **B) Introduction to Trading Systems**- Meaning, Selection criteria of stocks for trading, Selection criteria of index for trading, Adjustments for corporate actions.
3	**Introduction to Forwards and Futures**
	A) Introduction to Forwards and Futures – Meaning and limitations of forward, Meaning and features of future contract. **B) Futures terminology** – spot price, future price, contract cycle, expiration day, tick cycle, contract size, contract value, basis, cost of account, initial margin, marking to market, open interest and volume traded, contract specifications, price band, position in derivatives markets. **C)** Difference between futures and forwards, Pay off for futures, Pricing of futures and Uses of futures.
4	**Introduction to Options**
	A) Option Market- Basics of options, Option terminology – index option, stock option, buyer of option, writer of option, American option, European Option, option price and premium, lot size, expiration day, spot price, strike price, ITM option, ATM option, OTM option, intrinsic value, time value, open interest, exercise of option, assignment of option, Pay off charts for option **B)** Pricing fundamentals of options, Black & Scholes Model, Uses of options and Option trading strategies.

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1. Elective Courses (EC)

Introduction to Equity Research

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Equity Research – An Overview	15
2	Fundamentals of Research	15
3	Company Analysis	15
4	Valuation Principles	15
	Total	60

Sr. No.	Modules / Units
1	**Equity Research – An Overview**
	A) Introduction – Meaning, Goals of equity research, Elements of equity research, Process of equity research, Types of equity research, Classification of stocks, Market participants, Role of equity research in capital market and Different approaches to equity research. **B) Introduction to Research Analyst Profession** – Role of research analyst, Responsibilities of research analyst, Basic principles of interaction with Clients/ Companies, Qualities of Research Analyst.
2	**Fundamentals of Research**
	A) Fundamentals of Research – Key points considered before investing, Research on business and stocks, Overview of Fundamental analysis, Technical analysis and Behavioural finance. **B) Economy Analysis** – Principles of macro and micro economics, key economic variables for carrying fundamental analysis, sources of information/data for carrying economic analysis **C) Industry Analysis** – Theories for analysis for industry performance – Michael Porter's Five Force Model for Industry Analysis, PESTLE Analysis, BCG Analysis, SCP Analysis. Key industry drivers and sources of information for industry analysis.
3	**Company Analysis**
	A) Qualitative Dimensions – Understanding business and business models, Company's SWOT Analysis, Management Quality and its governance system, Pricing power and sustainability of power, Success factors of the company, Compliance orientation of company and sources of information. **B) Quantitative Dimensions** – History of Business V/s Future of Business, Reading of financial statements, Peer comparison, dividend and earning history of the company and Role of corporate actions of the company.
4	**Valuation Principles**
	A) Introduction to Valuation – Difference between price and valuation, Need for valuation, Sources of value in business, Discounted cash flow model for business valuation, Absolute Valuations v/s Price Value Sense, Earning based value matrices, Asset based valuation matrices, Trading & Transaction Multiples, SOTP valuation **B) Fundamentals of Risk and Return** – Introduction to Compounded Annual Growth Rate, Risk in investments, Sensitivity analysis , Comparison of equity returns with bond returns and Behavioural biases influencing investments.

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2A. Ability Enhancement Courses (AEC)

Information Technology in Investment Management II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	E-Business	10
2	Security for E-Business	15
3	Cyber Law and Security	15
4	MS-Office: Packages for Institutional Automation	20
	Total	**60**

Sr. No.	Modules / Units
1	**E-Business**
	A) Introduction, E-Commerce – Definition, History of E-commerce, types of E-Commerce B to B etc. Comparison of traditional commerce and e-commerce. E-Commerce business models – major B2 B, B2C model, Consumer-to-Consumer (C2C), Consumer-to-Business (C2B) model, Peer to-Peer (P2P) model and Advantages/ Disadvantages of e-commerce **B)** Web auctions, Virtual communities, Portals, E-business revenue models.
2	**Security for E-Business**
	A) Security threats– An overview, Implementing E-commerce security, Encryption – Decryption, Cryptography methods, SSL protocol, Firewalls. **B) Threat hunting**: Definition of Threat hunting, Threat Hunting vs. Threat detection, Benefits and challenges of threat hunting, Best Practices for threat hunting, Considerations for threat hunting and threat detection, Threat hunting/detection software.
3	**Cyber Law and Security**
	A) Cyber Crimes - Various threats and attacks, Phishing, Key Loggers, Identity Theft, Call & SMS forging, e-mail related crimes, Denial of Service Attacks, Hacking, Online shopping frauds, Credit card frauds, Cyber Stalking **B) Cyber Security** - Computer Security, E-Security, Password Security and Reporting internet fraud **C) Cyber Law** - Need of Cyber Law, History of Cyber Law in India, Legal Aspects of E-Business, Information Technology Act 2000 - salient features.
4	**MS-Office: Packages for Institutional Automation**
	A) MS-PowerPoint presentation: Internal links between slides, hyperlinks, embedding multimedia content onto the slides (video/audio/stylish text), slide animation, timer, creating new presentation by existing theme, import online themes, creating a template of presentation, save and run the slide show(.ppsx) **B) Applications of Internet: -** Introduction to e-mail, writing professional e-mails, creating digitally signed documents, Google drive: usage of Google drive in storing the Google documents, excel sheets, presentations and PDF files. **C) Use of outlook express:** Configuring outlook express, Creating and managing profile in outlook, Sending and receiving e-mails via outlook express, Emailing the merged documents, Boomerang facility of email.

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2B. Skill Enhancement Courses (SEC)

Foundation Course – IV
(An Overview of Banking & Insurance)
Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Banking Sector	10
2	Regulatory and Developmental Framework governing Banking & Insurance sector	10
3	Introduction to Life and Health Insurance	10
4	Microfinance & Financial Inclusion	15
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Banking Sector**
	A) Introduction to Banking Sector – Meaning of Banking Companies, primary and secondary functions of banks, banking system in India, Overview of RBI, Public, Private, Co-operative, Payment Bank and Regional Rural Banks **B) Introduction to Insurance Sector** – Meaning of Insurance Companies, Functions, Principles, Types of insurance policies and their advantages & disadvantages. **C)** Significance and Role of Banking and Insurance in mobilizing savings, investment, wealth accumulation and economic growth.
2	**Regulatory and Developmental Framework governing Banking & Insurance sector**
	A) Overview of Regulatory Architecture – Banking Regulation Act 1949, Banking Regulation Act (Amendment 2015), Payment and Settlement Act 2007, Negotiable Instrument Act 1881 **B) Overview of Regulatory Architecture relating to Insurance** - Introduction to Insurance Act 1938 , IRDA Act 1999 and The Insurance Laws (Amendment) Act, 2015 **C)** Developmental Activities of RBI and IRDA
3	**Introduction to Life and Health Insurance**
	A) Life Insurance Business – Components, Human Life Value Approach, Mutuality, Principle of risk pooling, Life Insurance Contract, Determinants of risk premium. **B) Health Insurance** – Meaning, IRDA regulations, Determinants of health insurance, Health Insurance Market in India and Determinants of risk premium.
4	**Microfinance & Financial Inclusion**
	A) Microfinance - Introduction, Need and Code of Conduct for Microfinance Institutions in India, Advantages, Purpose, Limitations and Models of SHG – Bank Linkage Program, Role of NABARD and SIDBI, Portfolio Securitization, SHG-2, NRLM and SRLM, Priority Sector and its Classification **B) Financial Inclusion** - Need & Extent, RBI Committee Report of Medium Term Path on Financial Inclusion 2015, World Findex Report 2015, NISM Report 2015, (Only Brief Extracts relating to bank account holdings and credit taken**) ,** Features & Procedures of Pradhan Mantri Jan Dhan Yojana, and PM Mudra Yojana, Features, procedures and significance of Stand up India Scheme for Green Field

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2B. Skill Enhancement Courses (SEC)

Foundation Course- Contemporary Issues- IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Significant, Contemporary Rights of Citizens	12
2	Approaches to understanding Ecology	11
3	Science and Technology –II	11
4	Introduction to Competitive Exams	11
	Total	**45**

Sr. No.	Modules / Units
1	**Significant, Contemporary Rights of Citizens**
	A. Rights of Consumers-Violations of consumer rights and important provisions of the Consumer Protection Act, 2016; Other important laws to protect consumers; Consumer courts and consumer movements. **(3 Lectures)** **B. Right to Information**- Genesis and relation with transparency and accountability; important provisions of the Right to Information Act, 2005; some success stories. **(3 Lectures)** **C. Protection of Citizens'/Public Interest**-Public Interest Litigation, need and procedure to file a PIL; some landmark cases. **(3 Lectures)** **D. Citizens' Charters, Public Service Guarantee Acts. (3 Lectures)**
2	**Approaches to understanding Ecology**
	A. Understanding approaches to ecology- Anthropocentrism, Biocentrism and Eco centrism, Ecofeminism and Deep Ecology. **(3 Lectures)** **B. Environmental Principles-1**: the sustainability principle; the polluter pays principle; the precautionary principle. **(4 Lectures)** **C. Environmental Principles-2**: the equity principle; human rights principles; the participation principle. **(4 Lectures)**
3	**Science and Technology –II**
	Part A:Some Significant Modern Technologies, Features and Applications (7 Lectures) i. **Laser Technology**- Light Amplification by Stimulated Emission of Radiation; use of laser in remote sensing, GIS/GPS mapping, medical use. ii. **Satellite Technology**- various uses in satellite navigation systems, GPS, and imprecise climate and weather analyses. iii. **Information and Communication Technology**- convergence of various technologies like satellite, computer and digital in the information revolution of today's society. iv. **Biotechnology and Genetic engineering**- applied biology and uses in medicine, pharmaceuticals and agriculture; genetically modified plant, animal and human life. v. **Nanotechnology**- definition: the study, control and application of phenomena and materials at length scales below 100 nm; uses in medicine, military intelligence and consumer products. **Part B:Issues of Control, Access and Misuse of Technology. (4 Lectures)**

Sr. No.	Modules / Units
4	**Introduction to Competitive Exams**
	Part A. Basic information on Competitive Examinations- the pattern, eligibility criteria and local centres: **i.** Examinations conducted for entry into professional courses - Graduate Record Examinations (GRE), Graduate Management Admission Test GMAT), Common Admission Test (CAT) and Scholastic Aptitude Test (SAT). **ii.** Examinations conducted for entry into jobs by Union Public Service Commission, Staff Selection Commission (SSC), State Public Service Commissions, Banking and Insurance sectors, and the National and State Eligibility Tests (NET / SET) for entry into teaching profession. **Part B. Soft skills required for competitive examinations- (7 Lectures)** **i.** Information on areas tested: Quantitative Ability, Data Interpretation, Verbal Ability and Logical Reasoning, Creativity and Lateral Thinking **ii.** Motivation: Concept, Theories and Types of Motivation **iii.** Goal-Setting: Types of Goals, SMART Goals, Stephen Covey's concept of human endowment **iv.** Time Management: Effective Strategies for Time Management **v.** Writing Skills: Paragraph Writing, Report Writing, Filing an application under the RTI Act, Consumer Grievance Letter.

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10. Reza, B. K., *Disaster Management*, Global Publications, New Delhi, 2010.
11. Sathe, Satyaranjan P., *Judicial Activism in India*, Oxford University Press, New Delhi, 2003.
12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.

Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

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2B. Skill Enhancement Courses (SEC)

Foundation Course in NSS - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Entrepreneurship Development	10
2	Rural Resource Mobilization	10
3	Ideal village & stake of GOS and NGO	13
4	Institutional Social Responsibility and modes of Awareness	12
	Total	**45**

Sr. No.	Modules / Units
1	**Entrepreneurship Development**
	UNIT - I Entrepreneurship development Entrepreneurship development- its meaning and schemes Government and self-employment schemes for Entrepreneurship development **UNIT - II - Cottage Industry** Cottage Industry- its meaning, its role in development process Marketing of cottage products and outlets
2	**Rural Resource Mobilization**
	UNIT - I - Rural resource mobilization- A case study of eco-village, eco-tourism, agro-tourism **UNIT - II - Micro financing with special reference to self-help groups**
3	**Ideal village & stake of GOS and NGO**
	UNIT - I - Ideal village Ideal village- the concept Gandhian Concept of Ideal village Case studies on Ideal village **UNIT - II - Government Organisations(GOs) and Non-Government Organisations (NGOs)** The concept and functioning
4	**Institutional Social Responsibility and modes of Awareness**
	UNIT - I - Institutional Social Responsibilities Concept and functioning- case study of adapted village **UNIT - II - Modes of awareness through fine Arts Skills** Basics of performing Arts as tool for social awareness, street play, creative dance, patriotic song, folk songs and folk dance. Rangoli, posters, flip charts, placards, etc**.**

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Programme at Semester IV
with Effect from the Academic Year 2017-2018

2B. Skill Enhancement Courses (SEC)

Foundation Course in NCC - IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	05
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	10
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Fire Services & Fire fighting • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils. • NGOs: Role & Contribution • Drug Abuse & Trafficking • Corruption • Social Evil viz. Dowry/ Female Foeticide/Child Abuse & trafficking etc. • Traffic Control Org. & Anti drunken Driving
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Hygiene and Sanitation (Personal and Food Hygiene) • Basics of Home Nursing & First-Aid in common medical emergencies • Wound & Fractures
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, and turnout, and develop the quality of immediate and implicit obedience of orders, with good reflexes. • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • General Salute, Salami Shastra • Squad Drill • Short/Long tail from the order and vice-versa • Examine Arms
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Theory of Group and Snap Shooting • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Setting a Map, finding North and own position • Map to ground, Ground to Map • Point to Point March **B. Field Craft and Battle Craft** • Observation, Camouflage and Concealment • Field Signals • Types of Knots and Lashing **C. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)** ***OR*** **Navy** **A. Naval Communication** • Semaphore ▪ Phonetic Alphabets ▪ Radio Telephony Procedure ▪ Wearing of National Flag, Ensign and Admiral's Flag. **B. Seamanship** • **Anchor work** ▪ Types of Anchor, Purpose and Holding ground • **Boat work** ▪ Demonstrate Rigging a whaler and enterprise boat- Parts of Sail and Sailing Terms ▪ Instructions in Enterprise Class Board including theory of Sailing, Elementary Sailing Tools ▪ Types of Power Boats Used in the Navy and their uses, Knowledge of Anchoring, Securing and Towing a Boat **C. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)**

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Fuselage • Main and Tail Plain **B. Instruments** • Introduction to RADAR **C. Aero modelling** • Flying/ Building of Aero models **D. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)**

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2B. Skill Enhancement Courses (SEC)

Foundation Course in Physical Education - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Stress Management	10
2	Awards, Scholarship & Government Schemes	10
3	Yoga Education	10
4	Exercise Scheduling/Prescription	15
	Total	**45**

Sr. No.	Modules / Units
1	**Stress Management**
	• Meaning & concept of Stress • Causes of Stress • Managing Stress • Coping Strategies
2	**Awards, Scholarship & Government Schemes**
	• State & National level Sports Awards • State Sports Policy & Scholarship Schemes • National Sports Policy & Scholarship Schemes • Prominent Sports Personalities
3	**Yoga Education**
	• Differences between Yogic Exercises & non- Yogic exercises • Contribution of Yoga to Sports • Principles of Asanas& Bandha • Misconceptions about Yoga
4	**Exercise Scheduling/Prescription**
	• Daily Routine Prescription. • Understanding Activity level & Calorie requirement. • Adherence & Motivation for exercise. • Impact of Lifestyle on Health

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3. Core Courses (CC)

Security Analysis and Portfolio Management – II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Fundamental Analysis	15
2	Technical Analysis	15
3	Efficient Market Theory	15
4	Capital Asset Pricing Model	15
	Total	**60**

Sr. No.	Modules / Units
1	**Fundamental Analysis**
	A) Economy Analysis- Introduction, Meaning, Framework of Economic Analysis, Forecasting, Barometric or Indicator Approach, Econometric Model Building and Opportunistic Model Building. **B) Industry Analysis**- Concept of Analysis, Industry Life Cycle, Industry Characteristics **C) Company Analysis**- Financial Statements, Analysis of Financial Statements and Assessment of risk (Leverages)
2	**Technical Analysis**
	A) Dow Theory **B)** Meaning and Principles of Technical Analysis, Price Chart, Line Chart, Bar Chart, Japanese Candlestick Chart, Trends and Trend Reversals, Chart Patterns, Support and Resistance, Reversal Patterns, Continuation Patterns and Elliot Wave Theory **C)** Mathematical Indicators – Calculation of Moving Averages (Simple and Exponential Moving Average), Oscillators and Relative Strength Index **D)** Market Indicators **E)** Fundamental Analysis V/s Technical Analysis
3	**Efficient Market Theory**
	A) Random Walk Theory **B)** The Efficient Market Hypothesis **C)** Forms of Market Efficiency **D)** Competitive Market Hypothesis
4	**Capital Asset Pricing Model**
	A) CAPM – Fundamental Notions of Portfolio Theory, Assumption of CAPM, Efficient Frontier with Riskless Lending and Borrowing, Capital Market Line, Security Market Line and Pricing of Securities with CAPM. **B) Arbitrage Pricing Theory** (APT) – The Return Generating Model, Factors Affecting Stock Return, Expected Return on Stock, APT V/s CAPM.

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3. Core Courses (CC)

Business Economics II- Macroeconomics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Macroeconomic Data and Theory	15
2	Money, Inflation and Monetary Policy	15
3	Constituents of Fiscal Policy	15
4	Open Economy : Theory and Issues of International Trade	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Macroeconomic Data and Theory**
	• **Macroeconomics:** Meaning, Scope and Importance. • **Circular flow of aggregate income and expenditure**: closed and open economy models • **The Measurement of national product:** Meaning and Importance - conventional and Green GNP and NNP concepts - Relationship between National Income and Economic Welfare. • **Short run economic fluctuations :** Features and Phases of Trade Cycles • **The Keynesian Principle of Effective Demand:** Aggregate Demand and Aggregate Supply - Consumption Function - Investment function - effects of Investment Multiplier on Changes in Income and Output
2	**Money, Inflation and Monetary Policy**
	• **Money Supply:** Determinants of Money Supply - Factors influencing Velocity of Circulation of Money • **Demand for Money :** Classical and Keynesian approaches and Keynes' liquidity preference theory of interest • **Money and prices** : Quantity theory of money - Fisher's equation of exchange - Cambridge cash balance approach • **Inflation:** Demand Pull Inflation and Cost Push Inflation - Effects of Inflation- Nature of inflation in a developing economy. • **Monetary policy :**Meaning, objectives and instruments, inflation targeting
3	**Constituents of Fiscal Policy**
	• **Role of a Government** to provide Public goods-Principles of Sound and Functional Finance • **Fiscal Policy:** Meaning, Objectives - Contra cyclical Fiscal Policy and Discretionary Fiscal Policy • **Instruments of Fiscal policy :** Canons of taxation - Factors influencing incidence of taxation - Effects of taxationSignificance of Public Expenditure **-** Social security contributions- Low Income Support and Social Insurance Programmes - Public Debt - Types, Public Debt and Fiscal Solvency, Burden of debt finance • **Union budget** -Structure- Deficit concepts-Fiscal Responsibility and Budget Management Act.
4	**Open Economy : Theory and Issues of International Trade**
	• **The basis of international trade :** Ricardo's Theory of comparative cost advantage - Heckscher – Ohlin theory of factor endowments - terms of trade - meaning and types - Factors determining terms of trade - Gains from trade - Free trade versus protection • **Foreign Investment :** Foreign Portfolio investment- Benefits of Portfolio capital flows-Foreign Direct Investment - Merits of Foreign Direct Investment - Role of Multinational corporations • **Balance of Payments:** Structure - Types of Disequilibrium - Measures to correct disequilibrium in BOP. **Foreign Exchange and foreign exchange market** : Spot and Forward rate of Exchange - Hedging, Speculation and Arbitrage -Fixed and Flexible exchange rates- Managed flexibility

Revised Syllabus of Courses of B.Com.(Investment Management*)*
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Reference Books

Reference Books
Financial Management – I
• *Financial Management : I MPandey, Vikas Publishing House.* • *Financial Management : M.Y.Khan, P.K.Jain, Tata McGraw Hill.* • *Financial Management : Ravi M Kishore, Taxman* • *Financial Management : James C Van Horne, Prentice Hall* • *Financial Management : Prassana Chandra, Prentice Hall.* • *Financial Management : Chandra Haribariran Iyer: IBHL Publication.*
Cost and Management Accounting
• *Dr. Girish Jakhotiya- Strategic Financial Management* • *Lall, B.M. and Jain, I.C. – Cost Accounting: Principles and Practice, Prentice Hall, Delhi* • *Welsch, Glenn A., Ronald W. Hilton and Paul N. Gordan – Budgeting, Profit and Control, Prentice Hall, Del* • *John K Shank & Vijay Govindaraja, Strategic Cost Management - The new tool for Competitive Advantage, Free Press* • *Cost Accounting-Principles and Practice; Arora M.N: Vikas, New Delhi.* • *Cost Accounting; Jain S.P. and Narang K.L: Kalyani New Delhi.*
Fundamentals of Capital Market
• *E. Gordon & K. Natarajan: Capital Market in India; Himalaya Publishing House,* • *Sanjeev Aggarwal : Guide to Indian Capital Market; Bharat Law House* • *V.L. Iyer : SEBI Practice Manual; Taxman Allied Service (P) Ltd.,* • *M.Y. Khan: Indian Financial Systems; Tata McGraw Hill*
Financial Services
• *IM Pandey Financial Management, Vikas Publishing House Ltd.* • *Khan M.Y , Financial Services, Mc Graw Hill Education.* • *Dr.S.Gurusamy, Financial Services, Vijay Nicole Imprints.*
Marketing of Investment Products
• *Marketing: Moving from Traditional to Digital – Philip Kotler, Hermawan Kartajaya, and Iwan Setiawan* • *Principal of Marketing- Philip Kotler and Garg Armstrong* • *Marketing – Michael Etzel and Bruce Walker*
Information Technology in Investment Management - I
• E- *Commerce, By Marriappa M* • *"Frontiers of Electronic Commerce"-By Kalakota Ravi and A. B. Whinston* • *Management Information System-by WamanJawadekar—3rd Edition, TMH publications* • *Enterprise Resource Planning - Text and Cases– by Rajesh Ray- TMH publications* •

- *Joseph, P.T., E-Commerce: An Indian Perspective, Prentice Hall of India, New Delhi,*
- *2009.*
- *Connected CRM-by David Williams-Wiley Publishers*
- *Microsoft Office Professional2013-Step by step- By Beth Melton,Mark Dodge, Echo Swinford, Andrew Couch*

Foundation Course – III (Overview of Investment Management)

- *Francis J.C Investments- Analysis and Management Mc Graw Hill New York.*
- *Reilly Frank K and Keith Brown Investment Analysis and Portfolio Management*
- *Management and Organizational Behavior , Ninth Edition, by Laurie J. Mullins, Pearson publisher*
- *Risk Management : M/s Macmillan India Limited*

Foundation Course in NSS III

- *National Service Scheme Manual (Revised) 2006, Government of India, Ministry of Youth Affairs and Sports, New Delhi.*
- *University of Mumbai National Service Scheme Manual 2009.*
- *Avhan Chancellor's Brigade - NSS Wing, Training camp on Disaster Preparedness Guidelines, March 2012*
- *Rashtriya Seva Yojana Sankalpana - Prof. Dr. Sankay Chakane, Dr. Pramod\Pabrekar, Diamond Publication, Pune*
- *National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya,*
- *Annual report of National Service Scheme (NSS) published by Dept. of Higher and Technical Education, Mantralaya,*
- *NSS Cell, Dept. of Higher and Technical Education, Mantralaya, UTKARSHA- Socio and cultural guidelines*
- *Case material as a Training Aid for Field Workers, Gurmeet Hans.*
- *Social service opportunities in hospitals, Kapil K. Krishnan, TISS*
- *New Trends in NSS, Research papers published by University of Pune*
- *ANOOGUNJ Research Journal, published by NSS Unit C. K. Thakur college*
- *Training Manual for Field Work published by RGNIYD, Chreeperumbudur*
- *Prof. Ghatole R.N. Rural Social Science and Community Development.*
- *Purushottam Sheth, Dr. Shailaja Mane, National Service Scheme*
- *Joint programme of National Service Scheme, University of Mumbai & DISHA - DEEPSHIKHA Projects, Nair Hospital, 2011-12*
- *National Service Scheme in India: A Case study of Karnataka, M. B. Dishad, Trust Publications, 2001*
- *http://www.thebetterindia.com/140/national-service-scheme-nss/*
- *http://en.wikipedia.org/wiki/national-service-scheme 19=http://nss.nic.in/adminstruct*
- *http://nss.nic.in/propexpan*
- *http://nss.nic. in*
- *http://socialworknss.org/about.html*

Foundation Course in NCC - III

- *Cadet's Hand book – Common subject..all wings, BY DG NCC, New Delhi.*
- *Cadet's Hand book – Specialised Subjects, Army, Navy, Air-force, BY DG NCC, New Delhi.*
- *NCC OTA Precise, BY DG NCC, New Delhi.*
- *"AVAN" Model of Disaster Mang., Vinayak Dalvie, Proceedings of Int. Conf. on Urban Plan. and Env Strat & Challenges, Elphinstone College, Jan 2007.*
- *Humanistic Tradition of India, N.L.Gupta, Mohit Publication, New Delhi*
- *Social psychology, Baron & Byrne, Pearson Publication, 12th Edition self awareness know yourself / insight (110) Group & Individuals (374) Group discussion*
- *Chanakya's 7 Secrets of Leadership, Radhakrishanan Pillai and D.Shivnandhan, Jaico*
- *Social Psychology: Understanding Human Interaction, Baron, Robert A., (302/BAR/BYR),7th Edition*

- *Seven Habits of Highly Effective People., Covey , Stephen*
- *The Habit of Winning., Iyer , Prakash, Penguin , India ; 2011*
- *The Goal, Goldratt , Eliyahu, The Northriver press ; 1994*
- *Freedom Struggle, Chandra Bipin, National Book Trust 1972*
- *Freedom of Religion and The Indian Judiciary, Bachal V.M. , Shubhada Saraswat, (362P)*
- *India 1996- A Reference Annual Govt. of India*
- *Saha Soneri Pane, Vinayak D. Savarkar*
- *Environmental Biology and Toxicology, P.D. Sharma., Rastogi Publication*
- *Environmental Science, S.C. Santra, New Central Book Agency*
- *National Cadet Corps (India), Lambert M. Surhone, Mariam T. Tennoe, Susan F. Henssonow, Betascript Publishing, 2011*
- *National Cadet Corps, Youth in Action (Google eBook), National Cadet Corps (India), Lancer Publishers, 2003*
- *Youth in Step: History of the National Cadet Corps, V. Longer, Lancer international, 1983 Original from the University of Michigan*
- *National Cadet Corps of India, Man Mohan Sharma, Vision Books, 1980 Original from the University of Michigan*
- *The National Cadet Corps Act, 1948, as Modify Up to the 1st July 1963, India, Government of India Press, 1963 (Military Law)*
- *Cadet Corps in India: Its Evolution and Impact, Satis Chandra Maikap, Darbari Udyog, 1979 Original from the University of California*
- *National Cadet Corps: 100 Years of Distinction, National Cadet Corps (Singapore), NCC*
- *The NCC, Singapore, National Cadet Corps Council, National Cadet Corps Council*
- *Grooming Tomorrow's Leaders: National Cadet Corps, 1917-2006, R.S. Chhettri, Lancer Publishers, 2006*
- *National Civil Defence Cadet Corps, Lambert M. Surhone, Mariam T. Tennoe, Susan F. Henssonow, Betascript Publishing, 2011*
- *Discovery of India, Jawaharlal Nehru*
- *Health and Hygiene, Manoj. J.S., Agra University Publication*
- *Yoga for Healing, Venkateswaran P.S., Bombay:- Jaico Publishing House 1989*
- *Yoga Illustrated, New Delhi, Ministry of Information and Broadcasting, 1995*
- *Yoga Practice, 1972, Shivnande Swami, Mumbai:- D.B. Taraporewala 1972*
- *Yoga of Patanjali-1979, Yardi M.R., Bhandarkar Oriental Research Institute- 1974*
- *Sustainable Development (An Alternative Paradigm), Satpathy , N., Karnavati Publications , Ahmedabad*
- *Global Partners for Sustainable Development, Pachauri R.K & Srivastava L., Tata Energy Research Institute, New Delhi ; 1994, 1998*
- *Ecology and the Politics of survival : Conflict over Natural Resources in India, Shiva , Vandana, Sage Publications , California , 1991*

Foundation Course in Physical Education - III

- *Lippian Cott Williams and Wilkins 2006.*
- *American College of Sports Medicine, ACSM's, Guidelines for Exercise Testing and Priscription. (2013) Ninth Edition, Lippian Cott Williams and Wilkins.*
- *American College of Sports Medicine, ACSM's Resource Manual for Guidelines for Exercise Testing and Priscription. (2006) 5th Ed., Lippian Cott Williams and Wilkins, 2006.*
- *Beashel, P.,& Taylor, J. (1996). Advance Studies in Physical Education and Sports. U.K.: Thomas Nelson and Sons Ltd.*
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- *C.V. Mosloy.*
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- *Dheer, S.D.(1991). Introduction to Health Education. New Delhi : Friends Publication.*
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- *Murgesh N. – Anatomy, Physiology and Health Education, Sathya, Chinnalapatti, 1990.*
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Security Analysis and Portfolio Management – I

- *Blake, David 1992, Financial Market Analysis , Mc Graw Hill London*
- *Francis J.C Investments- Analysis and Management Mc Graw Hill New York.*
- *Pistolese Clifford Using Technical Analysis Vision Books*
- *Reilly Frank K and Keith Brown Investment* Analysis and Portfolio Management.

Mutual Fund Management

- *Future scenario of Financial services : R.Gordan & Natarajan (Himalaya)*
- *Marketing of Financial services : V. K. Avadhani (Himalaya)*
- *MF, Data, Interpretation & analysis : K.G. Shahadevan & Thripairaju (Prentice hall of India)*
- *Mutual funds in India (Modern scenario): Dr. Manoj Dave & Mr. Lalitkumar Chauhan, (Paradise Publishers)*
- *Mutual Funds & Financial Management : Ramesh Garg (Yking books)*
- *Mutual Fund* products & services : Indian institute for Banking & Finance (Taxmann)

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Reference Books

Reference Books
Financial Management - I
• *Financial Management : I MPandey, Vikas Publishing House.* • *Financial Management : M.Y.Khan, P.K.Jain, Tata McGraw Hill.* • *Financial Management : Ravi M Kishore, Taxman* • *Financial Management : James C Van Horne, Prentice Hall* • *Financial Management : Prassana Chandra, Prentice Hall.* • *Financial Management : Chandra Haribariran Iyer: IBHL Publication*
Direct Taxation
• *Taxmann's Direct Taxes Law & Practice – Dr Vinod Singhania & Dr Kapil Singhania* • *Direct Taxes Law & Practice – Dr Girish Ahuja & Dr Ravi Gupta*
Fundamentals of Equity Market
• *E. Gordon & K. Natarajan: Capital Market in India; Himalaya Publishing House,* • *Sanjeev Aggarwal : Guide to Indian Capital Market; Bharat Law House* • *V.L. Iyer : SEBI Practice Manual; Taxman Allied Service (P) Ltd.,* • *M.Y. Khan: Indian Financial Systems; Tata McGraw Hill*
Financial Derivatives
• *Futures, options & other derivatives by John C. Hull & Basu* • *Derivatives market by Robert McDonald, Pearson education* • *Fundamentals of futures & options by John Hull* • *Option trading – bull market strategies by K.Sasidharan & Alex K. Mathews, McGraw Hill publication*
Introduction to Equity Research
• *James Valentine - Practices for Equity Research Analysts: Essentials for Buy-Side and Sell-Side Analysts* • *Gillian Elock - How to Get an Equity Research Analyst Job: A Guide to Starting a Career in Asset Management* • *Denis Bouyssou and Thierry Marchant - Evaluation and Decision Models with Multiple Criteria: Stepping stones for the analyst (International Series in Operations Research & Management Science)* • *McKinsey & Company Inc., Tim Koller - Valuation: Measuring and Managing the Value of Companies (Wiley Finance) Hardcover – 4 Sep 2015*
Information Technology in Investment Management - II
• *An Overview of Cyber Crime & security-Volume 1-1st Edition --By Akash Kamal Mishra* • *R. G. Saha, E-Business, HPH* • *Handbook of Information Security, Threats, Vulnerabilities, Prevention Volume 3---By Hossein Bidgoli* • *Microsoft Office Professional2013-Step by step --By Beth Melton,Mark Dodge, Echo Swinford, Andrew Couch* • *Cyber law: the Indian perspective---By Pavan Duggal -Saakshar Law Publications*
Foundation Course – IV (An Overview of *Banking & Insurance*)
• *Banking Law and Practice – M.L Tannan* • *Microfinance Perspective and Operations – IIBF, 2016.* • *Rural Banking Operations – IIBF, 2017 Edition* • *Towards Financial Inclusion in* India – K.G Karmakar, G.D Banerjee, N.P Mohanpatra

Foundation Course in NSS IV

- *National Service Scheme Manual (Revised) 2006, Government of India, Ministry of Youth Affairs and Sports, New Delhi.*
- *University of Mumbai National Service Scheme Manual 2009.*
- *Avhan Chancellor's Brigade - NSS Wing, Training camp on Disaster Preparedness Guidelines, March 2012*
- *Rashtriya Seva Yojana Sankalpana - Prof. Dr. Sankay Chakane, Dr. Pramod\Pabrekar, Diamond Publication, Pune*
- *National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya,*
- *Annual report of National Service Scheme (NSS) published by Dept. of Higher and Technical Education, Mantralaya,*
- *NSS Cell, Dept. of Higher and Technical Education, Mantralaya, UTKARSHA- Socio and cultural guidelines*
- *Case material as a Training Aid for Field Workers, Gurmeet Hans.*
- *Social service opportunities in hospitals, Kapil K. Krishnan, TISS*
- *New Trends in NSS, Research papers published by University of Pune*
- *ANOOGUNJ Research Journal, published by NSS Unit C. K. Thakur college*
- *Training Manual for Field Work published by RGNIYD, Chreeperumbudur*
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- *Joint programme of National Service Scheme, University of Mumbai & DISHA - DEEPSHIKHA Projects, Nair Hospital, 2011-12*
- *National Service Scheme in India: A Case study of Karnataka, M. B. Dishad, Trust Publications, 2001*
- *http://www.thebetterindia.com/140/national-service-scheme-nss/*
- *http://en.wikipedia.org/wiki/national-service-scheme 19=http://nss.nic.in/adminstruct*
- *http://nss.nic.in/propexpan*
- *http://nss.nic. in*
- *http://socialworknss.org/about.html*

Foundation Course in NCC - IV

- *Cadet's Hand book – Common subject..all wings, BY DG NCC, New Delhi.*
- *Cadet's Hand book – Specialised Subjects, Army, Navy, Air-force, BY DG NCC, New Delhi.*
- *NCC OTA Precise, BY DG NCC, New Delhi.*
- *"AVAN" Model of Disaster Mang., Vinayak Dalvie, Proceedings of Int. Conf. on Urban Plan. and Env Strat & Challenges, Elphinstone College, Jan 2007.*
- *Humanistic Tradition of India, N.L.Gupta, Mohit Publication, New Delhi*
- *Social psychology, Baron & Byrne, Pearson Publication, 12th Edition self awareness know yourself / insight (110) Group & Individuals (374) Group discussion*
- *Chanakya's 7 Secrets of Leadership, Radhakrishanan Pillai and D.Shivnandhan, Jaico*
- *Social Psychology: Understanding Human Interaction, Baron, Robert A., (302/BAR/BYR),7th Edition*
- *Seven Habits of Highly Effective People., Covey , Stephen*
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- *Freedom Struggle, Chandra Bipin, National Book Trust 1972*
- *Freedom of Religion and The Indian Judiciary, Bachal V.M. , Shubhada Saraswat, (362P)*
- *India 1996- A Reference Annual Govt. of India*
- *Saha Soneri Pane, Vinayak D. Savarkar*
- *Environmental Biology and Toxicology, P.D. Sharma., Rastogi Publication*
- *Environmental Science, S.C. Santra, New Central Book Agency*
- *National Cadet Corps (India), Lambert M. Surhone, Mariam T. Tennoe, Susan F. Henssonow, Betascript Publishing, 2011*
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- *Youth in Step: History of the National Cadet Corps, V. Longer, Lancer international, 1983 Original from the University of Michigan*
- *National Cadet Corps of India, Man Mohan Sharma, Vision Books, 1980 Original from the University of Michigan*
- *The National Cadet Corps Act, 1948, as Modify Up to the 1st July 1963, India, Government of India Press, 1963 (Military Law)*
- *Cadet Corps in India: Its Evolution and Impact, Satis Chandra Maikap, Darbari Udyog, 1979 Original from the University of California*
- *National Cadet Corps: 100 Years of Distinction, National Cadet Corps (Singapore), NCC*
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Revised Syllabus of Courses of B.Com.(Investment Management*)*
Programme at Semester III and IV
with effect from the Academic Year 2017-2018

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: 25 %

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.

- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern
(Practical Courses)

Maximum Marks: 75
Questions to be set: 05
Duration: 2 ½ Hrs.
All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2	Full Length Practical Question	15 Marks
	OR	
Q-2	Full Length Practical Question	15 Marks
Q-3	Full Length Practical Question	15 Marks
	OR	
Q-3	Full Length Practical Question	15 Marks
Q-4	Full Length Practical Question	15 Marks
	OR	
Q-4	Full Length Practical Question	15 Marks
Q-5	A) Theory questions	08 Marks
	B) Theory questions	07 Marks
	OR	
Q-5	Short Notes To be asked 05 To be answered 03	15 Marks

Note:
Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75
Questions to be set: 05
Duration: 2 ½ Hrs.
All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2	Full Length Question	15 Marks
	OR	
Q-2	Full Length Question	15 Marks
Q-3	Full Length Question	15 Marks
	OR	
Q-3	Full Length Question	15 Marks
Q-4	Full Length Question	15 Marks
	OR	
Q-4	Full Length Question	15 Marks
Q-5	A) Theory questions B) Theory questions	08 Marks 07 Marks
	OR	
Q-5	Short Notes To be asked 05 To be answered 03	15 Marks

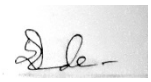
Note:
Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

Cover Page

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**B.A. (Film, Television and New Media Production)**
2	Eligibility for Admission	12th pass.
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	--
5	No. of Years / Semesters	03 years & 06 semesters
6	Level	P.G. / √ **U.G.**/ Diploma / Certificate **(Strike out which is not applicable)**
7	Pattern	Yearly / Semester √ **(Strike out which is not applicable)**
8	Status	New / Revised √ **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year __2017-18.



Date: 20/2/2017

Signature :

Name of BOS Chairperson √ / Dean : __Dr. Sunder Rajdeep

AC_____

Item No. ----------

University of Mumbai

Revised Syllabus for the B.A. (Film, Television and New Media Production) Semester I to VI

(As Per CBCS
With effect from the academic year 2017-18 for
Semester I to VI)

REVISED SYLLABUS INCLUDING SCHEME OF COURSES, SCHEME OF EXAMINATION, AND MEDIUM OF INSTRUCTION FOR THE BACHELOR OF ARTS (Film, Television and New Media Production).

Objectives :

Bachelor of Arts (Film, Television & New Media Production) programme

1. To prepare students in the production aspects of Film Television & New Media, as required by the present media environment all across globe.

2. To empower the students in the production & managerial aspects of the media business with due emphasis on latest production techniques, along with marketing and branding management of various media products and associated services.

3. To develop creative temperament and mindset needed in the content production segment of media industry.

4. To inculcate competencies thereby enabling to undertake professional work.

5. To provide an active industry interface by way of co-learning.

6. To take the students through the entire pipe line of production process with regards to the content creation for various media pads, providing the students an insight in to the correlation that exists between content creation and associated commercial aspects of media business.

Ordinances & Regulations

O 6078 Bachelor of Arts (Film, Television & New Media Production)

1. General Guidelines

The Credits are defined in terms of the learner's hours which are divided into two parts such as Actual and Notional. The value of a particular course can be measured in number of Credit Points. The value of One (01) Credit is equal to 30 Hours of learners load.

The scheme of Examination shall be divided into two parts i.e. Internal Assessment includes Assignments, Seminars, Case Studies and Unit Tests which will be of 40 marks and the Semester End Examinations which will be of 60 marks. The semester wise Credit Points will be varied from program to program but the value of Credits for Under Graduate Programmes shall be of 120 Credits and for Post graduate Degree programmes it will be 96 credits in the Faculty of Arts.

3. Credit Based Evaluation System

Scheme of Examination

For all 6 semesters, the performance of the learners shall be evaluated into two components. The first component shall carry 40% marks which will be an internal assessment while the second component shall carry 60% marks at semester end examination.

The allocation of marks for the Internal Assessment 40% and Semester End Examinations 60% are as shown below:

a) Structure of Internal Assessment = 40% =40 marks

Sr. No. Particulars Marks

1. One periodical class test held in the given semester **10 Marks**
2. Subject specific Term Work Module/assessment modes –at least two as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, lab practical, open book test etc and written assignments, Case study, Projects, Posters and exhibits etc for which the assessment is to be based on class presentations wherever applicable) to be selflessly assessed by the teacher/s concerned **20 Marks.**
3. Active participation in routine class instructional deliveries (and in practical work, tutorial, field work etc as the case may be) **05 Marks.**
4. Overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities **05 Marks.**

b) Semester End Examinations – 60% **60 Marks**

i. Duration – These examinations shall be of 2 Hours duration.
ii. Theory Question Paper Pattern:

1. There shall be four questions each of 15 marks.
2. All questions shall be compulsory with internal choice within the questions.
3. Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weight-age of the topic.

The assessment of Part 'A' i.e. Internal Assessment and Part 'B' i.e. Semester End Examination as mentioned above for the Semesters I to IV shall be processed by the Colleges- 'Institutions of their learners' and issue the grade cards to them after the conversion of marks into grade as per the procedure mentioned bellow.

The assessment of Part 'A' i.e. Internal Assessment as mentioned above for the Semesters V & VI shall be processed by the Colleges /'Institutions of their learners' admitted for the programme.

For part B that is semester end examination of the semesters V & VI, the University shall conduct the assessment. The Internal Assessment marks of learners appearing for Semesters V & VI shall be submitted to the University by the respective colleges/ Institutions before the commencement of respective Semester End Examinations. The Semester End Examinations for Semesters V & VI shall be conducted by the University and the results shall be declared after processing the internal assessment and the marks awarded to the learners. The grade card shall be issued by the University after converting the marks into grades.

R 8720 Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment & Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 16 out of 40) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 24 Out of 60) separately, to pass the course and minimum of Grade E in each project, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment & Semester End Examination together.

CARRY FORWARD OF THE MARKS IN CASE IF THE LEARNER GETS 'F' GRADE IN ONE OR MORE SUBJECTS:

1. A learner who PASSES in the Internal Examination but FAILS in the Semester End Examination of the course shall reappear for the Semester End Examination of that course. However his/her marks of the Internal Examinations shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.
2. A learner who PASSES in the Semester End Examination but FAILS in the Internal Assessment of the course
shall reappear for the Internal Examination of that course. However his/her marks of the Semester End
Examination shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.
3. For Courses without practical: In case of a learner who is reappearing for the Internal Examination, the examination will consist of one project of 40 marks which will be divided into 20 marks for the documentation of the project, 10 marks for the presentation and 10 marks for the viva and the interaction.

ALLOWED TO KEEP TERMS (ATKT):

As per University of Mumbai rules and regulations for Faculty of Arts

4. Additional Examinations:

INTERNAL ASSESSMENT: As per University of Mumbai rules and regulations for Faculty of Arts.

A. Class test or assignment for Internal Assessment:

As per University of Mumbai rules and regulations for Faculty of Arts

B. SEMESTER END EXAMINATIONS
ELIGIBILITY TO APPEAR FOR ADDITIONAL SEMESTER END EXAMINATION:

As per University of Mumbai rules and regulations for Faculty of Arts

MODE OF CONDUCT OF SEMESTER END ADDITIONAL EXAMINATION:

As per University of Mumbai rules and regulations for Faculty of Arts

Evaluation of Projects (Wherever Applicable)

1. A learner who PASSES IN ALL THE COURSES BUT DOES NOT secures minimum grade of E in project as applicable has to resubmit a fresh project till he/she secures a minimum of grade E. His/her marks in the theory papers that the learner has passed will be carried forward and he/she shall be entitled for grade obtained by them on passing.
2. The evaluation of project and viva-voce examination shall be by awarding grade in the seven point scale.
3. A learner shall have to obtain minimum of grade E (or its equivalent marks) in project evaluation and viva/voce taken together to obtain 40% marks in project work.

5. Calculations of GPA & SGPA

1. As per University of Mumbai rules and regulations for Faculty of Arts

O 6079 Eligibility for Admission:

Candidates for being eligible for admission to the three-year integrated course leading to the Degree of BA (Film, Television & New Media Production), shall be required to have passed the Higher Secondary School Certificate Examination (Academic or Vocational Stream) conducted by different Divisional Boards of Maharashtra State Board of Secondary and Higher Secondary Education or an Examinations of any another University or Body recognized as equivalent thereof by the Senate of the University of Mumbai.

2. Eligibility for the award of the degree:
A candidate shall be eligible for the award of the Degree only if he / she has undergone the prescribed course of study in a College affiliated to the University for a period of not less than three academic years, passed the examinations of all the Six Semesters earning 120 credits, letter grade of at least E or above (i.e. O/A/B/C/D/E) in core and specialized papers and fulfilled such conditions as have been prescribed there for.

R 8721 Fee Structure

The fees for the course will be Rs 1,44, 000/- for the entire course inclusive of tuition fees.

Note:
The breakup per semester will be as follows :
Rs 24,000/- per semester : Admission fees – 1000/- Tuition fees – 16000/- Library Fees – 1000/- Computer Lab fees – 6000/-

An Additional Refundable Security deposit of Rs 10,000/- will be charged to the students and will be refunded to them post the completion of the course provided there is no loss to either equipments & library material.

R 8722 Student In-take capacity: 60 students

Course Structure

BA Films, Television and New Media Production				
	Semester I	**Practical Marks**	**Theory Marks**	**Total Marks**
Course Code	**Name of Courses**			
BAFTNMP 101	Effective Communication Skills	40	60	**100**
BAFTNMP 102	Introduction to History of Art/Storytelling through other forms of Art	40	60	**100**
BAFTNMP 103	Initiation to Literature & Creative Writing	40	60	**100**
BAFTNMP 104	Basics of Photography	40	60	**100**
BAFTNMP 105	Film Appreciation – Genres	40	60	**100**
BAFTNMP 106	Graphic Designing (Photoshop, Illustrator, etc.)	40	60	**100**
	Total			**600**
	Semester II			
BAFTNMP 207	Basics of Post Production	40	60	**100**
BAFTNMP 208	History of Non- fiction Film	40	60	**100**
BAFTNMP 209	Writing for Visual Media	40	60	**100**
BAFTNMP 210	Importance of Sound and Sound SFX	40	60	**100**
BAFTNMP 211	Basics of Cinematography-1	40	60	**100**
BAFTNMP 212	Practical Film Making 1 (Only non-fiction film)	100	-	**100**
	Total	300	300	**600**
	Semester III			
BAFTNMP 313	Introduction to Direction for Television	40	60	**100**

BAFTNMP 314	Basics of Cinematography-2	40	60	**100**
BAFTNMP 315	Understanding TV formats & Genres	40	60	**100**
BAFTNMP 316	Concepts of Story Boarding	40	60	**100**
BAFTNMP 317	Graphics and Post production (Flash, Editing software, After effects)	40	60	**100**
BAFTNMP 318	TV Production / Ad film making	100	-	**100**
	Total	300	300	**600**
	Semester IV			
BAFTNMP 419	Introduction to Direction for Film	40	60	**100**
BAFTNMP 420	Basics of Visual Communication/Film Aesthetics	40	60	**100**
BAFTNMP 421	Convergence and Basics of Web Designing	40	60	**100**
BAFTNMP 422	Concepts of Post Production & Computer Graphics (including VFX)	40	60	**100**
BAFTNMP 423	Drama Production/ Writing for Visual Media-2	40	60	**100**
BAFTNMP 424	Intermediate Practical Film Making (Fiction Film)	100	0	**100**
	Total			**600**
	Semester V			
BAFTNMP 525	Laws related to Films, TV and Internet	40	60	**100**
BAFTNMP 526	New Media Theory and Practice (With advanced Web design and app making)	40	60	**100**
BAFTNMP 527	Aspects of Media Production (Set design, makeup, etc., line production, logistics, etc.) / Understanding Indian Contemporary Cinema	40	60	**100**
BAFTNMP 528	Introduction to Production Management	40	60	**100**
BAFTNMP 529	Trends and Technology in Film & Television (will include overview of Media Business, Pitching for funds, distribution, marketing, etc.)/ Basics of Marketing and Publicity Design for Films & TV	40	60	**100**
BAFTNMP 530	Advanced Practical Film Making (Includes Compositing, Special Effects, etc.) – Music Videos	100	-	**100**
	Total			**600**
	Semester VI			
BAFTNMP 631	Final Project- Short Film (10-15 minutes)		Viva Voce by	

			External Referee	
	Comprehensive, which will include writing an original story to production and distribution of film in the national and international circuit. It will also involve creating a blog, FB page, website for the film. Write a report	100	(Viva by external examiner)	**100**

Semester- I :
BAFTNMP- 101 : Effective Communication Skills :

Unit- I :
Fundamentals of Communication: Developing reading & writing skills (Marathi, Hindi and English), Editing & Summarizing (Marathi, Hindi and English), Oral Communication (Marathi, Hindi and English)

Unit- II :
Enhanced Communication Skills Development: Enhancing communication skills – verbal, Enhancing communication skills - non verbal, Body type- posture- body language reading, Analyzing body language signals and meanings

Unit –III :
Psychology of communication: Gestures- expressions - facial language, eye contact,
shake hands, sitting posture, Maintaining comfort distance from people, mirroring, Dressing sense, corporate dressing, formal, semi formal, casual, dressing for various occasions & events, Understanding personalities - auditory / visuals / kinesthetic, eye movement, facial expressions, emotions, smile

Unit -IV :
Personality Development: Verbal communication, voice training, speech, clarity, grammar speed, volume, enunciation, pronunciation, ends of sentences, humour, pauses, Stress management, breathing pattern, mind psyching, right attitude, understanding your limitations and strengths, Table manners & etiquettes correct use of spoon knife, etc, Choosing the right accessories i.e shoes, handbags, jewellery, etc.

Textbooks:
1. Crucial Conversations: Tools for Talking When Stakes are High , by Kerry Patterson.
2. Presenting to Win: The Art of Telling Your Story, by Jerry Weissman.

Reference Books:
1. Verbal Judo: The Gentle Art of Persuasion, by George J. Thompson.
2. Write to the Top: Writing for Corporate Success, by Deborah Dumaine.

BAFTNMP -102 : Introduction to History of Art/ Storytelling through other forms of Art :

To understand the basics and genres of Music, dance and theatre.
To learn the basics of various acting schools and the art of drama.
To learn the evolution of visual techniques from painting to cinema.
To learn the basic relationship between music and dance in relation to Film making.
Students should be exposed to the canonical text of Natya shastra from where all the traditional performing arts have emerged.

Unit- I :
Music : Genres of Music, Introduction to Contemporary Music (Hindi, Regional & POP), Music Directors & Composers, Use of Folk music in Indian Cinema

Unit -II – Dance: Genres of Dance – Understanding storytelling through Folk Dance & Contemporary Dance, Role of Dance in Hindi Cinema

Unit- III – Theatre: The development of theatre, Acting Schools, Make-up, Managing Play, Study of one English and one Hindi or regional play. Influence of theatre on cinema.

Unit- IV – Paintings :

1. European Paintings and Painters- A brief overview starting from the renaissance to modern painters. Idea of Perspective coming into painting and changing the way we perceive the world
2. Indian Paintings & Painters- A look at the rich historical tradition of Indian Paintings- Miniature Paintings to Modern Painters. Difference between the formal aspects of Painting & Cinema. Exploring the idea of time and space in painting in relation to cinema
3. Important Movements- Analysing the important movements that have taken place in post-colonial India in painting to the contemporary scenario.

Textbooks :

1) Natya Shastra by Bharata Muni.
2) Melodrama and Popular Culture: Ira Bhaskar.
3) History of Art – Bernard .S. Myers, Trawin Copplestone.
4) Framing Film- Cinema and the Visual Arts, **EDITED BY STEVEN ALLEN AND LAURA HUBNER.**

Reference Books:

1. Dancing: The Pleasure, Power, and Art of Movement; by Gerald Jonas. Harry N. Abrams in association with Thirteen/WNET 1992.
2. History of Dance: An Interactive Arts Approach; by Gayle Kassing.

BAFTNMP -103 : Initiation to Literature & Creative Writing :

Objectives :

To introduce basic tenets of Indian literature including regional literature
To introduce and appreciate various forms of literature (Novel, Poetry, Drama, Essay)
To help build skills for creative writing
To help understand the structure of Story, poetry and drama
To introduce writing for internet

Unit- I :
Introduction to Indian Writers – Hindi/Marathi/Urdu & other regional languages: History of Indian literature, prominent writes, important works, cultural significance.

Unit –II :
A Brief Introduction to Creative Writing: What is creative writing, various forms of writing, various form of writing styles, how to build creative writing skills.

Unit –III :
Formal structure of the short story: Various forms of writing styles, Genres of story, how to develop an engaging idea, Prominent writers, Pick your style.

Unit -IV – Formal aspects of Poetry: Elements of poetry, types of Poetry, Difference between various styles, Famous poets and their works, Study of the Epic Ballad - Mahabharata.

Unit – V :
Formal aspects of Drama: Structure of drama, one act-two act-three act play, Characterization, Freytag's triangle, Subject specific drama

Unit -VI :
Writing for the internet: How internet writing is different from conventional writing, Blogging, Reputation management, Development of Blogs, writing for social media, writing for SEO & SMO.

Textbooks:

1.) A Concise History of Indian Literature in English by Arvind Mehrotra.

2) The Creative Writing Course book: Forty Authors Share Advice and Exercises for Fiction and Poetry.

3) Creative Writing By Adele Ramet.
4) Creative Writing for People Who Can't Not Write By Kathryn Lindskoog.

Reference Books:

1. Creative Writing: A Workbook with Readings By Linda Anderson.
2. Teaching Creative Writing By Graeme Harper.
3. The Everything Creative Writing Book By Wendy Burt-Thomas.
4. The Soul of Creative Writing By Richard Goodman, Goodman, Chong.

BAFTNMP -104 : Basics of Photography :

Objectives:

To learn the basics of art of Photography.
To understand the basic intricacies involved in taking a photograph.
To understand what makes a good picture.
To develop basic photographic sense and knowledge.

Unit- I :
Development of Photography over the years: Brief History of Photography, early photography methods, switch from film to digital, difference between film and digital photography, formats of images in digital.

Unit- II :
Cameras & Techniques: Types of camera, film cameras V/S digital cameras, lenses and their importance, Story Design and Development, Laws of Composition, Gestalt Law and Visual Perception, Semiotic photography.

Unit III
Lighting - Theory & practice: Sources of Lighting, 2 point lighting, 3 point lighting, creating contrast, outdoor natural lighting, related accessories for lighting.

Unit -IV :
Post production of Photos, Digital Image Editing – Photoshop: Processing of Raw images, Introduction to Adobe Photoshop and image ready software, how to enhance the photo digitally.

Textbooks:
1. The Art of Photography; by Bruce Barnbaum.
2. Creative Nature & Outdoor Photography; Brenda Tharp.
3. Chasing the Light by Ibarionex Perello.

Reference Books:

1. The Camera by Larry Hills.

2. The Creative Black Book.
3. The Print by Ansel Adams, Robert Baker.
4. 500 poses for Photographing Women by Michelle Perkins.
5. Creative Landscapes: Digital Photography Tips & Techniques by Author: Davis, Harold.

BAFTNMP- 105 : Film Appreciation – Genres :

What is cinema, Film theory – form and function, Film analysis, Auteur Theory,
effect of auteur, Contributions of D W, Griffith, Alfred Hitchcock, Jean Du Godard, Digital Aesthetics, Music and choreography, film genre.
Cinema and society, History of Cinema, Hollywood cinema, early cinema and film form
the studio system, rise and decline of the studio system.

Indian Cinema

History of Indian cinema, history of regional cinema, legends of Indian cinema, Hindi film industry, the Hindi film industry, music and choreography in Indian cinema, contemporary cinema.

Textbooks :

1) The Oxford History of World Cinema.
2) The Cinematic ImagiNation : Indian Popular Films as Social History by Jyotika Virdi.
3) History of Indian Cinema by Renu Saran.

BAFTNMP- 106 : Graphic Designing (Photoshop, Illustrator, etc.)

Objectives :

The learners are exposed to the industry of graphic design. The domain of skills and tools is largely devoted to learning graphic reproduction methods using both modern, that is electronic, as well as old school techniques. These inputs enable learners to solve simple problems of visual communication related to corporate identity or social communication. Learners use software like Adobe Photoshop and Adobe Illustrator.

Unit –I :

COLOUR THEORY : Colour psychology, Colour schemes, Colour wheel, Colour combination, Hue.

Unit –II :

PERSPECTIVE STUDY : 1-point perspective, 2-point perspective, 3-point perspective, Mixed perspective.

Unit –III :

STILL LIFE : Sketching & rendering, Light study, Photography.

Unit –IV :

TEXTURE STUDY : Texture creation, mixed media, Water/Pastel painting.

Unit –V :
PORTRAIT PAINTING : Portrait Caricature, Cartoon.

Unit –VI :
PHOTOSHOP : Basic tools in Photoshop, Photo editing, Colour correction.

Unit –VII :
ILLUSTRATOR : Basic tools in Illustrator, Vector graphics, Graphics design.

Unit –VIII :
COMIC BOOKS : Understanding storyboards, Styles of contemporary comics, Colour tones.

Unit- IX :
COMPOSITION : Basic composition skills, Rule of thirds, Understanding of subject and its relation to light and depth of field, Application in comic books.

Unit –X :
TYPOGRAPHY : Understanding of typos & fonts, Application of appropriate typos on art works.

Semester- II :

BAFTNMP 207 Basics of Post Production

Objectives:

An editor's job is to decide, 24/25/30 times a second, where the audience needs to be. Do we stay in a shot or transition to another, and if so, what shot and how do we get there? Working side-by-side with the director to craft the movie that ultimately hits the screen – or your phone – editing is really about manipulating the audience, in the best possible way, all in the service of storytelling.
In this class, we will study terminology and concepts, learning both the rules and how to break them, as we look at the aesthetics choices and the technological workflow for both picture and sound editing. We will examine the historical role of editing, from the earliest silent film through the digital revolution that has transformed moviemaking today.

INTRO TO EDITING THEORY
Introduction to the history of film editing. Lumiere Brothers, Thomas Edison, Edwin Porter, DW Griffith); the manipulation of editing; Lev Kuleshov's experiment; the language of cinema; introduction to the editor as storyteller and understanding the narrative structure.

INTRO TO PREMIERE PRO
Screening of Examples. The Premiere Pro interface features and functions, how to import and organize footage, basic editing techniques

EDITING EXERCISE
Watch the work of a Master Editor, Basic Production techniques, Practicing/Reviewing skills
PROJECT: Interview and Film a classmate telling a story for 10 minutes or talking about something they're excited about. Edit together a two minute version of this.

Unit 1
Effective Editing
Bird's-eye view of the modern process of editing, Setting Up for Editing
Efficient editing habits to work faster, Thinking creatively. Efficient workflow, Configure factory-standard systems, Optimal media management from ingest through to final output. Non Linear Editing Concepts Interface of NLE system, The Three-Point Edit, Additional Edits

Unit II
Working in the Timeline, Transitions, Keyframing, Filters, Ingesting

Unit III
Compositing, Color Correction, Audio, Titling, Review and Look Forward

Textbook:
Grammar of the Edit
Roy Thompson, Christopher J. Bowen - Focal Press, 2013. ISBN: 978-0240526003

SUGGESTED TEXTS:
Film Art: An Introduction, David Bordwell and Kristin Thompson
The Invisible Cut: How Editors Make Movie Magic, Bobbie O'Steen
Cut By Cut: Editing Your Film or Video, Gael Chandler
In the Blink of an Eye: A Perspective on Film Editing, Walter Murch
The History of Film Editing, Karel Reisz, Gavin Miller
On Film Editing, Edward Dmytrk
Film Editing: Great Cuts Every Filmmaker Should Know, Gael Chandler
First Cut: Conversations with Film Editors, Gabriella Oldham

BAFTNMP 208 History of Non- fiction Film

Objectives

This course explores the history and theory of non-fiction film and video, with an emphasis on work that falls under the rubric of "documentary."

Documentary is a unique form of non-fiction moving image media that claims a special relationship to reality and truth. Through screenings, readings and class discussion, we will explore such questions as:

- How does documentary relate to narrative fiction filmmaking? To other non-fiction forms of television like reality TV or news reports?
- How "real" are documentary representations, and how much does it matter?
- What are some different formal approaches documentary, and how does each mediate the representation of real life it offers?
- How has documentary image-making changed over time? What can we learn from this history that is relevant to media-making today?
- What are the particular ethics of representing others in a medium like video or film?
- What responsibility do documentarians have to their subjects, to the form, and to society at large?
- How do people watch documentaries, and what is the impact of these films on the world they aim to represent?

Screen and analyze a wide range of documentaries, exploring the genre as narrative, journalism, propaganda, rhetoric, activism, diary, art, archive, and entertainment.

Course Objectives
By the end of the semester, you should:

Be familiar with key periods in the history of non-fiction film and video from 1895 to the present.
Be able to recognize and write about various forms and conventions of documentary storytelling, including the basic grammar of documentary moving images.
Explore central questions surrounding the representation of reality and truth, including voice, authority, evidence and point of view.
Explore key issues in the ethics of documentary representation, including maker-subject relationships, informed consent, fairness, and evidence.
Be familiar with efforts to create more democratic systems of media production and distribution.
Learn how to watch earlier films both as an audience THEN (with understanding of the film's social, cultural, historical context), and NOW (with understanding of your own future goals and with critical, analytical eyes to study history).
Be able to think – and write — critically about non-fiction media.

Textbooks
The texts for this class Documentary: A History of the Non-Fiction Film (2nd Edition) by Erik Barnouw (available at Shakespeare and Co) and Crafting Truth: Documentary Form and Meaning, by Louise Spence and Vinicius Navarro (available at Shakespeare and Co.). Additional readings will be available through e-res.

As some readings will be accessed electronically, please bring either a printed version of the article (preferred) OR a digital version of the article to class.

BAFTNMP 209 Writing for Visual Media

Objectives:
To understand the basic structure of screenplay
To introduce to the basic skills for screen writing
To understand the intricacies of screen writing
To learn the build characters and write meaning full dialogues

Unit I
Preparing to Think Visually: Diving In to the Screenwriter's Mind, Approaching Screenwriting as a Craft, Breaking Down the Elements of a Story, Unpacking Your Idea

Unit II
Structure of Story & Screenplay: Plot Part I: Beginnings, Plot Part II: Middles, Plot Part III: Endings

Unit III
Dynamics of Characterization: Character Building, Constructing Dynamic Dialogues, Non – traditional Film

Unit IV
Finalizing the Script: Maintaining an Audience's Trust, Turning Your Story into a Script, Take Two: Rewriting Your Script, Adaptation and Collaboration: Two Alternate Ways to Work

Textbooks:

1. How not to write a screenplay: 101 common mistakes most screenwriters make by Denny Martin Flinn
2. Screen Adaptation: A Scriptwriting Handbook by Kenneth Portnoy
3. Screenplay: The Foundations Of Screenwriting By Syd Field

Reference Books:

1. The Screenwriter's Bible By David Trottier
2. The Bare Bones Book of Screenwriting: The Definitive Beginner's Guide to ... By J. T. Clark
3. Screenwriting for a Global Market: Selling Your Scripts from Hollywood to ... By Andrew Horton

4. Screenwriting For Dummies By Laura Schellhardt
5. Screenwriting: The Sequence Approach By Paul Joseph Gulino
6. The Tools of Screenwriting By David Howard, Edward Mabley
7. The Art of Screenwriting: An A to Z Guide to Writing a Successful Screenplay By William Packard
8. Writing the Character-Centered Screenplay By Andrew Horton

BAFTNMP 210 Importance of Sound and Sound SFX

Objectives:
To learn about the basic of sound |To understand the nature of sound and recording devices | To learn the basics of sync sound, mixing console, analog v/s digital workflow | To understand the need for sound and importance of sound in film | To learn to record a song

Unit I – Basics of Sound: Nature of acoustical waves; concepts of amplitude and frequency - wavelength and harmonics.Psycho-acoustics: Nature of hearing and perception of sound, including concepts of pitch, loudness, and timbre; the precedence effect; localization in rooms; equal loudness contours; and other mysteries of hearing.Principles of Stereophony | **Unit II – Sound for Film and Video:** The sound track – its importance in an AV medium, Different elements of a sound track, Explanation of how sound is put to the film | **Unit III – Sync Sound:** The size of the role sound should play in your film will vary depending on your professor's requests, but when it comes to the technical side of things, you are at least required to know how to achieve synchronized sound and picture with film.**Interconnectivity of Analog & Digital Equipment:** Basic analog connectors, cabling, patch – bay, interconnectivity between various recording studio equipment.Various Digital interconnects and their sockets on the digital equipment. **Microphones Types:** Dynamic, Condenser, Ribbon, Polar Pattern, Sensitivity. Microphone designs for special applications**Acoustics I (Fundamentals):** The behavior of sound in outdoors and in closed spaces; Absorption, reflection, diffraction, refraction, reverberation. | **Unit IV – Mixing Console Basics**
The signal flow and various auxiliary systems.**Digital Audio:** Analog to Digital to Analog conversion. Sampling Frequency, Bit Rates. Problems in digital audio.Different digital media, Standard digital recording & mastering formats. Audio file formats, storage mediums – optical, magnetic, Jitter etc.**Computers in Audio:** Different platforms – different operating systems, Configuration of a PC for sound recording.Mother Boards, Processor, Sound Card, Graphic card, Monitors**Recorders:** Analog, Digital, Tape Based & Tapeless. Digital Audio Workstations (DAW's) | **Unit V – Film Showcase:** Case studies of famous Indian as well as foreign films | **Unit VI – Microphone Techniques:** Placement, Applications, Proximity effects etc. microphones and placement techniques for stereo recording. **Monitoring Systems:** Active & Passive types, Domestic and professional listening environment, Stereo and surround monitoring. |**Unit VII – The Production Process of a Song:** Music Basics. – Types of Music, Concepts of Melody, Harmony, Rhythm & counter melody etc. Format of a song. Preproduction, Tracking, Overdubbing, Editing, Mixing and Mastering. **Processors:** Theory of Tonal, Dynamic & Spatial processors. Equalizers – types and their application, Compressors & Limiters - theory and

application, Effects processors - Reverberation and Delay devices and their plug in counterparts. | **Unit VIII – Sound for film:** Location sound , Radio mics - uses and potential difficulties. Boom operation for sync sound, Hands-on training in location sound recording for video. **Nuendo Basic:** Basic principles, understanding the process from initial set up to completion of a project. To set up for a vocal/instruments dub. Hands-on training - You will share a Nuendo workstation during the class. **Principles of Mixing:** The basic techniques of mixing and the fundamental approach. The Building Blocks of Mixing
Setting the sound stage, and the sonic implications of panning and of placing instruments at varying distances from the listener;Consideration of different approaches to getting desired results from EQ; A comprehensive review of the uses of dynamic processor; on Individual channels and Mix master. Finishing a mix with automation.
"Mixing in the box." And “Mixing through the board.”**Production of the Sound Track for the student project film:** Discussing sound design strategy with the director of the film at pre production stage.Attending film sync shoots.Video File formats, Acquiring picture for post production from edit suite.Dubbing the dialogues wherever necessary, Selecting SFX and BG music from the library, recording Foley and music as per the demand of the script.Mixing the final track. Export it to the editor, supervise the final assembly of the film.

Textbooks:

1. Pro Tools 9: Music Production, Recording, Editing and Mixing By Mike Collins
2. Pro Tools All-in-One Desk Reference For Dummies By Jeff Strong
3. Sound for Film and Television By Tomlinson Holman

Reference Books:

1. Sound For Digital Video By Tomlinson Holman
2. Producing for TV And Video: A Real-world Approach By Cathrine Kellison
3. Sound for picture: an inside look at audio production for film and television By Jeff Forlenza, Terri Stone
4. Audio in Media By Stanley R. Alten
5. Master Handbook of AcousticsByF.Alton Everest
6. Modern Recording Techniques By David Miles Huber
7. Mastering Audio By Bob Katz
8. Mixing Audio By Roey Izhaki
9. Practical Recording Techniques By Jenny Bartlett
10. Critical Listening Skills for Audio Professionals By F.Alton Everest
11. The Audible Past By Jonathan Sterne

BAFTNMP 211 Basics of Cinematography-1

Objectives:

To understand the importance of cinematography in film making | To enhance the basic knowledge about lighting and its use | To understand various equipments required for various form of lighting | To understand the basics of various camera, lenses and digital cinematography

Unit I – Power of a Picture: Power of a still picture | Shooting a good Still picture | Composition-Framing | Understanding & Use of color | Capturing the Drama | Black and white Photography; **Unit II – Light:** Role of light | Lighting techniques | Concept of lighting various planes | Understanding Various types: Tungsten lamps, Cool Lights, HMI, Cyclorama/background lights, Soft Box lights. | Use of cutter stand, black cloth and Camera filters | barn doors | use of reflectors | Three point lighting | Ratio lighting: 1:2, 1:3, 1:4 | Creating various Background patterns and types | Lighting – Situations | Studio lighting for three cameras set up: Talk Show, Game Show | Available day light situations | Shooting for Documentary style | Face lighting. Key, fill, back light | Depth of field Exercise | High key lighting | Low key lighting; **Unit III –Lenses:** Type of Lenses | Power of Lenses | Understanding the shot requirement and usage of a lens | Idea of perspective: Depth Of Field, Depth of focus, Critical understanding of Fixed Lens Vs. Zoom Lens | Focus pulling | 18% grey card | Metering | Color temperature meter; **Unit IV – Camera Movements:** Basic grammar of shots | Primary Camera Movement: Pan, Tilt, Zoom, Character Movement | Usage and need of Track and trolly, Crane, jimy gip, Poll Cam | Managing Movements | Single camera Setup | Multi camera setup | Continuity Exercise | Do's and don'ts of camera movements | Aesthetics and Psychological Impact of Moving Images | Various parts of Motion picture cameras | Moving Image-Motion Picture | Impact of collective moving Images | Motion Picture Dynamics; **Unit V – Understanding digital video recording**
Principle of video recording | Digital Recording Formats | Editing and compression | Digital sampling and storage | Technical formats of video- PAL, NTSC | "Time Code" in Video Recording | Film Stock and Processing

Textbooks:

1. Camera Terms and Concepts by David Elkins
2. The Camera Assistant by Doug Hart
3. Motion Picture Camera and Lighting Equipment by David Samuelson

Reference Books:

1. Motion Picture Camera Techniques by David Samuelson
2. The 16mm Camera Book by Douglas Underdahl
3. The Hands On Manual for Cinematographers by David Samuelson
4. The Professional Lighting Handbook by Verne Carlson
5. The Filmmakers Pocket Reference by Blain Brown
6. American Cinematographer ASC Manual
7. The Zone System for Photographers by Carson Graves
8. Cinematography: Screencraft by Peter Ettedgui
9. Contemporary Cinematographers-On Their Art by Pauline Rodgers

10. Operating Cinematography for Film and Video by William Hines
11. Cinematography-A Guide for Filmmakers and Film Teachersby Kris Malkeiwicz
12. Film Lighting: Talks with Hollywood's Cinematographers and Gaffersby Kris Malkiewicz
13. The Five C's of Cinematography: Motion Picture Filming Techniquesby Joseph V. Mascelli
14. The Art of the Cinematographer: A Survey and Interviews with Five Mastersby Leonard Maltin
15. Anton Wilson's Cinema Workshop by Anton Wilson
16. Image Control-Motion Picture and Video Camera Filtersand Lab Techniquesby Gerald Hirschfeld
17. Lighting for Film and Electronic Cinematographyby John David Viera and Dave Viera
18. Painting with Light by John Alton
19. Picture Composition for Film and Television by Peter Ward
20. Matters of Light and Depth-Creating Memorable Images for Video, Film and Stills Through Lighting by Ross Lowell
21. Lighting Technology by Fitt and Thornley Set Lighting Technician's Handbookby Harry C. Box
22. Digital Cinematography by Ben De Leeuw
23. If It's Purple, Someone's Gonna Die: The Power Of Color In Visual Storytelling By Patti Bellantoni
24. High Definition Cinematography By Paul Wheeler

BAFTNMP 212 Practical Film Making 1 (Only non-fiction film)

Objectives:
To understand the film making process for multiple locations in non fiction films
To understand the entire workflow
To gain exposure on various cameras and software used for production

The students will undergo the process of making a non-fiction film.
The students will be exposed to Semi professional camera cameras & software. The students will also undergo same basic exercises such as 3 shot and 6 shot to give them a basic sense of framing, composition, movement and editing. The final project will be a non-fiction film with the duration of 5-10 minutes.

Semester III

BAFTNMP 313 Introduction to Direction for Television

Direction for Television:

Understanding Television Culture & Semiotics.

Understanding Space & Time, Ideology, Aesthetics, Stylistics & Setting.
Construction: mise-en-scene & technical codes -1
Writing For Television**:** Research, Ideation and Conceptualization, Understanding The IV Act Structure for TV, Elements of a TV Program
Constructing a plot w.r.t a family tree for serials.
Constructing Character biography
Writing for Humour
Popular Indian TV Discourse- eg.: Aahat (Horror), Daily Soap (any) & Tarak Mehta (comedy)
Syntagmatic & Paradigmatic analysis
Polysemy
Popular TV Discourse- Friends
Principles of Affinity & Contrast
Director's Role in Television
Inter-textuality & Role and Impression of Women
Exploring Non-fiction Reality TV
Exploring Non-fiction AD Filmmaking -1
Linear Motif in TV
Creating content for TV- Directing for a Webisode

The course aims to develop the sensibilities and sensitivities of the taughtto comprehend the process of direction for television that entails understanding and analysis of different genres of television.

The learning includes understanding the television medium vis-à-vis the film, ideating, plotting and writing for different genres followed by inspecting the Director's role. Analyzing the present day scenario. Experimenting by devising for short versions.

The sessions could be designed to give a thorough understanding of both – theory as well as practicals. All lectures will be in the form of interactive sessions and it is expected that the student reads/watches television as directed before attending lectures.

Learning outcomes:

1. Understanding of the process of Direction for Television
2. Theoretical framework and practical approach to Direction
3. Creating Ads for various categories

BAFTNMP 314 Basics of Cinematography-2

Objectives:
To understand the basic structure of film and digital camera | To enhance the basic knowledge about lighting and its use | To understand various equipments required for various form of mood lighting | To understand basics of various digital cameras, lenses and digital

cinematography | To learn the basics of special effects cinematography |To understand the needs of co-creators

Unit I – Structure of Film and Digital Camera: Understanding the internal structure of camera | perforation loop | pressure plate | Pull down claw | Magazine: Types of magazine | Threading of film | Intermittent Movement | Analysis of Claw motion | Registration pin | Sprocket wheel | Frames per sec | Camera Motors | Slow motion and Fast motion | Reverse Movement | Lens Mount Flange Depth | Magazine Cover/rain cover | Digital Process of Image capturing | Latitude of film Camera format | Latitude of digital format | Shooting Format-16-mm/35-mm/70-mm/super.16/I-max/3-D | Convenience of Digital format | The Future of Film Formats ; **Unit II – Special Effects and Cinematography:** Chrome key Concept | Preparation for chrome key | Compositing a digital Picture | Digital matte painting; **Unit III – Mood Lighting & Colour Lighting Theory & Practice:** Red, Blue, Green , Purple & Orange lights and Treatments for Various Scenes | Colour and Cultural; **Unit IV – Image formation (Understanding requirements of a director):** Understanding a Screenplay writing | Writing for visuals- STORY BOARDING | Capturing the drama on the camera | How to create packets of emotional experience-Scene | Creation of Drama-Ingredients of a Drama; **Unit V – Understanding the needs of Co- creators (Director, Editor, Sound Recordist...)**
Working in team | Team Building | Conflict formation | Conflict Resolution

Textbooks:

1. Camera Terms and Concepts by David Elkins
2. The Camera Assistant by Doug Hart
3. Motion Picture Camera and Lighting Equipment by David Samuelson

Reference Books:

1. Motion Picture Camera Techniques by David Samuelson
2. The 16mm Camera Book by Douglas Underdahl
3. The Hands On Manual for Cinematographers by David Samuelson
4. The Professional Lighting Handbook by Verne Carlson
5. The Filmmakers Pocket Reference by Blain Brown
6. American Cinematographer ASC Manual
7. The Zone System for Photographers by Carson Graves
8. Cinematography: Screencraft by Peter Ettedgui
9. Contemporary Cinematographers-On Their Art by Pauline Rodgers
10. Operating Cinematography for Film and Video by William Hines
11. Cinematography-A Guide for Filmmakers and Film Teachersby Kris Malkeiwicz
12. Film Lighting: Talks with Hollywood's Cinematographers and Gaffersby Kris Malkiewicz
13. The Five C's of Cinematography: Motion Picture Filming Techniquesby Joseph V. Mascelli
14. The Art of the Cinematographer: A Survey and Interviews with Five Mastersby Leonard Maltin
15. Anton Wilson's Cinema Workshop by Anton Wilson

16. Image Control-Motion Picture and Video Camera Filtersand Lab Techniquesby Gerald Hirschfeld
17. Lighting for Film and Electronic Cinematographyby John David Viera and Dave Viera
18. Painting with Light by John Alton
19. Picture Composition for Film and Television by Peter Ward
20. Matters of Light and Depth-Creating Memorable Images for Video, Film and Stills Through Lighting by Ross Lowell
21. Lighting Technology by Fitt and Thornley Set Lighting Technician's Handbookby Harry C. Box
22. Digital Cinematography by Ben De Leeuw
23. If It's Purple, Someone's Gonna Die: The Power Of Color In Visual Storytelling By Patti Bellantoni
24. High Definition Cinematography By Paul Wheeler

BAFTNMP 315 Understanding TV formats & Genres

Objectives:

To understand how television programming works | To learn about TRPs and drama creation | To study the impact of niche programming | To learn about various genres of television programming

Unit I – Nature of drama in television: Various shows, formats and genres, telecast patterns, audience viewership performance | **Unit II – Creating Drama for TRPs:** Building the story, herd culture existing in current times, breaking the barriers | **Unit III – Creating niche television programming:** Importance of niche content, niche content channels, producing niche content in wake of DTH connections | **Unit IV – Differentiation of infotainment, edutainment, entertainment, lifestyle genres:** Differentiation of genres, Specialty of different genres, popularity of genres, content on demand, Study of BBC & Discovery, Study of GECs

Textbooks:

1. Fundamentals of Film Directing By David K. Irving
2. Writing, Directing, and Producing Documentary Films and Videos By Alan Rosenthal
3. Breaking into Film by Kenna McHugh
4. Before You Shoot : A Guide to Low Budget Film and Video Production by Helen Garvey

Reference Books:

1. Film Directing Cinematic Motion: A Workshop for Staging Scenes By Steven Douglas Katz
2. Film Directing Fundamentals: See Your Film Before Shooting By Nicholas T. Proferes
3. Problems Of Film Direction By Sergei Eisenstein

BAFTNMP 316 Concepts of Story Boarding

Objectives:

To understand the need for storyboarding | To learn the fundamentals of shoot taking and division | To understand various storyboarding techniques | To understand the importance of perspective and lighting while storyboarding

Unit I – Intro to Storyboarding/Visual Story telling & Storyboards: Origins of Story boards and aspect ratio | **Unit II – Fundamentals of Shots:** Terminology of Shoots, Camera Framing, Camera Angles and Movements | **Unit III – Storyboarding Techniques:** · Concept- what the story is about, Drawing the components of the storyboard
· Indicating motion in the storyboard, Increased reality- perspective and lighting | **Unit IV – Composition, Perspective & Lighting:** Compositional Elements, line-shape-contrast, creating meaning within image, Creation of depth through lens choice and linear, atmospheric and size perspective, High- Key Lighting, Low key Lighting, 3 point Lighting, Tonal quality of lighting. | **Unit V – Continuity:** Basic Rules of continuity, 180 – Degree rule, screen direction, Cutaways & Cut-ins | **Unit VI – Story Boards for Animations & Special Effects Films:** Structure of animation films, Special effects breakdown, creating the environment | **Unit VII – Story Boarding for Commercials and New Media:** Structure of commercials, elements of brand building to be implemented, special colour scheme for brands and products

Text Books:

1. Exploring Storyboarding By Wendy Tumminello
2. The Art of the Storyboard: Storyboarding for Film, Tv, and Animation By John Hart
3. Directing the StoryBy Francis Glebas

Reference Books:

1. Beginning Illustration And Storyboarding For Games By Les Pardew
2. Storyboards: Motion In Art By Mark Simon
3. From Word to Image: Storyboarding and the Filmmaking Process By Marcie Begleiter
4. Prepare to board! By Nancy Beiman
5. Storyboarding 101: A Crash Course in Professional Storyboarding By James O. Fraioli
6. Writing with pictures: how to write and illustrate children's books By Uri Shulevitz

BAFTNMP 317 Graphics and Post production (Flash, Editing software, After effects)

Basics of 2D animation, Vector and Raster Graphics, Basic Animation in Flash, Advanced editing using Flash Elements in the film, Using After Effects, The interface of After Effects, Importing graphics and film, Keyframes, After effects and timeline, Animating using after effects, Compositing

BAFTNMP 318 TV Production / Ad film making

To introduce the process of 25 mins Television series making
To understand the production pipeline of 25 mins Television series making process |
To understand the entire workflow 25 mins Television series making process

To gain exposure on various cameras and software used for production of 25 mins Television series making

The students will undergo the process of 25 mins Television series. The students will be exposed to professional HD cameras & software and will work on projects ranging from 5Mins-25mins. The students will be exposed to the entire process of film making and the production workflow in television Series. The students can also work on an Ad film for about 60 seconds depending on the kind of TV series they are making.

Semester IV

BAFTNMP 419 Introduction to Direction for Film

Introduction to Direction for Films

Objectives:
To understand the need for direction in films | To understand the role played by a director | To understand the Qualities required to be a director | To learn how to manage creativity and creative team | To learn about drama and continuity for films | To learn the details involve in the production of a feature films
Unit I – ARTISTIC IDENTITY AND DRAMA: The World of the Film Director, Identifying Your Themes | **Unit II – SCREENCRAFT:** A Director's Screen Grammar, Seeing with a Moviemaker's Eye, Shooting Projects | **Unit III – THE STORY AND ITS DEVELOPMENT:** Recognizing the Superior Screenplay –How to create drama, Analyzing a Screenplay, Director's Development Strategies, Alternative Story Sources, Setting Creative Limitations | **Unit IV – AESTHETICS AND AUTHORSHIP:** Point of View, Subtext, Genre, and Archetypes, Time, Structure, and Plot, Space, Stylized Environments, and Performances, Form and Style | **Unit V – PRODUCTION:** Developing a Crew, Mise-en-Scéne, Producing a Shooting Script, Before the Camera Rolls, Roll Camera, Location Sound, Continuity, Directing the Actors, Directing the Crew, Monitoring Progress | **Unit VI – ORGANIZING ACTION IN AN ACTION SCENE:** Staging and Camera for *Over Easy* Action Scene, Development of Screenplay, Director's Preparation for Directing an Action Scene, *Over Easy* Action Scene/Staging and Camera Angles for - Storyboard Artist | **Unit VII – ORGANIZING ACTION IN A NARRATIVE SCENE:** Staging and Camera for Narrative Scene, Choosing a Location, Staging, Camera Style | **Unit VIII - Styles And Dramatic Structures:** Style, Narrative, Dramatic, and Poetic Visual Styles, The Variety of Dramatic Structures,
Textbooks:

1. Film Directing Cinematic Motion: A Workshop for Staging Scenes By Steven Douglas Katz
2. Film Directing Fundamentals: See Your Film Before Shooting By Nicholas T. Proferes
3. Problems Of Film Direction By Sergei Eisenstein

Reference Books:

1. Directing: Film Techniques and Aesthetics By Michael Rabiger
2. On directing film By David Mamet

3. Directing Actors: Creating Memorable Performances for Film and Television By Judith Weston
4. Art Direction for Film and Video By Robert L. Olson
5. The film director's team By Alain Silver, Elizabeth Ward
6. Notes of a film director By Sergei Eisenstein
7. Producing and Directing the Short Film and Video By Peter W. Rea, David K. Irving
8. Fundamentals of Film Directing By David K. Irving
9. Writing, Directing, and Producing Documentary Films and Videos By Alan Rosenthal
10. Breaking into Film by Kenna McHugh
11. Before You Shoot : A Guide to Low Budget Film and Video Production by Helen Garvey

BAFTNMP 420 Basics of Visual Communication

Basics of Visual Communication

Aesthetics, Perception, Representation, Visual Rhetoric, Cognition, Semiotics, Reception Theory, Narrative, Media Aesthetics, Ethics, Visual Literacy, Cultural Studies.

BAFTNMP 21 Convergence and Basics of Web Designing

Convergence and Basics of Web Designing

Concept of Convergence, Internet Key Terms, New Media. Web Designing, HTML programming, Basic Java Script, Designing your own website, uploading the website, links and navigation

BAFTNMP 22 Concepts of Post Production & Computer Graphics (including VFX)

Concepts of Post Production & Computer Graphics (including VFX)

Objectives:

To understand the basics of visual effects | To understand the basic process of visual effects | To learn about GUI

and CG | To understand the basics of 3D and creating real world in the digital world | To learn about compositing and camera tracking | To understand the process of vfx and final rendering

Unit I – Introduction to pre-production, production and post-production: Visual effects' a relatively new term describes what used to be more appropriately called 'special photographic effects'. What makes an effect

'special'? The decision as to which medium and format VFX elements are going to be shot with is directly dependent on how they shall be employed and what the specifications are for their final resting place. Methods of creating visual effects, Implementation | Unit II – Introduction to the User Interface (GUI): Introduction to 3D Space and the GUI, Introduction to Modeling, Introduction to Polygonal Box Modeling, Introduction to Shell Modeling | Unit III – CG Basics: Animation Basics, Animation Hierarchies and Deformation, Joints Hierarchies and Constraints, Cameras, Rendering and Path Animation | Unit III – Understanding Pipeline and integration: Digital image manipulation, 2D digital image manipulation, Compositing software, New life into old methods, Perfecting the illusion, 3D computer-generated imaging (CGI), Digitizing (getting information into the computer) | Unit IV – Introduction to Lighting and Rendering: Light Properties, Defining Shadows, Defining Highlights and Specular, Diffuse

Inter-reflection and Global Illumination, Render Layers, Rendering Engines and methods | Unit V – Introduction to Compositing: Camera Staging and Composition, Renderers and Algorithms Benefits/Disadvantages, Rendering Passes, Introduction to Specific Compositing Software, Compositing 3D | Unit VI – Study of VFX and Camera Tracking: Overview of Production Pipelines, Rendering Utility Nodes, Camera Tracking Foundation 2D and 3D | Unit VII – Introduction to FX (Effects): Overview of Dynamics, Rigid Body and Fluids, Introduction to Particles, Expressions, Introduction to Fields, Project Work | Unit VIII – Compositing and Rendering: The Interface, Keying, Rotoscoping, Color Correction, Keying, Multi-Pass Compositing

Textbooks:

1. The Art and Technique of Matchmoving: Solutions for the VFX Artist By Erica Hornung
2. Maya Visual Effects: The Innovator's Guide By Eric Keller
3. The Filmmaker's Book of the Dead: How to Make Your Own Heart-Racing Horror Movie By Danny Draven

Reference Books:

1. Adobe Photoshop for VFX artists By Lopsie Schwartz
2. Visual Effects for Film and Television By A. J. Mitchell
3. The Visual Effects Producer: Understanding the Art and Business of VFX By Charles L. Finance, Susan Zwerman
4. The VES Handbook of Visual Effects By Jeffrey A. Okun, Susan Zwerman
5. Compositing Visual Effects: Essentials for the Aspiring Artist By Steve Wright
6. Vfx Artistry By Spencer Drate, Judith Salavetz
7. The Visual Effects Arsenal: VFX Solutions for the Independent Filmmaker By Bill Byrne
8. Encyclopedia of Color Correction by Alexis Van Hurkman
9. The Art And Science Of Digital Compositing by Ronald Brinkman
10. Creating Motion Graphics with After Effects, Vol. 2 by Chris Meyer

BAFTNMP 421 Drama Production

Drama Production

The module is intended to provide an introduction to the process of digital short film production for the purpose of making works of drama and fiction. The focus will therefore be on enabling the development of the practical and theoretical skills in pitching, planning, writing, shooting and editing necessary to produce a coherent and competent fictional moving image project.

The module will seek to introduce the student to a range of creative and scheduling skills which will assist them in the production of their projects. It will foreground the inherently collaborative and collective aspects of the production process by aiding the student to refine a range of communication and inter-personal skills to accomplish a broad range of tasks, including identification and planning of a suitable production idea; Allocation of roles for the pre-production, shooting and editing phases, as well as encouraging collective responsibility and accountability which is absolutely essential to the completion of any professional or team production. The module will also build upon the more technical grounding offered in Techniques 2 in order to develop the practical vocabulary and skills required to produce moving image projects. Students will be encouraged to investigate and undertake a role throughout their productions. In crews, they will produce two shorts for inclusion in their personal practice portfolio.

Curriculum content

- Examine a range of current short fiction films
- Pitching fiction ideas to peers
- Researching locations and production demands
- Work with a range of production skills
- Work within a specific role
- Negotiate team and group work
- Undertaking the three stages of fiction production
- Basic ideas and concepts around screen writing
- Direction and team interplay

Textbook

Rabinger, M (2007) Directing: Film Techniques and Aesthetics, 4th Edition, Hoboken, Taylor and Francis

Jones, C. and Jollige, G. (2000), The Guerilla Film Makers Handbook: London: Continuum

Reference Books

Catliff, S & Granville J. (2013) The Casting Handbook: For Film and Theatre Makers, UK, Routledge

Cartwright, S. (2012) Pre-Production planning for Video, Film and Multimedia, Hoboken, Taylor and Francis

Field, S. (2005) Screenplay: The foundations of Screenwriting, New York, Delta

Landry. P (2012) Scheduling and Budgeting your Film, Focal Press

La Motte, R (2010) Costume Design 101: 2nd Edition: The Business and Art of Creating Costumes for Film and Television, Michael Wiese Productions

Murch, W (2001) In the Blink of an Eye: A Perspective on Film Editing, Silman James Press

Potter, C. (2001) Screen Language from Film Writing to Film Making: London Methuen

BAFTNMP 422 Intermediate Practical Film Making (Ad and Short Fiction Film)

Objectives:
To understand the production pipeline of film making process in advertisement film making | To introduce the process of Advertisement Film (product as well as PSU) Corporate AV and In-depth Multiple Characters Single Multiple Location Short Film making | To understand the entire workflow in Advertisement Film (product as well as PSU) Corporate AV and In-depth Multiple Characters Single Multiple Location Short Film | To gain exposure on various cameras and software used for production of Advertisement Film (product as well as PSU) Corporate AV and In-depth Multiple Characters Single Multiple Location Short Film

The students will undergo the process of Advertisement Film (product as well as PSU), Corporate AV and In-depth Multiple Characters Single Multiple Location Short Film. The students will be exposed to professional HD cameras & software and will work on projects ranging from 30Seconds-15mins. The students will be exposed to the entire process of film making and the production workflow in Advertisement and Multiple Character multiple location Short Film production.

Semester V

BAFTNMP 525 Laws related to Films, TV and Internet

To understand the various laws pertaining to media | To understand the need and importance of Copyright |To learn about intellectual property rights | To understand about media business ethics and issues pertaining to it

Unit I – Indian Contract Act, 1872: Essentials of valid contract
discharge of contract, remedies for breach of contract. Contracts of Indemnity, Guarantee, Bailment, Pledge and Agency. |Unit II – The Negotiable Instruments Act 1881: Essentials of a Negotiable instruments, Kindsof Negotiable Instrument Holder and Holder in Due Course, Negotiation byendorsements, crossing of a cheque and Dishonour of a cheque. | Unit III – Media Law, Copyright and Intellectual Property: IPR & copyright laws, Copyright Agreements : Short-Term vs. Long-Term Agreements, Media Law and Infringements : Case Studies, Menace of piracy and remedies to counter piracy, Statutory and non-statutory bodies formed to fight piracy |
Unit IV – Role and importance of Business Ethics and Values in Business - Definition of Business, Ethics Impact on
Business Policy and Business Strategy - Role of CEO - Impact on the Business Culture. | Unit V – Types of Ethical issues - Bribes - Coercion - Deception - Theft - Unfair Discrimination. | Unit VI – Vendors, Government, & Social Audit. | CSR- Definition and Importance, examples of various initiatives taken by various business groups like TATAs, Infosys, Birla and others | Difference between Cause Related Marketing (CRM) and CSR Case Studies: Reliance WLL license, 2G Scam, Satyam Scam and PWC's role in the scam!!! | Role of bodies like Competition Commission of India, SEC, SEBI, TRAI, etc in curbing unethical practices

Text Books:

1. Maheshwari, S.N. and S.K. Maheshwari; A Manual of Business Law, 2nd Edition, Himalaya Publishing House, 2004.
2. Kuchhal M.C.,"Modern Indian Company Law",2004,Shree Mahavir Book Depot.
3. Kuchhal, M. C.; Business Law, Vikas Publishing House, New Delhi, 2004.

Reference Books:

1. Kapoor, N. D.; Elements of Mercanlite Law, Sultan Chand & Sons, NewDelhi,2003
2. Memoria & Menoria - Business Policy
3. David J. Fritzsche - Business Ethics: A Global & Management Perspective - Tata McGraw-Hill
4. Ramaswamy Namakumari - Strategic Planning - Corporate Strategy - MacMillan India Ltd
5. Velasquez - Business Ethics - Prentice - Hall of India
6. Dr.S. Shankaran - Business Ethics & values
7. Gulshan S.S. and Kapoor G.K., "Business Law including CompanyLaw",2003,New Age International Private Limited Publishers.
8. Aggarwal S.K., "Business Law ,2003",Galgotia publishing Company.
9. Bagrial, Ashok;Company Law, Vikas Publishing House, 2004.4. Kapoor, N. D.;
10. Elements of Company Law, Sultan Chand & Sons, NewDelhi, 2003.5. Dr. Singh, Avtar;

11. Company Law, Eastern Book Co. Lucknow, Bharat LawHouse, Delhi, 2004
12. Peter Madsen & Jay M. Shafritz - Essential of Business Ethics
13. Ken Smith and Phil Johnson - Business Ethics and Business Behavior
14. Pratley - Essence of Business Ethics - Prentice - Hall of India

BAFTNMP 526 New Media Theory and Practice (With advanced Web design and app making)

Web Designing – Adobe Dreamweaver, Designing a web page without the graphic user interface (HTML using notepad), Frames, Layers, Search Engine Optimization, HTML and DHTML, Using JavaScript, Embedding Java Applets, Using Activex Controls, Embedding Video and Audio into web pages, Streaming media, Using YouTube, Creating Forms, Learning basic PHP and MYSQL, Creating Database and using it in the web design, Creating a website for Mobile phones, Creating a news site, creating a brochure site, designing a portal interface, using vernacular language in web sites, dynamic fonts, creating a vernacular medium website, New media and popular culture, social networking, emerging identities, games as advanced new media, mobile journalism, new media as a pedagogical tool.

BAFTNMP 527 Understanding Indian Contemporary Cinema

Exploring the changing trends in Hindi Popular cinema in terms of storytelling, performances technological and production aspects. Emergence of Film Festivals as a mode of exhibition and the kind of films selected for such prestigious film festivals. Focus on the changing aesthetic trends of regional films, popular films and festival films. Looking at the emergence of digital media and internet being a source of exhibition for films.

BAFTNMP 528 Introduction to Media Project Management

Objectives:

To educate about the basics involved in a media project management | To educate about the basic project

production workflow and management | To educate about the role of a project manager | To help understand the details involving a new business project or proposal

Unit I – Production Management: The production Manager's job, The process of Production Management, The Business of Film-Pre production, production & post production, Preparing for production, Special Low Budget Indie productions, Locations & unions Management, Cast & Crew – Selection, contracts, agreements, work permits, etc.,

Budget preparation and budget forms, Insurance & competition bonds | Unit II – Business Creation: Business Plans and Ideation: Entrepreneurship Routes, Case Studies (Relevant and time specific), Introduction to Company Creation, Processes of Registration and Incorporation, Company Law, Introduction to Company Law, Registration Procedures and Exceptions, Company Procedure and Ethics | Unit III – Contracts and Negotiations: Revenue sharing model, Minimum guarantee model, Share in profits model | Unit IV – Conflict Resolutions: Negotiations and Bargaining : Role Play Exercise, Research Methodology for Business Planning | Unit V –

Scouting for business opportunities: Investor Pitch Exercises, Business Plan Formulation and Redesign, Financial Projections for Businesses

Textbooks:

1. Film Production Management 101 Management and Coordination by Deborah S Patz
2. Surviving Production: The Art of Production Management for Film and Television by Deborah S Patz
3. Film Production Management by Bastian Cleve

Reference Books:

1. Character Animation & Film Production By Chris Neuhahn, Josh Book
2. Producing and Directing the Short Film and Video By Peter W. Rea, David K. Irving
3. Film Production Theory By Jean Pierre Geuens
4. Production Management for Film and Video By Richard Gates
5. The Independent Film Producer's Survival Guide: A Business and Legal Sourcebook By Gunnar Erickson, Harris Tulchin, Mark Halloran
6. The Complete Film Production Handbook By Eve Light Honthaner
7. Independent feature film production By Gregory Goodell
8. Film Production By Steven Bernstein
9. Film production: the complete uncensored guide to independent filmmaking By Greg Merritt

BAFTNMP 529 Basics of Marketing and Publicity

Objectives:

To introduce the basics of marketing and publicity design | To educate about the importance of marketing in today's world | To help understand the various tools needed for marketing and publicity design | To learn about the marketing plan and market research | To help get insight into consumer consumption behavior

Unit I – Introduction to Marketing: 1. Importance of marketing, definition of marketing, scope of marketing, functions of marketing, marketing and its relation to other business functions, difference between sales and marketing. 2. Key marketing terms and concepts- need, want, demand, exchange, marketing myopia and marketing orientations, distinction between selling and marketing.3. Marketing Mix, 4Ps, 7Ps, 4Cs. | **Unit II – Marketing Research:** Definition, Marketing Research Process, Types of Research: Primary, Secondary, Qualitative,Quantitative | **Unit III – Consumer Behavior:** 1. Introduction and importance, model of consumer behavior, characteristics affecting consumer behavior. | **Unit IV – Segmentation, Targeting & Positioning:** 1. Segmentation - Bases and process of segmentation, requirements for effective segmentation, niche marketing, segmenting consumer markets, segmenting business markets.2. Targeting- Evaluating market segments, selecting target market segments.3. Positioning- Positioning maps, differentiation and positioning strategy, communicating and delivering the chosen position | **Unit V – Introduction to the concept of IMC:** Introduction & Familiarization,Definition of Promotion & Promotion Mix,Tools of Promotion Mix, IMC Planning Process, Creative Strategy, Media Strategy | **Unit VI – Packaging**

for film & television: The art of Promo, Advertisement & In serial promotions, Art of Writing Copy, Designing for various mediums, Public Relations, Planning, organizing and managing events. Managing the internet and social Media.Vendor selection and management, Media Planning & Buying

Reference books:

1. Competing For The Future By C.K. Prahalad & Gary Hamel.
2. Kotler on Marketing: How to Create, Win, and Dominate Markets By Philip Kotler.
3. How to Win Friends and Influence People By Dale Carnigie.
4. Market Research: A Guide to Planning, Methodology and Evaluation By Paul Hague.
5. Art of War By Sun Tzu.
6. Strategic Management By Gregory Dess, Lumpkin & Taylor.
7. How Winners Sell: 21 Proven Strategies to Outsell Your Competition and Win the Big Sale ByDave Stein.
8. Beyond Bullet Points: Using Microsoft® Office PowerPoint® 2007 to Create Presentations That Inform, Motivate, and Inspire By Cliff Atkinson.
9. Selling the Invisible: A Field Guide to Modern Marketing By Harry Beckwith.
10. Marketing Services: Competing Through Quality By Parasuraman & Leonard L. Berry.
11. Marketing Management (12th Edition) (Marketing Management) By Philip Kotler.
12. Consumer Behavior: Building Marketing Strategy, 9/e, (with DDB Needham Data Disk) By Hawkins, Best, & Coney.
13. Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers By Geoffrey A. Moore.
14. Mind and Heart of the Negotiator, The (3rd Edition) By Leigh Thompson.
15. Radically Transparent By Andy Beal & Judy Strauss.

BAFTNMP 530 Advanced Practical Film Making - Music Videos

Objectives:

To introduce the process of Music Video

To understand the production pipeline of Music Video

To understand the entire workflow in Music Video making process

To gain exposure on various cameras and software used for production of Music Video

The students will undergo the process of Music Video. The students will be exposed to professional HD cameras & software and will work on projects ranging from 5Mins-8mins. The students will be exposed to the production workflow in music Video.

Semester VI

BAFTNMP 631 Final Project- Short Film (30 minutes)

Comprehensive, which will include writing an original story to production and distribution of film in the national and international circuit. It will also involve creating a blog, FB page, website for the film. Write a report on the roles performed by each student. The students will have to make a 30 minute short fiction project.

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AC – 17/05/2022
Item No. – 5.1(R)

UNIVERSITY OF MUMBAI

Revised Syllabus for S.Y.B.A. (English) (Ancillary) and

(Applied Component)

Semester - Sem V and VI

(Choice Based Credit System)

(With effect from the academic year 2022-23)

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**S.Y.B.A. (English) (Ancillary) and (Applied Component)**
2	Eligibility for Admission	F.Y.B.A.
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	02 years & 04 semesters
6	Level	~~P.G.~~ / U.G./ ~~Diploma / Certificate~~ (Strike out which is not applicable)
7	Pattern	~~Yearly~~ / Semester (Strike out which is not applicable)
8	Status	~~New~~ / Revised (Strike out which is not applicable)
9	To be implemented from Academic Year	From Academic Year **2022-2023**

Date: 25/10/2021

Signature :

Name of BOS Chairperson / Dean : **Dr. Sudhir Nikam**

University of Mumbai

Revised Syllabus for S.Y.B.A. (English)

(Ancillary) & (Applied Component)

Semester- III / IV

(Choice Based Credit System)

With effect from the academic year 2022-23

Board of Studies in English

Dr. Sudhir Nikam (Chairperson)

Dr. Rajesh Karankal (Member)

Dr. Santosh Rathod (Member)

Dr. Bhagyashree Varma (Member)

Dr. Deepa Mishra (Member)

Dr. B. N. Gaikwad (Member)

Dr. Dattaguru Joshi (Member)

Dr. Satyawan Hanegave (Member)

Dr. Deepa Murdeshwar-Katre (Member)

University of Mumbai

Syllabus for S.Y.B.A. (English) (Ancillary)

Program: B.A.

Course: Optional English: Introduction to Drama

Paper II

(Choice Based Credit System with effect from the Academic Year 2022- 2023)

1. Syllabus as per Choice Based Credit System (CBCS):

i)	**Name of the Program**	**:** S.Y.B.A. English (Ancillary)
ii)	**Course Code**	**:** Semester III UAENG301 & Semester IV UAENG401
iii)	**Course Title**	**: Optional English: Introduction to Drama Paper II**
iv)	**Semester wise Course Contents**	**:** Enclosed the copy of the syllabus
v)	**References and Additional References:**	Enclosed in the Syllabus
vi)	**Credit Structure**	03
vii)	**No. of lectures per Unit**	15
viii)	**No. of lectures per week**	03
2.	**Scheme of Examination**	**:** 5 Questions of 20 marks each
3.	**Special notes, if any**	**:** No
4.	**Eligibility, if any**	**:** No
5.	**Fee Structure**	**:** As per University Structure

6. Special Ordinances / Resolutions if any: No.

SYBA English (Ancillary) Course Title

Optional English: Introduction to Drama

Paper II

(100 Marks Examination Pattern)

Objectives of the Course:

- To create interest and develop passion amongst learners towards drama (and theatre)
- To familiarize learners with the salient elements and characteristics of drama
- To introduce learners to different forms and types of drama
- To introduce learners to the trends and characteristics of significant dramatic movements through representative dramas
- To equip the learners with the tools and techniques to critically appreciate drama
- To inculcate and propagate human values reflected in the plays among learners
- To demonstrate that drama is reflection / representation of life
- To Develop analytical skills and critical thinking through close reading of drama

Course Outcomes:
By the end of the course, a learner will:

- develop interest and passion for drama (and theatre).
- be familiarized with the salient elements and characteristics of drama.
- be able to identify the different forms and types of drama.
- be capable to identify the various trends and characteristics of significant dramatic movements through the representative dramas.
- be equipped with the tools and techniques to critically appreciate drama.
- imbibe human values reflected in the selected plays.
- justify that drama is reflection / representation of life.
- develop analytical skills and critical thinking through close reading of the represnttative dramas.

Semester III:	**Paper II**	**Total Credits: 03**
Course Title: Optional English: Introduction to Drama		

Total Lectures: 45

Course Content

Unit 1: **No. of lectures: 15**

Definition, Concept and Significance of Drama

Origin and Development of Drama

Terms and Concepts associated with Drama:

Plot (Main Plot, Sub-plot, Simple, Complex, Peripeteia and Anagnorisis, Exposition, Complication, Resolution, Denouement, Climax, Anti-climax)

Character (Hero, Villain, Confidante, Foil)

Act and Scene,

Soliloquy and Aside,

Music, Chorus Lights, Masks, Proscenium Arch, Play within Play, Subtext, Catharsis, Hamartia, Comic relief, Unity of action, time and place, Narrator and Sutradhar, etc.

Unit 2: **No. of lectures: 15**

Sophocles : *Oedipus Rex / Oedipus, The King*

OR

John Galsworthy : *Strife*

Unit 3: **No. of lectures: 15**

Girish Karnad : *Flowers*

OR

Mohan Rakesh : *Half-way House (Adhe Adhure)*

Evaluation: First Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

Semester IV:	**Paper II**	**Total Credits: 03**
Course Title: Optional English: Introduction to Drama		

Total Lectures: 45

Course Content

Unit 1: **No. of lectures: 15**

Types of Drama (based on form, content, function, theme, style, etc.):

Interlude, Chronicle Plays, Mystery Plays, Miracle Plays, Morality Plays, Romantic Comedy, Comedy of Humours, Restoration Comedy of Manners, Sentimental Comedy, Senecan Plays or Revenge Plays, History Plays, Heroic Drama, Blank Verse Drama, Poetic Drama / Verse Drama, Drama of Ideas / Problem Play, Expressionist Plays, Epic Theatre, Absurd Plays, Plays by Angry Young Men, Kitchen Sink Drama, Theatre of Cruelty, Comedy of Menace, etc.

Unit 2: **No. of lectures: 15**

Eugene O'Neil : *The Hairy Ape*

OR

Lorraine Hansberry : *A Raisin in the Sun*

Unit 3: **No. of lectures: 15**

Wole Soyinka : *The Lion and the Jewel*

OR

David Williamson : *The Removalists*

Evaluation: Second Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

References:

Abrams, M. H. and Harpham, Geoffrey Galt. *A Glossary of Literary Terms.* Cengage Learning, 2015.

Ackerman, Alan Louis, editor. *Reading Modern Drama*. University of Toronto Press, 2012.

Albert, Edward. *History of English Literature.* Oxford UP, 2009.

Andermahr, Sonya. et al. *A Glossary of Feminist Theory.* Arnold, 2000.

Athenian Society. *Drama, Its History.* Nabu Press, 2012.

Auger, Peter. *The Anthem Glossary of Literary Terms and Theory.* India, Anthem Press, 2011.

Baldick, Chris. *Oxford Dictionary of Literary Terms*. Cambridge UP, 2008.

Bennett, Andrew and Nicholas Royle. *An Introduction to Literature, Criticism and Theory*. Routledge, 2004.
Bharatamuni. *The Natyasastra.* Translated by Manmoham Ghosh, The Royal Asiatic Society of Bengal, 1959.
Birch, Dinah, editor. *The Oxford Companion to English Literature*. Oxford UP, 2009.
Boulton, Marjorie. *The Anatomy of Drama*. Routledge, 2015.
Brandon, James R. *Theatre in Southeast Asia.* Harvard UP, 2009.
Brooks, Cleanth and Heilman, Robert B. - *Understanding Drama.* Creative Media Partners, 2018.
Cavanagh, Dermot Alan Gillis et.al., editors. *The Edinburgh Introduction to Studying Literature.* Edinburgh UP, 2010.
Chakrabarti, Piyas. *Anthem Dictionary of Literary Terms and Theory.* Anthem Press, 2006.
Chakraborty, Kaustav. *Indian Drama in English*. PHI Learning Pvt. Ltd., 2014.
Chatterji, Suniti Kumar. *Indian* Drama. The Publications Division, Ministry of Information and Broadcasting, Government of India, National Printing Works, 1956.
Childs, Peter. *The Routledge Dictionary of Literary Terms.* Routledge, 2006.
Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries.* Orient BlackSwan, 2014.
Cuddon, J. A. *A Dictionary of Literary Terms and Literary Theory.* Wiley-Blackwell, 2013.
Culler, Jonathan. *Literary Theory: A Very Short Introduction*. Oxford UP, 2000.
Dawson, S. W. *Drama & the Dramatic*. Routledge, 2018.
Esslin, Martin. *An Anatomy of Drama*. Hill and Wang, 1981.
Fleming, Mike. *Starting Drama Teaching*. Routledge, 2017.
Ford, Boris. *The Pelican Guide to English Literature.* Volume I to X. Penguin Books,1991.
Galsworthy, John. *Strife.* Books Way, 2021.
Gibson, Arthur. *What is Literature.* Peter Lang Pub Inc, 2007.
Hansberry, Lorraine. *A Raisin in the Sun.* Vintage, 2004.
Hudson, W. H. *An Introduction to the Study of English Literature.* G. K. Publishers Pvt. Ltd., 2011.
Hudson, W. H. *An Outline History of English Literature.* G. K. Publishers Pvt. Ltd., 2011.
Karnad, Girish. *Collected Plays Vol. II.* edited by Aparna Bhargava Dharwadker, Oxford UP, 2011.
Keith, A. Berriedale, *The Sanskrit Drama: In its Origin, Development Theory & Practice*. Oxford UP, 1998.
Kennedy X. J. and Dana *Gioia. An Introduction to Fiction, Poetry, and Drama.* HarperCollins College Publishers Inc., 1995.
Klages, Mary. *Key Terms in Literary Theory*. Continnum International, 2012.
Krasner, David. *A History of Modern Drama*. Volume I, Wiley-Blackwell, 2012.
Krasner, David. *A History of Modern Drama*. Volume II 1960-2000, Wiley-Blackwell, 2016.
McClinton-Temple, Jennifer. *Encyclopaedia of Themes in Literature*. Facts on File Inc., 2006.
Michael. *A History of English Literature*. Palgrave Macmillan, 2000.
Naik, M. K. *A History of Indian English Literature*. Sahitya Akademi, 2009.
Nicoll, Allardyce. *The Theory of Drama*. Doaba Publications, 1998.
O'Neil, Eugene. *The Hairy Ape.* Good Press, 2019.
Prasad, Birjadish. *Background of the Study of English Literature*. Macmillan, 1999.
Pritner, Cal, and Scott E. Walters. *Introduction to Play Analysis*. Waveland Press, 2017.
Quinn, Edward. *A Dictionary of Literary and Thematic Terms.* Facts on File Inc., 2006.
Rakesh, Mohan. *Halfway House.* Translated by Bindu Batra. Worldview Publications, 1999.
Rees, R. J. *English Literature: An Introduction to Foreign Readers*. Macmillan, 1982.
Rush, David. *A Student Guide to Play Analysis*. Carbondale, IL: Southern Illinois UP, 2005.
Salgado, Gamini. *English Drama: A Critical Introduction.* St. Martin's Press, 1980.

Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford UP, 2004.
Shepherd-Barr, Kirsten. *Modern Drama: A Very Short Introduction*. Oxford UP, 2016.
Sophocles. *Oedipus Rex*. edited by R. D. Dawe, Cambridge UP, 2006.
Soyinka, Wole. *The Lion and the Jewel*. Oxford UP, 1974.
Styan, J. L. *Elements of Drama.* Cambridge UP, 2001.
Styan, J. L. *Modern Drama in Theory and Practice.* Cambridge UP, 1980.
Turco, Lewis. *The Book of Literary Terms.* UP of New England, 1999.
Walsh William, *Commonwealth Literature.* Oxford UP, 1973.
Widdowson, Peter. *The Palgrave Guide to English Literature and its Contexts 1500-2000.* Palgrave Macmillan, 2004.
Williamson, David. *The Removalists*. Currency Press, 1980.

Activity: Students should be encouraged to perform any scene or act from any play.

MOOCs:

Merin Simi Raj. Twentieth Century American Drama. IIT Madras.
https://nptel.ac.in/noc/courses/noc21/SEM2/noc21-hs75/

Prof. Aysha Iqbal. American Literature and Culture. IIT Madras.
https://nptel.ac.in/noc/courses/noc21/SEM2/noc21-hs63/

Chattopadhyay, Sayan. 'Introduction to Literary Theory.' IIT Kanpur.
https://onlinecourses.nptel.ac.in/noc20_hs82/preview

Perui, Avishek . 'Gender and Literature'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs59/preview

Raj, Merin Simi. 'History of English Language and Literature'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs52/preview

Perui. Avishek. 'Feminists Writings'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs58/preview

Web Resources:

1. https://youtu.be/2CVO9Vd067U (Greek Theatre Explained)
2. https://youtu.be/4_XPcAwmuLg (Ancient Greek Theatre and Machinery)
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The Removalists: A Study Guide

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University of Mumbai

Syllabus for S.Y.B.A. (English) (Ancillary)

Course: Optional English: Introduction to Poetry

Paper III

(Choice Based Credit System with effect from the Academic Year 2022-2023)

1. Syllabus as per Choice Based Credit System (CBCS):

i) Name of the Program **:** S.Y.B.A. English (Ancillary)

ii)	**Course Code**	**:** Semester III UAENG302 & Semester IV UAENG402
iii)	**Course Title**	**: Optional English: Introduction to Poetry Paper III**
iv)	**Semesterwise Course Contents**	**:** Enclosed the copy of the syllabus
v)	**References and Additional References:** Enclosed in the Syllabus	
vi)	**Credit Structure**	03
vii)	**No. of lectures per Unit**	15
viii)	**No. of lectures per week**	03
2.	**Scheme of Examination**	**:** 5 Questions of 20 marks each
3.	**Special notes , if any**	**:** No
4.	**Eligibility, if any**	**:** No
5.	**Fee Structure**	**:** As per University Structure

6. Special Ordinances / Resolutions if any: No.

SYBA English (Ancillary) Course Title:

Optional English: Introduction to Poetry

Paper III

(100 Marks Examination Pattern)

Objectives of the Course:

- To introduce students to different genres and forms of poetry
- To sensitize them to the rhythmical and formal properties of poetry by introducing key elements of poetry
- To provide them with basic poetic devices for analyzing poems
- To introduce them to the trends and characteristics of significant poetic movements through representative poems
- To develop their skills in reading, writing and to critically appreciate poetry
- To introduce students to poetry produced in various social and cultural context

Course Outcome: By the end of the course, a student should develop the ability to:

- Identify different genres and forms of poetry
- Identify poetic technique, style and rhetorical devices used in poetry
- Critically appreciate poems by separating various component parts and investigating the relationship of the parts to the whole
- Demonstrate understanding of wide range of poems from different historical periods, written in a wide range of forms, styles and subject matter
- Identify the major poets of world literature and define the importance of their works
- Enhance their cultural sensitivity through reading of representative poems from diverse cultural context

Semester III: Paper III Total Credits: 03

Course Title: Optional English: Introduction to Poetry

Total Lectures: 45

Unit I **15 Lectures**

A) Elements of Poetry: Turns of Speech: Voice and persona, tone, mood, attitude; Diction: Denotation and connotation; Imagery; Symbol; Allegory; Figurative Language; Music: Rhyme and Rhythm, Scansion (scansion to be taught and practiced; not for evaluation)

B) Types of Verse: Nature, characteristics and functions: Epic, lyric, sonnet, elegy, ode, ballad, dramatic monologue and free verse

Unit II **15 Lectures**

John Milton :'Invocation' (from *Paradise Lost*), Book 1, Lines 1-26

Robert Frost :'The Road Not Taken'

Edmund Spenser : 'Men Call you Fayre…'(*Amoretti* LXXIX)

William Shakespeare : Sonnet 19, 'Devouring Time, blunt thou the Lion's paws'

Walt Whitman :'O Captain! My Captain!'

Ralph Waldo Emerson: 'Ode to Beauty'

W. B. Yeats : 'The Song of Wandering Aengus'

Unit III **15 Lectures**

John Keats : 'La Belle Dame sans Merci'

Alfred Lord Tennyson: 'Ulysses'

Rabindranath Tagore : 'Freedom'

Sarojini Naidu : 'Indian Weavers'

Wole Soyinka : 'To My First White Hairs'

Pablo Neruda : 'You Start Dying Slowly'

Nissim Ezekiel : 'Enterprise'

Evaluation Pattern:

Third Semester End Examination Pattern	**Duration: 3 Hours**	**Marks: 100**
Question 1(A): Short notes on Unit I (A)	(2 out of 4)	:10 Marks
and		
Question 1 (B): Short notes on Unit I (B)	(2 out of 4)	:10 Marks
Question 2: Essay on Unit II	(1out of 3)	:20 Marks
Question 3: Essay on Unit III	(1 out of 3)	:20 Marks
Question 4: Short Notes on Unit II	(2 out of 4)	:20 Marks
Question 5: Short Notes on Unit III	(2 out of 4)	:20 marks

Semester IV:	**Paper III**	**Total Credits:03**
	Course Title: Introduction to Poetry	
		Total Lectures: 45

Unit I: Trends and Movements in Poetry: Modernism and after **15 Lectures**

Modernism, War Poetry, Harlem Renaissance, Imagism, Symbolism, Surrealism, Confessional Poetry, Beat poetry, Modernism in Indian English Poetry

Unit II **15 Lectures**

T.S. Eliot :'The Love Song of J. Alfred Prufrock'

Wilfred Owen :'Anthem for Doomed Youth'

Claude McKay :'If We Must Die'

William Carlos Williams :'The Red Wheelbarrow'

Wallace Stevens :'Sunday Morning'

Kamala Das :'An Introduction'

Arun Kolatkar :'The Bus'

Unit III **15 Lectures**

Phillip Larkin :'Church Going'

Robert Creeley : 'I Know a Man'

Meena Kandasamy :'Touch'

Gabriel Okara: : 'The Mystic Drum'

Chinua Achebe : 'Refugee Mother and Child'

Margaret Atwood : 'This is a Photograph of Me'

Derek Walcott : 'A Far Cry from Africa'

Evaluation Pattern:

Fourth Semester End Examination Pattern	**Duration: 3 Hours**	**Marks: 100**

Question 1: Short notes on Unit I	(4 out of 6)	:20Marks
Question 2: Essay on Unit II	(1out of 3)	:20 Marks
Question 3: Essay on Unit III	(1 out of 3)	:20 Marks
Question 4: Short Notes on Unit II	(2 out of 4)	:20 Marks
Question 5: Short Notes on Unit III	(2 out of 4)	:20 marks

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MOOCs:

Dhanwal, S. P. 'Poetry'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs64/preview
Chattopadhyay, Sayan. 'Introduction to Literary Theory.' IIT Kanpur.
https://onlinecourses.nptel.ac.in/noc20_hs82/preview
Perui, Avishek . 'Gender and Literature'.IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs59/preview
Raj, Merin Simi. 'History of English Language and Literature'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs52/preview
Perui. Avishek. 'Feminists Writings'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs58/preview

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University of Mumbai

Syllabus for S.Y.B.A. (Applied Component)

Course: Business Communication

Paper I & II

(Choice Based Credit System with effect from the Academic Year 2022-2023)

1. Syllabus as per Choice Based Credit System (CBCS):

i.	**Name of the Program**	**:** S.Y.B.A. (Applied Component)
ii.	**Course Code**	**:** Semester III (UABC301) Semester IV (UABC401)
iii.	**Course Title**	**: Business Communication Papers I and II**
iv.	**Semester wise Course Contents**	**:** Enclosed in the Copy of the Syllabus
v.	**References & Additional References**	**:** Enclosed in the Syllabus
vi.	**Credit Structure**	**:** Number of credits per Semester – 02
vii.	**No. of lectures per Unit**	**:** As mentioned in the syllabus
viii.	**No. of lectures per week**	04

2.	**Scheme of Examination**	**: 05 Questions** of 20 Marks each
3.	**Special notes, if any**	**:** No
4.	**Eligibility, if any**	**:** No
5.	**Fee Structure**	**:** As per University Fee Structure
6.	**Special Ordinances / Resolutions if any**	**:** No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Business Communication

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course: This course aims to introduce students with

- To build up comprehensive understanding of business correspondence and conditions.
- To create influential oral, written and practical skills among students.
- To develop the powerful utilization of communication technologies.
- To equip students with the career skills such as collaborative working at workplace, interviews, etc.

Course Outcome: At end of the course learners will develop

- Theoretical understanding of both business and communication
- The business correspondence techniques.
- Competency in effective use of media and electronic devices in business.
- Interpersonal skills, presentation skills, oral, written and listening skills.

Semester III: Applied Component: Paper-I Total Credits: 02 **Course Title: Business Communication**

Total Lectures: 60

Unit I : Theory of Communication (05)

- Concept of Communication
- Meaning
- Definition
- Process
- Need
- Feedback
- Emergence of Communication as a key concept in the Corporate and Global world

Unit II : Communication at the Workplace

i. Channels of Communication (03)

Formal and Informal – Vertical, Horizontal, Diagonal and Grapevine

ii. Methods of Communication (05)

Verbal, Non-Verbal and Visual (including Kinesics, Para-Language, Proxemics, Silence, Sign, Signal and Symbol)

iii. Business Etiquette **(04)**

Office Etiquette, Internet Etiquette / Netiquette, Business Card Etiquette, Handshake Etiquette, Mobile Phone Etiquette

iv. Barriers to Communication and Ways to Overcome Them **(06)**

Physical or Environmental, Semantic or Language, Psychological and Cross-Cultural Barriers

Ways to Overcome these Barriers

v. Listening **(04)**

What is Listening?
The Listening Process
Importance of Good Listening
How to Develop Effective Listening Skills
Obstacles to Listening

vi. Business Ethics **(07)**

What is Ethics? Business Ethics?
Importance of Business Ethics at Workplace
Digital Ethics
Environmental Ethics
Ethics in International Business
Corporate Social Responsibility

Unit III: New Media in Communication **(07)**

- Impact of Technology Enabled Communication
- Video Conference: Skype, Google Meet, Go-To-Meeting and Jio-Meet
- Social Media: WhatsApp, Twitter, Facebook, Instagram, Telegram and Blogs

Unit IV: Business Correspondence

i. Theory of Business Letter Writing **(05)**

- Principles of Effective Letter Writing
- Parts of a Business Letter
- Layout of a Business Letter (Full Block)

ii. Personnel Correspondence **(09)**

Job Application Letter and Resume
Letter of Recommendation
Letter of Appointment
Letter of Acceptance of Job Offer
Letter of Appreciation
Letter of Resignation

Unit V : Paragraph Writing and Book Review

i. Paragraph Writing **(02)**

Developing an idea, using appropriate linking devices, etc.
Cohesion and Coherence, etc.

ii. Book Review **(03)**

Steps in writing a book review: Introduction, Summary, Opinion and Conclusion
Recommended Books are: *The Wings of Fire* by Dr. APJ Abdul Kalam,
Bhujia Barons: *The Untold Story of How Haldiram Built a 5000 Crore Empire* by Pavitra Kumar and
The 7 Habits of Highly Effective People by Stephen Covey

Evaluation Pattern:

Third Semester	**End Examination Pattern**	**Duration: 3 Hours**	**Marks: 100**

Question 1. **:20 Marks (10+05+05)**

A. Explain the terms in 2 to 3 sentences (five out of eight) (from all Units)

B. Objective type questions (From all Units)

C. True or False (From all Units)

Question 2. Short Notes (four out of six) (From Unit – I and III) **:20 Marks**

Question 3. Essay Type Questions (two out of three (From Unit – II) **:20 Marks**

Question 4. Personnel Letters (four out of five) **:20 Marks**

Letter of Recommendation

Letter of Appointment

Letter of Acceptance of Job Offer

Letter of Appreciation

Letter of Resignation

Question 5. **20 Marks (10+05+05)**

A. Job Application Letter with Resume (05+05)

B. Book Review

C. Paragraph Writing

Semester IV:	Title of the paper:	Paper- II	Total Credits:03
	Course Title: Business Communication		

Total Lectures: 60

Unit I : Group Communication

i. Group Discussion and Interview **(08)**

- Group Discussion

What is GD? Effective Participation in GD, Role of Participants in GD and Role of Evaluators

- Interview, Definition

Preparing for an interview: the Interviewer and the Interviewee

Types of interview: Selection Interview, Appraisal Interview, Stress Interview, Exit Interview and Online Interview

- Soft Skills - Emotional Quotient (EQ), Conflict Management

ii. Meetings **(10)**

- Need and Importance of Meetings
- Types of Meetings: Formal and Informal Meetings
- Preparation and Conduct of Formal Meetings and Group Dynamics
- Role of the Chairperson
- Role of the Participants
- Drafting of Notice, Agenda and Resolutions
- Secretary: Types of Secretaries- Company Secretary/Private Secretary, Functions of Secretaries.

iii. Committees and Conferences **(08)**

- Committee

Definition of Committee

Types of Committees

Advantages and Disadvantages of Committee

- Conference

Definition of Conference

Organizing a Conference

Advantages and Disadvantages of organizing a conference

Unit II: Public Relations **(10)**

- Meaning
- Functions of the PR Department of an Organization
- Qualification of a PRO
- External and Internal Measures of Promoting PR
- Crisis Management
- Definition
- Causes of Crisis
- Types of Crisis
- Stages for Crisis Management

- Role of Crisis Manager

Unit III: Business Correspondence **(10)**

- Letters of Inquiry
- Letters of Reply to Inquiry
- Letters of Complaint, Claim and Adjustments
- Sales Letters
- Consumer Grievance Redressal Letters

Unit III : Report Writing **(06)**

- Parts of a Business Report
- Drafting Feasibility Reports
- Drafting Investigative Reports

Unit V : Language and Writing Skills **(08)**

i. Presentation Skills

- Principles of Effective Presentation
- Use of PPT
- How to make effective Power-Point Presentation

ii. Interactive Sessions (Not to be assessed in exam)

- Group Discussion
- Mock Interview

Evaluation Pattern:

Fourth Semester End Examination Pattern	**Duration: 3 Hours**	**Marks: 100**

Question 1. Short Notes (four out of six) **:20 Marks**
(From Unit – I Group Discussion, Interviews, Meetings)

Question 2. Essay Type Questions (two out of three) **:20 Marks**
(Based on Committees, Conferences and Public Relations)

Question 3. Trade Letters (four out of five) **:20 Marks**
Letters of Inquiry
Letters of Reply to Inquiry
Letters of Complaint, Claim and Adjustments
Sales Letters
Consumer Grievance Redressal Letters

Question 4. Answer the following questions **:20 Marks (10+10)**

A. Drafting Notice, Agenda and Two Resolutions (03+03+04)

B. Report Writing (One out of two) (10)

Question 5. Answer the following questions. **:20 Marks (10+05+05)**

A. Explain the terms in 2 to 3 sentences (five out of eight) (from all Units)

B. Multiple Choice Questions (From all Units)

C. Short Notes (From Unit-V (i) Presentation Skills)

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Books for Book Review:

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2. Covey, Stephen. *The 7 Habits of Highly Effective People*. Electronic Ed. RosettaBooks LLC, 2012.
3. Kumar, Pavitra. *Bhujia Barons: The Untold Story of How Haldiram Built a 5000 Crore Empire*. Potfolio/Penguin, 2016.

Web Resources:

1. http://lifehacker.com/top-10-ways-to-improve-your-communication-skills- 1590488550
2. https://www.thebalance.com/verbal-communication-skills-list-2059698
3. https://bemycareercoach.com/soft-skills/list-soft-skills.html
4. https://www.thebalance.com/verbal-communication-skills-list-2059698
5. https://bemycareercoach.com/soft-skills/list-soft-skills.html
6. https://www.sitepoint.com/social-networking-sites-for-business

Suggested List of YouTube Videos:

1. https://www.youtube.com/watch?v=K15ca0n0ois
2. https://www.youtube.com/watch?v=ixSUB11WNxk
3. https://www.youtube.com/watch?v=K15ca0n0ois

MOOCs:

1. https://www.mooc-list.com/tags/communication-skills
2. https://www.mooc-list.com/tags/effective-communication
3. http://www.about.com/Communication+Skills+List

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UNIVERSITY OF MUMBAI

Syllabus for

S.Y.B.A. (Applied Component)

Course Title: Mass Communication

Paper I & II

(Choice Based Credit System with effect from the Academic Year 2022-2023)

7. Syllabus as per Choice Based Credit System (CBCS):

ix.	**Name of the Program**	**:** S.Y.B.A. (Applied Component)
x.	**Course Code**	**:** Semester III (UAMASSCOM301) Semester IV (UAMASSCOM401)
xi.	**Course Title**	**: Mass Communication** **Papers I and II**
xii.	**Semester wise Course Contents**	**:** Enclosed in the Copy of the Syllabus
xiii.	**References & Additional References**	**:** Enclosed in the Syllabus
xiv.	**Credit Structure**	**:** Number of credits per Semester – 02
xv.	**No. of lectures per Unit**	**:** As mentioned in the syllabus
xvi.	**No. of lectures per week**	04

8. **Scheme of Examination** **: 05 Questions** of 20 Marks each

9. **Special notes, if any** **:** No

10. **Eligibility, if any** **:** No

11. **Fee Structure** **:** As per University Fee Structure

12. **Special Ordinances / Resolutions if any** **:** No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Mass Communication

Paper I & II

(100 Marks Examination Pattern)

Learning Objectives:

1. To introduce some major aspects of communication, mass communication processes, crucial mass media theories and mass communication industries
2. To develop a broad perspective of the past and the present status of mass media in India
3. To comprehend different types of Mass Media and gain a critical understanding of the impact of mass media on Indian history, society and culture
4. To develop critical awareness of the ethics and ideologies in mass media products
5. To understand the mass media laws in India, and how these laws shape the media practices
6. To introduce students to the application of social media
7. To identify various careers opportunities in media industry.

Course Outcome:

By the end of the course the students should be able to

1. understand the importance, scope, and function of communication and media
2. understand the strengths and limitations of basic theories of mass communication
3. demonstrate knowledge of growth and development of various mass media
4. throw light on the present status of various mass media
5. gain knowledge about various media laws and ethics
6. critically understand and analyse various mass media products and explore various career opportunities in media industry.

Semester III – Paper I

Credits: 02

Lectures per week: 04 **Total lectures: 60 per semester**

Unit 1- Nature of Mass Communication (20 lectures)

A) Scope, need, and elements of communication

B) Meaning, definition, and features of Mass Communication

C) Mass media theories like Cultivation theory, Gatekeeping theory, Magic bullet/hypodermic needle theory

D) Functions of Mass Communication: entertainment, surveillance, education, interpretation, persuasion, socialization, opinion building

E) Mass audience & opinion leaders: concept, sociology and psychology

Unit II- Traditional media, Print Media and Radio (15 lectures)

A) Folk media

B) The making of a newspaper: major formats of newspaper items

C) Partisan Journalism/Yellow Journalism/Objective Reporting

D) Major types of magazines

E) Radio as a patron of music

F) Radio News, Radio Drama, Community Radio and Campus Radio

Unit III- Films/ Cinema (15 lectures)

A) History of Indian cinema and major milestones

B) Major types of films/cinema: Documentaries, Art films, Animations, Short films, and Biopics

C) Some aspects of film making (scripting, directing, sounds)

D) The impact of films/cinema on society

E) Ethics of cinema

Unit IV- Trends in New media or Digital media (10 lectures)

A) Online news websites

B) Social media and social networking sites

C) Special issues regarding social media: mass campaigns; fake news; fact-checkers

D) Film streaming services (Netflix, Amazon Prime)

E) Web series

Evaluation Pattern:

Third Semester End Examination

Duration: 3 Hours **100 Marks**

Q.1. Objective Type:

a) Explain the following in 2/3 sentences (5 terms from all the 4 units): 10 marks

b) Multiple choice questions (5 questions on all the 4 units): 05 marks

c) State whether the statements are true or false (5 statements on all the 4 units): 05 marks

Question No. 2 to 5 on Unit No. 1 to 4 respectively:

Q.2 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.3 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Q.4 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.5 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Semester IV – Paper II

Credits: 2

Lectures per week: 04 **Total lectures: 60 per semester**

Course Title: Mass Communication

Unit I- Evolution of Different Media and the Contemporary Context (10 Lectures)

A) Beginnings of mass media in India

B) Technological milestones and changing trends from conventional to digital media

C) Role of media in national development

D) Reach of media (regional and demographic coverage)

Unit II - Television (15 lectures)

A) Major formats of TV programmes

B) Television and its impact on Indian families

C) Television and consumerism

D) Television and surveillance

E) Reality Television

Unit III- Media-related Issues and Laws in India (20 lectures)

A) Freedom of expression and Censorship

B) Relationship between media and government

C) Media objectivity, media bias, and political leanings

D) Trial by media and media ethics (Television and Print)

E) Objectionable advertising

F) Information technology (IT) Acts related to media

G) Major laws in India related to media

Unit IV- Functions of Media Personnel and Careers in Media (15 lectures)

A) Cyber Journalism

B) Editors

C) Translators

D) Copywriters

E) Role of Radio Jockey/Video Jockey

F) Blogging

G) Writing jingles

H) Voice-over Artists

I) Public Relations specialists

J) Advertising/marketing specialists

K) Script-writers

L) Newsreaders

M) Researchers/Writers

N) Music specialists

O) Social media specialist

Evaluation Pattern:

Fourth Semester End Examination

Duration: 3 Hours **100 Marks**

Q.1 Objective Type:

a) Explain the following in 2/3 sentences (5 terms from all the 4 units) :10 marks
b) Multiple choice questions (5 questions on all the 4 units) :05 marks
c) State whether the statements are true or false (5 statements on all the 4 units):05 marks.

Question No. 2 to 5 on Unit No. 1 to 4 respectively:

Q.2 a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.3 a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.4 a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.5 a) 1 Full length essay type question : 20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

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3. Ahuja B. N. *History of Press., Press Laws and Communications*. New Delhi: Surjeet Publications, 1988.
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5. Baghel, Sanjay Singh (Ed.). *Social Media and Indian Youth*. New Delhi: Apple Books, 2015.
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14. Kamath. M V. *Professional Journalism*. New Delhi: Vikas Publishing House, 1980.
15. Kumar, Keval. *Mass Communication: A Critical Analysis*. Mumbai: Vipul Prakashan, 2002.
16. Menon, P. K. *Practical Journalism*. Jaipur: Aavishkar Publishers, 2005.
17. Narula, Uma. *Mass Communication: Theory and Practice.* New Delhi: Har Anand, 2001.
18. Parthasarathy, Rangaswamy. *Journalism in India*. (Fourth Ed.). New Delhi: Sterling Publication, 2011.
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21. Rodrigues, Usha and Maya Ranganathan. *Indian News Media: From Observer to Participant.* New Delhi: Sage, 2015.
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26. Singh, Anand Shanker (Ed.). *Role of Media in Nation Building*. Cambridge Scholars Publishing, 2016.
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8. Ram, N. "The Changing Role of the New Media in Contemporary India." December, 2011. https://www.thehindu.com/multimedia/archive/00863/Contemporary_India__863821a.pdf
9. Ray, G.N. "Media Ethics." *Press Council of India*. http://presscouncil.nic.in/OldWebsite/speechpdf/Media%20Ethics%20at%20IIMC,%20Dhenkanal.pdf

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UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.A. (English)
(Applied Component)
Program: B.A.

Course: Introduction to Journalism

(Choice Based Credit System with effect from the academic year 2022-2023)

1. Syllabus as per Choice Based Credit System with effect from the academic year 2021-2022

i)	**Name of the Program**	**: B.A.**
ii)	**Course Code**	**: Semester III UAJOUR301**
		Semester IV UAJOUR401
iii)	**Course Title**	**: S.Y.B.A. Introduction to Journalism**
		(Applied Component)
		SEM III: Fundamentals of Journalism and Reporting
		SEM IV: Editing, Feature Writing and Layout
iv)	**Semester wise Course Contents**	**: Enclosed the copy of syllabus**
v)	**References and Additional References:**	**Enclosed in the Syllabus**
vi)	**Credit Structure**	**: No. of Credits per Semester – 02**
vii)	**No. of lectures per week**	**04**
2.	**Scheme of Examination**	**: 5 Questions of 20 marks each**
3.	**Special notes , if any**	**: No**
4.	**Eligibility, if any**	**: No**
5.	**Fee Structure**	**: As per University Structure**
6.	**Special Ordinances / Resolutions if any**	**: No**

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Introduction to Journalism

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course

1) To acquaint the learners with the basic concepts of journalism and to familiarize them with the content of a newspaper and departments of the newspaper publishing house.
2) To sensitize them to the styles of journalistic prose
3) To inculcate in them the skills of reporting, editing and feature writing in print medium
4) To enable the students to have a career perspective in journalism

Course Outcomes: By the end of the course, a student should develop the ability:

- To write in various journalistic formats effectively
- To write and edit reports and features
- To develop a career perspective in journalism

Semester III: Fundamentals of Journalism and Reporting (Applied Component) Paper I
Course code-UAJOUR301 **Credits 2**

Total: 60 Lectures

Unit 1: Introduction: **12 lectures**

(i) What is news (ii) Origin and development of the Indian Press (iii) Major Press Laws in India: Adam's Regulations, Vernacular Press Act (iv) Press and Socio-Political issues in pre- and post-Independence India (v) Journalism during Freedom Movement (vi) Press during the Emergency (vii) Photo-journalism

Unit 2: Agencies, Electronic Journalism, Ethics: **12 lectures**

(i) News Agencies, (ii) Press Syndicate (iii) Electronic Journalism (iv) Ethics in Journalism

Unit 3: Organization and Structure of a Newspaper House: **12 lectures**

Circulation, Advertising, Editorial and Mechanical Departments

Unit 4: Basics of Reporting: **12 lectures**

News Value, News Gathering, Readers' interest, Qualities and aptitude necessary for a reporter, Types of reports

Unit 5: **Writing of Reports:** **12 lectures**

Basic principles: objectivity, accuracy, speed, clarity and integrity; Parts of a news report; 5Ws; Headline writing; Types of Leads; and Report writing

Evaluation:	**Third Semester End Examination Pattern**	**100 Marks**	**3 Hours**

Question 1: Essay (1/2) or Short Notes (2/4) on Unit 1 :20 Marks

Question 2: Essay (1/2) or Short Notes (2/4) on Unit 2 : 20 Marks

Question 3: Essay (1/2) or Short Notes (2/4) on Unit 3 : 20 Marks

Question 4: Essay (1/2) or Short Notes (2/4) on Unit 4 : 20 Marks

Question 5: Students to write a news report with clear headlines and lead on a given topic or essay (1/2) on the basics of reporting on Unit :20 Marks

Semester IV: Editing, Feature Writing and Layout (Applied Component) Paper 2

Course code-UAJOUR401 Credits 2

Total: 60 Lectures

Unit 1: Basics of Editing: **8 lectures**

Principles of editing, Editorial policy, Role of the Editor, Role of the News Editor, Role of Chief Sub-editor, Role of Sub-editors

Unit 2: Process of Editing: **16 lectures**

Compiling of data, Editing for language and style, Editing for space, Editing for correctness, Editing for clarity

Unit 3: Editing an Article: **12 lectures**

Students are expected to learn how to edit an article for newsworthiness, length and suitable expression.

Unit 4: Basics of Feature Writing: **12 lectures**

Types of features: Obits, Reviews, Columns, Trend Stories.

Students are expected to learn how to write a feature on a contemporary topic.

Unit 5: Design and Make up: **12 lectures**

Make up and its functions, Types of Layout: Horizontal, Vertical Make up, Circus Make up, Modular layout, Broadsheet layout, Tabloid layout, Fonts and Typography

Evaluation: Fourth Semester End Examination Pattern 100 Marks 3 Hours

Question 1: Essay (1/2) or Short Notes (2/4) on Unit 1 :20 Marks
Question 2: Essay (1/2) or Short Notes (2/4) on Unit 2 :20 Marks
Question 3: Edit an article or report. : 20 Marks
Question 4: Write a feature on a contemporary topic (1/2) :20 Marks
Question 5: Essay (1/2) or Short Notes (2/4) Unit 5 : 20 Marks

References

Kamath. M V. *Professional Journalism*. New Delhi: Vikas Publishing House, 1980.

Mencher, Melvin. *Basic News Writing*. New Delhi: Universal Book Stall, 1992.

Menon, P. K. *Practical Journalism*. Jaipur: Avishkar Publishers, 2005.

Natrajan. J. *History of Indian Journalism*. New Delhi: Ministry of Information and Broadcasting, 1995.
Parthasarathy, Rangaswami. *Basic Journalism*. New Delhi: MacMillan India Ltd. 1989.

Parthasarathy, Rangaswami. *Here is the News! Reporting for the Media*. New Delhi: Sterling Publishers, 1994.

Prasad, Sharada, Rukun Advani (et al) *Editors on Editing*. New Delhi: National Book Trust, 2004.

Selvaraj, Madhur. *News Editing and Reporting*. New Delhi: Dominant Publishers, 2005.

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Syllabus for S.Y.B.A. (Public Relations)

(Applied Component)

Program: B.A.

Course: Public Relations

(Choice Based Credit System with effect from the academic year 2022-2023)

1. Syllabus as per Choice Based Credit System:

i) Name of the Program : S.Y.B.A. (Applied Component)

Semester III and IV

ii) Course Code : UAPR3A1 & UAPR4A1

iii) Course Title : Public Relations Papers I & II

iv) Semester wise Course Contents : Enclosed the copy of syllabus

v) References and Additional References : Enclosed in the Syllabus

vi) Credit Structure : No. of Credits per Semester – 02

vii) No. of lectures per week 04

viii) No. of lectures per unit 15

2. Scheme of Examination : 5 Questions of 20 marks each

3. Special notes, if any : No

4. Eligibility, if any : No

5. Fee Structure : As per University Structure

6.Special Ordinances / Resolutions if any : No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Public Relations

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course:

- To introduce learners to the origin, basic concepts and activities of Public Relations.
- To motivate learners to practice various basic skills required for successful career in the field of Public Relations
- To give learners an insight about the significance, uses and functions of Public Relations.
- To explain the learners importance of ethics and professional code for PR practitioners.
- To explicate the learners the role and function of Public Relations for Corporate field, education institutions, local self-government, government and NGOs
- To create awareness among students about various career opportunities available in the field of public relations and also to motivate them to pursue the same

Course Outcomes: By the end of the course,

- Students will be able to understand and explain the basic components and aspects of the Public Relations
- Students will comprehend and recognise the importance of Public Relations for achieving success in the various fields like business, education, works carried out by various government, local government bodies as well as non-government organisations
- Students will be able to practice various communication skills required in the field of Public Relations as well as in other fields
- Students will opt for various careers like PR officer as well as attempt to pursue other career opportunities in the field of Public Relations

Semester Three: Public Relations: Paper 1 - 2 Credits

Lectures: 60

Unit 1: Introduction to Public Relations

- The concept of Public Relations: Origin, definitions, activities, and role of PR
- Objectives of Public Relations
- Evolution and the development of modern Public Relations
- Development of Public Relations in India, Pre and post-independence period.

Unit 2: Principles, Components and importance of Public Relations for various sectors

- Principles of Public Relations
- Components of PR-Employees Relations, Industrial Relations, Community Relations, Customer Relations, Financial Relations, Press Relations, Government Relations and Liaison, Special Events, Counseling Research, Publicity, Fundraising/Launches
- Importance of Public Relations in business, industry, and for governmental, Public, nonprofit, nongovernmental organizations such as cultural, sports, educational organizations like trusts, clubs, schools, colleges etc.
- Misconceptions about PR –Propaganda, Fine Appearance, Free Gifts, Annual Parties, Protocol, Goodwill

.

Unit 3 : Process of Public Relations

- Defining the model, planning, execution and evaluation of the Action Plan of PR process
- Importance of communication in the process of PR, including theory, objectives, types, barriers, art of listening and communication skills required for successful process of PR
- Process and activities of Internal PR
- Process and activities of External PR

Unit 4 : Functions and tools of PR

- Functions and uses of Public Relations
- Media tools for PR- Press Release, Press Conference, Special Issue, News Clippings, Photo Gallery, Meetings
- Specific tools for PR- Family get together and outing, cultural programme for employees, Celebration of foundation day, week for specific purpose, camp, competition, lecture series, exhibition, open day, sponsorship, newsletter, in- house Journal etc.
- Crisis Management as PR function-types, guiding principles, preparation and role of PR in the Crisis management, services provided by PR during the crisis, the review of Crisis Management, Crisis communication in the times of Industrial disaster, consumer pressures, image problems, quality issues

Evaluation Pattern:
Third Semester End Examination
Duration:3 Hours 100 Marks

Question1. Objective type questions: (based on all units)

a) Explain the following concepts in three to five sentences each. (**Any five**) :**10 Marks**

(**7 Short answer Questions should be framed**)

b) Match the following pairs. :**05 marks**

c) State whether the following statements are true or false. **:05 marks**

Question 2. Based on Unit 1

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 3. Based on Unit 2

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 4. Based on Unit 3

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Question 5. Based on Unit 4

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Semester Four: Public Relations :Paper 2 - 2 Credits

Lectures: 60

Unit 1: Public Relations in Corporate Business

- Image Building of the brand, company and constituents of Image Building
- Corporate Social Responsibility and Public Relations
- New trends in corporate Public Relations-Benchmarking, Consultancy, Team Building, Branding and Image Building, Public Opinion, ICT technology and Digital Social Media like Facebook, twitter, linkedin, blogs etc.
- Corporate Citizenship and Public Relations
- Professional nature of Public Relations, reasons and factors responsible for the development of professional nature of public relations in business world, Research and training in the Public Relations

Unit 2: Ethics and Code of Conduct in PR

- Principles of Public Relations Practice
- Code of Ethics prescribed by PR Society of India
- IPRA Code of Conduct
- Purpose of Professional Bodies
- Code of AIR and T.V. Channels
- Code of commercial advertising on T.V. Channels
- Advertising and PR ethics.
- Impact of PR on the society

Unit 3: Public Relations in Practice

- Qualities of a PR Practitioner
- Areas of Work (Functions) of Public Relations Practitioners—Writing, Editing, Media Relations, Special Events, Mass Media Production ,Corporate Counseling, Crisis Communication, Managing News and Features
- Effective Oral Communication skill
- Skills for PR -Effective Public Speaking, Writing Skills, Debating Skills, Group Interaction.
- Written Communication and Audio-Visual Aids for PR

Unit 4: Public Relations and other related areas

- PR and Marketing, PR and Journalism, PR and Business Communication, PR and Psychology
- PR and advertising, types, creativity, message through entertainment, correlation and differences between PR and advertising
- PR Campaign
- Relations with Shareholders, Relations with Dealer – Distributor, Relations with Financial Institutions, Relations with other Business Groups Community Relations, Consumer Relations.

Evaluation Pattern:

Fourth Semester End Examination

Duration:3 Hours 100 Marks

Question1. Objective type questions: (based on all units)
a) Explain the following concepts in three to five sentences each. (**Any five**) :**10 Marks**
(7 Short answer Questions should be framed)
b) Match the following pairs. :**05 marks**
c) State whether the following statements are true or false. **:05 marks**

Question 2. Based on Unit 1

a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 3. Based on Unit 2
a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 4. Based on Unit 3
a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Question 5. Based on Unit 4
a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Suggested Readings :-

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Web Resources

The Era of Corporate Social Responsibility is Ending | Rachel Hutchisson | TEDxWilmington, @ https://www.youtube.com/watch?v=N8dXNzCIVxg accessed on 10th July 2020

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Re-thinking corporate social responsibility: Andy Le Seelluer at TEDxStHelier,@ https://www.youtube.com/watch?v=jga4s0Ei7Zs accessed on 15th July 2020

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About PR in general: https://apps.prsa.org/AboutPRSA/PublicRelationsDefined/ accessed on 26th July 2020
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UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.A.
(Women's Studies) (Applied Component)
Program: B.A.

Course: Women's Studies

(Choice Based Credit System with effect from the academic year 2022-2023)

1. Syllabus as per Choice Based Credit System:

i)	**Name of the Program**	**: B.A.**
ii)	**Course Code**	**: Semester III (UAWS3A1) and Semester IV (UAWS4A1)**
iii)	**Course Title**	**: Women's Studies (Applied Component)**
iv)	**Semester wise Course Contents**	**: Enclosed the copy of syllabus**
v)	**References and Additional References: Enclosed in the Syllabus**	
vi)	**Credit Structure**	**: No. of Credits per Semester – 02**
vii)	**No. of lectures per week**	**04**

2.	**Scheme of Examination**	**: 5 Questions of 20 marks each**
3.	**Special notes , if any**	**: No**
4.	**Eligibility, if any**	**: No**
5.	**Fee Structure**	**: As per University Structure**

6. Special Ordinances / Resolutions if any : No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Women's Studies

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course:

i. To enable an understanding of concepts such as sex and gender, patriarchy
ii. To enable an understanding of the construction of gender
iii. To provide insight into the workings of patriarchy and its oppressive nature
iv. To familiarize students with an understanding of feminist theory and the schools of feminist thought
v. To empower students with a knowledge of women's rights and legal safeguards
vi. To provide an understanding of major historical developments and feminist movements in feminist history
vii. To engender a critical understanding of literary and media texts dealing with women's issues

Course Outcome: By the end of the course, a student should develop the ability:

i. To articulate concepts linked to gender and feminism
ii. To have an understanding of patriarchy
iii. To have an awareness of crimes against women, and the constitutional and legal safeguards protecting / empowering women
iv. To have knowledge and understanding of feminist theory
v. To have a knowledge of feminist history
vi. To analyze and critically evaluate literary and media texts dealing with women's issues
vii. To be gender-sensitive, have a feminist outlook, and combat stereotypes and gender biases prevalent in society

Semester Three: Women's Studies :
Paper 1 (Applied Component) 2 Credits

Lectures: 60

Unit 1: An Introduction to Concepts, and the Scope and Practice of Women's Studies

a) Women's Studies: Relevance, Prospects and the Indian Context
b) Sex, Gender and Biological Determinism
c) Patriarchy as an oppressive ideology
d) Three Waves: Feminine, Feminist and Female

Unit 2: Schools of Feminism and Feminist Theory

a) Liberal Feminism
b) Marxist Feminism
c) Psychoanalytical Feminism
d) Radical Feminism

Unit 3: Combatting Crimes and Discrimination - Constitutional and Legal Safeguards for Women

a) Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)
b) National Policy on Empowerment of Women
c) Laws and safeguards against Rape and Sexual Harassment: Indian Penal Code; the Indecent Representation of Women Prohibition Act, 1987; the Vishakha Guidelines; the 'Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013'; the Internal Complaints Committee in organizations; the Zero FIR
d) Laws related to Women and Pregnancy: Maternity Benefit Act, 1961; Medical Termination of Pregnancy Act, 1971; The Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act, 2003; the Surrogacy (Regulation) Bill, 2016

Unit 4: Feminist historiography and Feminist Movements in India

a) Locating Women in History: The need for Feminist historiography
b) The Brahmo Samaj in India
c) The White Revolution, Amul and Women's Empowerment
d) The Nirbhaya case and combatting 'rape culture'

Unit 5: **Literary Texts**

a) Charlotte Perkins Gilman: "The Yellow Wallpaper"
b) James Joyce: "Eveline"
c) Fay Weldon: "Weekend"
d) Mahasweta Devi: "The Breast Giver"

Evaluation:	**Third Semester End Examination Pattern**	**100 Marks : 3 Hours**
Question 1:	One Essay or Two Short Notes	:20 Marks
Question 2:	One Essay or Two Short Notes	:20 Marks
Question 3:	One Essay or Two Short Notes	:20 Marks
Question 4:	One Essay or Two Short Notes	:20 Marks
Question 5:	One Essay or Two Short Notes	:20 Marks

Each question corresponds to the respective unit in the syllabus. In each question, there will be 2 essay type questions in options A and B respectively, and option C will have four short notes, with two to be attempted. There will be a choice of 3 questions: A (essay) or B (essay) or C (short notes).

Semester Four: Women's Studies (Applied Component) 2 Credits

Lectures: 60

Unit 1: Feminist History and Global Movements

a) The Seneca Falls Convention and Women's Suffrage Movement
b) Women Scientists and women in science
c) Women, Self-help Groups and Entrepreneurship
d) The #MeToo Movement

Unit 2: Schools of Feminism and Feminist Theory

a) Gynocriticism
b) Postmodern Feminism
c) Postcolonial Feminism
d) Intersectional Feminism

Unit 3: Women and Work

a) The Public-Private Dichotomy, sexual division of work and perceptions of jobs as gender-specific
b) Concepts of visible and invisible work, paid and unpaid labour
c) The Glass Ceiling, Sticky Floor and Glass Escalator Effects
d) Issues of working mothers and single working women

Unit 4: Women and the Media: Sexuality, Body Politics and Media Representations

a) Women and the Beauty Industry: Ageism, beauty standards, racism, cosmetic surgery, the Male gaze, and the casting couch phenomenon
b) Pregnancy related issues: Family Planning, Contraception, Abortion, Sex-determination, mental health and post-partum depression
c) Women on social media platforms, body shaming, cyber-bullying, cat-phishing, online stalking and harassment
d) The Representation of Women in the Media: Ads, Films, Music Videos and in the news

Unit 5: Literary and Media Texts

a) Sylvia Plath: "The Mirror"
b) Maya Angelou: "Still I Rise"
c) Short Films: *Juice* (directed by Neeraj Ghaywan), *Going Dutch* (Tittar Lodge Productions); *Ahalya* (directed by Sujoy Ghosh) and *Devi* (directed by Priyanka Banerjee)
d) Dove ads focusing on the campaign of 'real beauty'

Evaluation: Fourth Semester End Examination Pattern 100 Marks: 3 Hours

Question 1:	One Essay or Two Short Notes	:20 Marks
Question 2:	One Essay or Two Short Notes	:20 Marks
Question 3:	One Essay or Two Short Notes	:20 Marks
Question 4:	One Essay or Two Short Notes	:20 Marks
Question 5:	One Essay or Two Short Notes	:20 Marks

Each question corresponds to the respective unit in the syllabus. In each question, there will be 2 essay type questions in options A and B respectively, and option C will have four short notes, with two to be attempted. There will be a choice of 3 questions: A (essay) or B (essay) or C (short notes).

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Links to Films:

1. Juice:
   https://www.youtube.com/watch?v=R-Sk7fQGIjE
2. Going Dutch:
   https://www.youtube.com/watch?v=iFFYF-fykaU
3. Devi
   https://youtu.be/2KP0aDTVtFI
4. Ahalya
   https://youtu.be/Ff82XtV78xo

MOOC

Andrea Walsh, and Elizabeth Fox. *WGS.101 Introduction to Women's and Gender Studies.* Fall 2014. Massachusetts Institute of Technology: MIT OpenCourseWare, https://ocw.mit.edu. License: Creative Commons BY-NC-SA.

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University of Mumbai

Syllabus for S.Y.B.A. (Applied Component)

Program: B.A.

Course: Introduction to Advertising

(Choice Based Credit System with effect from the Academic Year 2022-23)

1. Syllabus as per Choice-Based Credit System:

a) Name of the Program : S. Y. B.A. (Applied Component) Semester III and IV

b) Course Code : Semester III (UAIA3A1) Semester IV (UAIA4A1)

c) Course Title : Introduction to Advertising Semester III: Paper I, (Basic Concepts of Advertising)

Semester IV: Paper II, (Creativity and Research in Advertising)

d) Semester wise Course Contents : Enclosed the copy of syllabus

e) References and Additional References: Enclosed in the Syllabus

f) Credit Structure : No. of Credits per Semester – 02

g) No. of lectures per Unit 12

h) No. of lectures per week 04

2. Scheme of Examination : 5 Questions of 20 marks each

3. Special notes, if any : No

4. Eligibility, if any : No

5. Fee Structure : As per University Structure

6. Special Ordinances /: No Resolutions if any: No

S.Y. B.A. (Applied Component)

Course Title: Introduction to Advertising

Paper I & II

(100 Marks Examination Pattern)

- **Objectives:**

i) To introduce learners to the main subfields and basic modern concepts/ideas, theoretical models, empirical instruments and data sources in advertising.
ii) To encourage learners for further interest in advertising studies
iii) To develop professional communicative competence
iv) To introduce learners to different tools of communication for corporate identity /brand building through various advertising techniques

- **Course Outcomes:**

By the end of the course, learners should develop the following abilities:

i) To demonstrate a working knowledge of the following areas associated with the advertising industry: Target marketing, Ad agency organizations and operations, media strategies, use of electronic media, outdoor media, print media, sales promotions, etc.
ii) To write clearly, coherently and effectively about various concepts in advertising
iii) To define the economic and social impact of advertising on society
iv) To understand the communication process of advertising, marketing research, campaign strategies, concepts, budgets, creative process, and ethics in advertising.

Semester-III	**Applied Component**	**Paper – I**	**Total Credits – 2**

Course Title: Introduction to Advertising - Basic Concepts of Advertising

Total Lectures: 60

Unit- I Introduction to Advertising **12 Lectures**

a) Advertising: Evolution of Advertising, Features of Advertising, Active participants, Role of Advertising in Marketing Mix, Role of Advertising in society.
b) Classification of Advertising: Social Advertising, Political Advertising, Advocacy Advertising, Retail Advertising, Financial Advertising, Corporate Image Advertising, Print Media Advertising, Electronic or Broadcast Media Advertising, National Advertising, International Advertising, Advertising on Social media

Unit- II Advertising and Media for Marketing and Communication **12 Lectures**

a) Introduction to Integrated Marketing Communication, Advertising and Publicity, Public Relation, Sales promotion, Different Forms of Displays - Window Display, Showcases, Showrooms , Exhibitions, Trade Fairs,

Traveling Displays, Car Cards, Sky Writing or Sky Balloons, Word of Mouth Influence (WOM), Packaging,

b) Advertising and Brand Management, A History of Branding and Advertising, Psychology of Advertising, Media Ecology, Consumer Behaviour, Environmental Marketing Communications

Unit- III The impact of Media in Advertising **12 Lectures**

a) Factors influencing Media selection and Media Planning Strategies, Importance of Advertising in Marketing , Role of Celebrity Endorsers in Advertising,
b) Media options for advertising – Television, Radio , Internet, Print, Film, Outdoor advertising and Social Media,
c) Concepts - Media Buying, Media Selling, Media Mix, Clutter, Zipping & Zapping, Branding & Brand Positioning

Unit- IV Economic & Social Aspects of Advertising **12 Lectures**

a) Economic aspects of Advertising: Impact on production, distribution and consumer cost, advertising and competition, Understanding the role of advertising agencies.
b) Social aspects of advertising, advertising and culture (values, festivals, customs), standard of living, ethics in advertising, Advertising and Women, Advertising and Children, Ethical issues of Packaging and Branding, Ethical issues in Online and Social Media Marketing,
c) Regulation and control on advertising in India – Advertising Standard Council of India (ASCI), Advertising Agencies Association of India (AAAI), and Information & Broadcasting Ministry, Advertising self-Regulation

Unit- V Advertising Agency and Advertising as a Career **12 Lectures**

a) Advertising Agency – definition, types of services offered, types of advertising agencies, structure of Ad agencies, agency selection criterion, ways of getting clients with special reference to creative pitch, Top advertising agencies and their campaigns.
b) Career options available in advertising field – Advertising agency, media, production houses, research and allied fields - printing, graphics and animation, modelling and dubbing, brand managers, copywriters, Art Directors, Web content Managers, Creative writers, Freelancing

Unit-VI Practical Segment

(This Unit is not to be considered for the Assessment/ Examination)

a) Poster / Technology based group presentations on various Advertisements on socially relevant topics with relevant case studies.
b) Creating a print Advertisement (Students can be asked to make a print advertisement and displaying it to the class)

Evaluation Pattern:

Third Semester End Examination	**Duration: 3 Hours**	**100 Marks**

Question 1	One Essay or Two Short notes on Unit I	20 Marks
Question 2	One Essay or Two Short notes on Unit II	20 Marks
Question 3	One Essay or Two Short notes on Unit III	20 Marks
Question 4	One Essay or Two Short notes on Unit IV	20 Marks
Question 5	One Essay or Two Short notes on Unit V	20 Marks

Semester IV Applied Component Paper II 2 Credits
Course Title: Introduction to Advertising - Creativity and Research in Advertising

Total Lectures: 60

Unit- I Creativity and Psychology in Advertising **12 Lectures**

a) Role of Creativity in Advertising, Positioning strategies, Role of Persuasion, Determining the message theme, USP, Decision on Advertising appeals and selling styles (soft selling / hard selling skills), Appropriateness and Novelty, Styles of Creative Advertising- Generic Creative Style, Pre-emptive Creative Style, Resonance Creative Style
b) Psychology in Advertising – Perception, attitudes and values, personality and motivations (including buying motives), Use of Metaphors in Advertising

Unit-II Copy Writing **12 Lectures**

a) Copy – types and essentials, Copy writing for print, Outdoor, Radio, Web and Television (concept of storyboards)
b) Elements of copy – headline (functions and types), over line, body copy, captions, taglines, slogans, call to action, logo, company name

Unit-III Creativity in Advertising **12 Lectures**

a) Illustrations – functions and types, Essentials of a good illustration
b) Visualization – Techniques of Visualization, Layouts- Stages and Types, Slogans, Logo, Headlines, Memes, GIFs as means of creative marketing strategy etc.
c) Digital Advertising: The societal and business impact of digital advertising, Types of digital advertising, The future of online advertising

Unit-IV Advertising Research **12 Lectures**

a) Evaluating advertising effectiveness, Importance of research in Advertising, Types of research: copy research and behavioural research, Psychographic Segmentation
b) The impact of Ideology on Advertisements- Various ideological issues and concerns
c) Pre-testing and Post-testing methods of evaluation, Pre-testing methods: methods for concept testing and copy testing , Post-testing methods: sales and response rates, recall tests, recognition tests and attitude and opinion tests.

Unit- V Advertising Budget **12 Lectures**

a) Meaning of Advertising Budget: Collection of Data and Preparation of Advertising Budget, Presentation and Approval of the Budget, Budget Execution, Control of Budget
b) Methods of Framing the Advertising Budget: Affordable Method, Percentage of Sales Method, Competitive Parity Method, Return on Investment Method, Objective and Task Method, Judgment Method
c) Approaches to Advertising Budget: Traditional Approach, Modern Approach, Marcom Budgeting

Unit-VI Practical Segment:

(This Unit is not to be considered for the Assessment/ Examination)

a) A visit to an Advertising agency or group presentation on Copy writing
b) Creating an electronic Advertisement and displaying it to the class via electronic communication medium

Evaluation Pattern:

Fourth Semester End Examination	**Duration: 3 Hours**	**100 Marks**

Question 1	One Essay or Two Short notes on Unit I	20 Marks
Question 2	One Essay or Two Short notes on Unit II	20 Marks
Question 3	One Essay or Two Short notes on Unit III	20 Marks
Question 4	One Essay or Two Short notes on Unit IV	20 Marks
Question 5	One Essay or Two Short notes on Unit V	20 Marks

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19. http://www.chillibreeze.com/ articles various/advertising-firms.asp
20. www.afaqs.com
21. www.ascionline.org;
22. www.campaignindia.in
23. www.exchange4media.com
24. www.tamindia.com
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MOOC Courses:

1) <<https://www.mooc-list.com/course/online-advertising-onlinead-open2study>>
2)\<<https://www.mooc-list.com/course/integrated-marketing-communications-advertisingpublic-relations-digital-marketing-and-more>>
3) <<https://www.mooc-list.com/course/content-advertising-social-imc-coursera>>
4) <<https://www.mooc-list.com/course/advertising-and-society-coursera>>

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University of Mumbai

Revised Syllabus and Question Paper Pattern of Courses
of
B.Com. (Financial Management) Programme
at
Second Year
Semester III and IV

Under Credit, Grading and Semester System

With Effect from Academic Year 2017-2018

S.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	*Elective Courses (EC)*		*1*	*Elective Courses (EC)*	
1, 2 & 3	*Any three courses from the following list of the courses	09	1,2 & 3	*Any three courses from the following list of the courses	09
2	*Ability Enhancement Courses (AEC)*		*2*	*Ability Enhancement Courses (AEC)*	
4	Entrepreneurial Development	02	4	Information Technology in Management	02
3	*Core Courses (CC)*		*3*	*Core Courses (CC)*	
5	Management Accounting	03	5	Corporate Finance	03
6	Business Law	03	6	Corporate Law	03
7	Business Regulatory framework	03	7	Office Management	03
	Total Credits	20		Total Credits	20

*List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)		*List of Discipline Related Elective(DRE) Courses for Semester IV (Any Three)	
1	Corporate Accounts -I	1	Corporate Accounts -II
2	Direct Tax -I	2	Direct Tax -II
3	Indirect Tax-I	3	Indirect Tax-II
4	Investment Banking	4	Merchant Banking
5	Cost Accounting-I	5	Cost Accounting-II

THIRD SEMESTER
Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester III

No. of Courses	Semester III	Credits
1	*Elective Courses (EC)*	
1, 2 & 3	*Any three courses from the following list of the courses	09
2	*Ability Enhancement Courses (AEC)*	
4	Entrepreneurial Development	02
3	*Core Courses (CC)*	
5	Management Accounting	03
6	Business Law	03
7	Business Regulatory framework	03
	Total Credits	20

List of Discipline Related Elective (DRE) Courses for Semester IV (Any Three)	
1	Corporate Accounts -II
2	Direct Tax -II
3	Indirect Tax-II
4	Merchant Banking
5	Cost Accounting-II

1. Elective Courses (EC)

Corporate Accounts- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Partnership Final Accounts based on Adjustment of Admission or Retirement / Death of a Partner during the Year	15
2	Piecemeal Distribution of Cash	15
3	Amalgamation of Firms	15
4	Conversion / Sale of a Partnership Firm into a Ltd. Company	15
	Total	60

Sr. No.	Modules/Units
1	Partnership Final Accounts based on Adjustment of Admission or Retirement / Death of a Partner during the Year
	Simple final accounts questions to demonstrate the effect on final Accounts when a partner is admitted during the year or when partner Retires / dies during the year Allocation of gross profit prior to and after admission / retirement / death when stock on the date of admission / retirement is not given and apportionment of other expenses based on time / Sales/other given basis Ascertainment of gross profit prior to and after admission/retirement / death when stock on the date of admission / retirement is given and apportionment of other expenses based on time / Sales / other given basis Excluding Questions where admission / retirement / death takes place in the same year
2	Piecemeal Distribution of Cash
	Excess Capital Method only Asset taken over by a partner Treatment of past profits or past losses in the Balance sheet Contingent liabilities / Realization expenses/amount kept aside for expenses and adjustment of actual Treatment of secured liabilities Treatment of preferential liabilities like Govt. dues / labour dues etc Excluding: Insolvency of partner and Maximum Loss Method
3	Amalgamation of Firms
	Realization method only Calculation of purchase consideration Journal/ledger accounts of old firms Preparing Balance sheet of new firm Adjustment of goodwill in the new firm Realignment of capitals in the new firm by current accounts / cash or a combination thereof Excluding : Common transactions between the amalgamating firms
4	Conversion / Sale of a Partnership Firm into a Ltd. Company
	Realisation method only Calculation of New Purchase consideration, Journal / Ledger Accounts of old firms. Preparing Balance sheet of new company

1. Elective Courses (EC)

Direct Tax- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Definitions u/s - 2: Basis of Charge	08
2	Exclusions from Total Income	07
3	Heads of Income	25
4	Deductions under Chapter VI - A	10
5	Computation of Total Income	10
	Total	60

Sr. No.	Modules/Units
1	Definitions u/s - 2 & Basis of Charge
	Definitions u/s - 2 Section 2 -Assessee, Assessment Year, Assessment, Annual value, Business, Capital asset, Income, Person, Previous Year, Transfer Basis of Charge Section 3- 9 -Previous Year, Residential Status, Scope Of Total Income, Deemed Income
2	Exclusions from Total Income
	Section 10 - restricted to, Agricultural Income, Sums Received From HUF By Member, Share of Profit from Firm, Casual & Non - Recurring Receipts, Scholarships, Income of Minor Child, Allowance to Members of Parliament and Legislative Assembly. Note -Exemptions related to specific Heads of Income to be covered with Relevant Provisions.
3	Heads of Income
	Salary Section 15 - 17, Including Section 10 relating to House Rent Allowance, Travel Concession, Special Allowance, Pension - Commutation, Leave Encashment, Compensation, Voluntary Retirement, Payment from Provident Fund Income From House Property Section 22 - 27, Including Section 2 - Annual Value Profits & Gains From Business & Profession Vocation Section 28-32, 36, 37, 40, 40A & 43B. including.: Section 2 - Business Capital Gains Section 45, 48, 49, 50, 54 and 55 Income from Other Sources Section 56 - 59
4	Deductions under Chapter VI - A
	80 A- Restriction on claim in Chapter VI- A deductions 80 C - Payment of LIC/PF and other eligible investments 80CCC - Contribution to certain Pension Fund 80D - Medical Insurance Premium 80 DD- Maintenance and medical treatment of handicapped dependent 80E - Interest on Educational Loan 80 TTA- Interest on Saving Bank account 80U - Deduction in the case of totally blind or physically handicapped or mentally retarded resident person
5	Computation of Total Income
	Computation of Total Income Of Individual & HUF

Note:

1. Relevant Law / Statute in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuing examinations after relevant year.
2. The syllabus is restricted to study of particular section/s, specifically mentioned in rules and notifications only

1. Elective Courses (EC)

Indirect Tax- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Maharashtra Value Added Tax (MVAT), Act 2002: Introduction	30
2	Maharashtra Value Added Tax (MVAT), Act 2002: Registration Procedure and Rules: Section 16	10
3	Maharashtra Value Added Tax (MVAT), Act 2002: Audit Section 22 and 61	10
4	Maharashtra Value Added Tax (MVAT), Act 2002: Penalty and Interest	10
	Total	60

Sr. No.	Modules/Units
1	Maharashtra Value Added Tax (MVAT), Act 2002: Introduction
	1. Definition Section: 2 (4) Businesses 2 (8) Dealers 2 (12) Goods 2 (13) Importer 2 (15) Manufacturer 2 (20) Purchase Price 2 (22) Resale 2 (24) Sales 2 (25) Sales Price 2 (27) Service 2 (33) Turnover of Sales and Rule 3 2. Incidence of levy of Tax Sec. 3 Incidence of Tax Sec. 4 Tax Payable Sec. 5 Tax Not Leviable on Certain Goods Sec. 6 Levy of Sales Tax on Goods specified in the Schedule Sec. 7 Rate of Tax on Packing Material Sec. 8 Certain Sale and Purchase not Liable for Tax 3. Payment of Tax and Recovery Section: 42 - Composition of Tax and Notification 1505/CR-105/Taxation-1 4. Set Off, Refund, etc. Section 48 and 49 Set Off, Refund etc. Along with Rules 52, 53, 54, 55
2	Maharashtra Value Added Tax (MVAT), Act 2002: Registration Procedure and Rules: Section 16
3	Maharashtra Value Added Tax (MVAT), Act 2002: Audit Section 22 and 61
4	Maharashtra Value Added Tax (MVAT), Act 2002: Penalty and Interest

Note:

1. Relevant Law / Statute in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuing examinations after relevant year.
2. The syllabus is restricted to study of particular section/s, specifically mentioned in rules and notifications only

1. Elective Courses (EC)

Investment Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction of Investment Banking	15
2	Concepts of Investment Banking	15
3	Risk and Return	15
4	Investment Banking Activities	15
	Total	60

Sr. No.	Modules/Units
1	Introduction of Investment Banking
	Investment its meaning and scope, types of asset classes, asset allocation, creating portfolio and process of portfolio management
2	Concepts of Investment Banking
	Investment banking concepts, Private placement methods, role of venture capital firms in raising funds, due diligence methods
3	Risk and Return
	Risk and return concepts, types of risk and its application, ASBA, IPO and FPO, SEBI disclosures and other regulators.
4	Investment Banking Activities
	Industry analysis, role of IPO in value unlocking, recent trends and developments, investments banking activities

1. Elective Courses (EC)

Cost Accounting- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Cost Accounting	15
2	Material Cost	15
3	Labour Cost	15
4	Overheads	15
	Total	60

Sr. No.	Modules/Units
1	Introduction to Cost Accounting
	Evolution Objectives and Scope of Cost Accounting Importance and Advantages of Cost Accounting Difference between Cost Accounting and Financial Accounting Limitations of Financial Accounting Definitions: Cost, Costing and Cost Accounting Classification of Cost on Different Bases Cost Allocation and Apportionment Coding System Essentials of Good Costing System
2	Material Cost
	Material Cost: The Concept Material Control Procedure Documentation Stock Ledger, Bin Card Stock Levels Economic Order Quantity (EOQ)
3	Labour Cost
	Labour Cost: The Concept Composition of Labour Cost Labour Cost Records Overtime / Idle Time / Incentive Schemes
4	Overheads
	Overheads: The Concept Classification of overheads on different bases i Apportionment and Absorption of Overheads

2. Ability Enhancement Course (AEC)

Entrepreneurial Development

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Concept, meaning and definition of entrepreneur and entrepreneurship	15
2	Entrepreneurial Project Development	15
3	Legal Considerations for different forms of organization	15
4	Entrepreneurship Development Programme and Risk Management	15
	Total	60

Sr. No.	Modules/Units
1	Concept, meaning and definition of entrepreneur and entrepreneurship
	· Importance and significance of growth of entrepreneurial activity. · Concept of intrapreneur. · Characteristics and qualities of entrepreneurs · Classification and types of entrepreneurs. · Women entrepreneurs · Theories of entrepreneurship (McClelland, Max Weber and Joseph Schumpeter)
2	Entrepreneurial Project Development
	· Idea generation - sources and methods · Identification and classification of ideas. · Environmental Scanning and SWOT analysis · Preparation of project plan · Points to be considered · Components of an ideal business plan - market plan, financial plan, operational plan, & HR plan. · Project formulation -project report significance and contents · Project appraisal - Aspects and methods : (a) Economic oriented appraisal (b) Financial appraisal (c) Market oriented appraisal Technological feasibility - Managerial Competency
3	Legal Considerations for different forms of organization
	Cultural and Environmental Issues in setting up of business enterprise with respect to : (Sole trading firm, Limited Liabilites Partnership, Limited company, Public Company, Private Company, NGO) Quick Start Methods of Business: Franchising , Mergers and Takeover
4	Entrepreneurship Development Programme and Risk Management
	· SME, SHG with special reference to microfinance and woman entrepreneur · Definition of risk, types of risk, risk management strategies.

3. Core Courses (CC)

Management Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Management Accounting	05
2	Analysis and Interpretation of Accounts	10
3	Financial Statement analysis: Ratio analysis	15
4	Cash Flow Management	15
5	Working Capital Management	15
	Total	60

Sr. No.	Modules/Units
1	Introduction to Management Accounting
	Meaning, Features, Scope, Importance, Functions, role of Management Accounting, Management Accounting Framework, Tools, Management Accounting and Financial Accounting
2	Analysis and Interpretation of Accounts
	a)Vertical Forms of Balance Sheet and Profit and Loss Account suitable for analysis b) Trend Analysis. c) Comparative Statement. d) Common Size Statement. NOTE: Practical Problems based on the above (a) to (d)
3	Financial Statement analysis: Ratio analysis
	Meaning of financial Statement Analysis, steps, Objective and types of Analysis. Ratio analysis: Meaning, classification, Du Point Chart, advantages and Limitations. Balance Sheet Ratios Revenue Statement Ratios Combined Ratios
4	Cash Flow Management
	Preparation of Cash Flow Statement with reference to Accounting Standard No .3. (Indirect method only))
5	Working Capital Management
	A. Concept, Nature of Working Capital , Planning of Working Capital B. Estimation / Projection of Working Capital Requirement in case of Trading and Manufacturing Organization C. Operating Cycle Practical Problems

3. Core Courses (CC)

Business Law

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Contract Act 1872	25
2	Special Contract	10
3	The Sales of Goods Act-1930	10
4	The Negotiable Instruments (Amended) Act 2015	10
	Total	60

No.	Modules/Units
1	Indian Contract Act - 1872
	· Contract - Definition of Contract and Agreement, Essentials of Valid Contract, Classification of Contracts. · Offer and Acceptance - Rules of valid offer and acceptance, Counter offer, standing or open offer, distinguish between offer and invitation to offer. Concept of Communication and Revocation of offer and acceptance (sec. 3,5) · Capacity to Contract (S. 10-12) - Minor, Unsound Mind, Disqualified Persons. · Consideration (S. 2 & 25) - Concept and Importance of consideration, Legal rules of Consideration, Exceptions to the Rule, 'No Consideration No Contract'(Ss. 25) Unlawful Consideration (S 23) · Consent (Ss.13, 14-18, 39.53, 55, 66)-Agreements in which consent is not free - Coercion, Undue Influence, Misrepresentation Fraud, Mistake. · Void Agreements (S. 24-30) - Concept, Void Agreements under Indian Contract Act. Contingent Contract (S. 31), Quasi Contract (S.68-72), Concept of E-Contract& Legal Issues in formation and discharge of E- Contract. Concept of Performance of Contract (S 37) · Modes of Discharge of Contract, Remedies on breach of Contract.(73-75)
2	Special Contracts
	· Law of Indemnity & Guarantee (Ss. 124-125, Ss. 126-129, 132-147) - Concept, Essentials elements of Indemnity and Guarantee, Contract of Indemnity vs. Guarantee, Modes of Discharge of Surety. · Law of Bailment (S. 148, 152-154, 162, 172, 178, 178A, 179) - Concept, Essentials of Bailment, Kinds of Bailment, Rights and Duties of Bailor and Bailee · Law of Pledge - Concept, Essentials of valid Pledge, Lien - concept, Difference between Pledge and Lien, Rights of Pawnor & Pawnee.(Ss.173, 174, 177) · Law of Agency (Ss. 182-185, 201-209) - Concept, Modes of creation of Agency, Modes of termination of Agency, Rights& Duties of Principal and Agent.
3	The Sale of Goods Act - 1930
	· Contract of Sale (S.2) - Concept, Essentials elements of contract of sale, Distinction between Sale and Agreement to sell (S.4) Distinguish between Sale and Hire Purchase Agreement, Types of Goods. Effects of destruction of Goods (Ss. 6,7.8), · Conditions & Warranties (Ss. 11-25 & 62, 63) - Concept, Distinguish, Implied Conditions & Warranties, Concept of Doctrine of Caveat Emptor -Exceptions. · Property - Concept , Rules of transfer of property (Ss. 18-26) · Unpaid Seller (Ss. 45-54, 55 & 56)- Concept, Rights of an unpaid seller, Remedies for Breach of contract of Sale (Ss. 55-61),Auction sale - Concept, Legal Provisions. (S. 64)
4	The Negotiable Instruments (Ammended) Act 2015
	· Negotiable Instruments - Concept (S13), Characteristics, Classification of Negotiable Instruments (Ss. 11, 12, 17-20, 42, 43, 104,134,135) Maturity of Instruments. · Promissory Note and Bill of Exchange (Ss. 4,5, 108-116)- Concept, Essentials of Promissory Note, Bill of Exchange (Ss. 4,5), Essential features of promissory note and Bill of exchange, Kinds Promissory note and Bill of exchange, Cheque (S.6)- Concept, Types & Crossing of Cheque, Distinguish between Bill of Exchange & Cheque, Dishonour of Cheque - Concept & Penalties (Ss. 138, 139,142) · Miscellaneous Provisions (S. 8-10, 22, 99-102, 118-122, 134-137) -Parties to Negotiable instruments Holder, Holder in due course, Rights & Privileges of Holder in due course, Payment in due course, Noting & Protest (99-104A)

3. Core Courses (CC)

Business Regulatory Framework

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Laws Related to Industrial Relations and Industrial Disputes	15
2	Laws Related to Health, Safety and Welfare	15
3	Social Legislation	15
4	Laws Related To Compensation Management	15
	Total	60

Sr. No.	Modules/Units
1	Laws related to Industrial Relations & Industrial Disputes
	· Industrial Disputes Act, 1947: Definition, Authorities, Awards, Settlements, Strikes Lockouts, Lay Offs, Retrenchment and Closure · The Trade Union Act, 1926
2	Laws related to Health, Safety and Welfare
	· The Factory Act 1948: (Provisions related to Health, Safety and Welfare) · The Workmen's Compensation Act, 1923 Provisions: · Introduction: The doctrine of assumed risk, The doctrine of Common Employment, The doctrine of Contributory Negligence · Definitions · Employers liability for compensation (S-3 to 13) · Rules as to Compensation (Sec 4 to Sec 9) (14 A & 17)
3	Social Legislation
	· Employee State Insurance Act 1948: Definition and Employees Provident Fund · Miscellaneous Provision Act 1948: Schemes, Administration and determination of dues
4	Laws related to Compensation Management
	· The payment of Wages Act 1948: Objectives, Definition, Authorised Deductions · Payment of Bonus Act, 1965 · The Payment Of Gratuity Act, 1972

Revised Syllabus
of Courses of B.Com. (Financial Management) Programme
at Semester IV

No. of Courses	Semester IV	Credits
1	*Elective Courses (EC)*	
1,2 & 3	*Any three courses from the following list of the courses	09
2	*Ability Enhancement Courses (AEC)*	
4	Information Technology in Management	02
3	*Core Courses (CC)*	
5	Corporate Finance	03
6	Corporate Law	03
7	Office Management	
Total Credits		20

List of Discipline Related Elective(DRE) Courses for Semester IV (Any Three)	
1	Corporate Accounts -II
2	Direct Tax -II
3	Indirect Tax-II
4	Merchant Banking
5	Cost Accounting-II

Note: The Syllabus of Ability Enhancement and Core Courses are same at all FY level

1. Elective Courses (EC)

Corporate Accounts- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Preparation of Final Accounts of Companies	15
2	Redemption of Preference Shares	15
3	Redemption of Debentures	15
4	Ascertainment and Treatment of Profit Prior to Incorporation	15
	Total	60

Sr. No.	Modules/Units
1	Preparation of Final Accounts of Companies
	Relevant provisions of Companies Act related to preparation of Final Account (excluding cash flow statement) Preparation of financial statements as per Companies Act. (excluding cash flow statement) AS 1 in relation to final accounts of companies (disclosure of accounting policies)
2	Redemption of Preference Shares
	Provision of the Companies Act for redemption of Preference Shares (Sec 55 of the Companies Act, 2013), Companies (Share and Debentures) Rules. Methods of Redemption of fully paid up Preference Shares as per Companies Act, 2013: The proceed of a fresh issue of shares, the capitalisation of undistributed profits and a combination of both, calculation of minimum fresh issue to provide the fund for redemption, (Question on entries and/or Balance Sheet) Note: Companies governed by Section 133 of the Companies Act, 2013 and comply with the accounting standards prescribed for them. Hence, the balances in security premium account not to be utilised for premium payable on redemption of preference shares.
3	Redemption of Debentures
	Introduction: Provisions of Section 71 (1) and (4) of the Companies Act, 2013, Creation and investment of DRR including The Companies (Share Capital and Debentures) Rules, 2014, the methods of writing-off discount/loss on issue of debentures; Terms of issue of debentures Methods of redemption of debentures: By payment in lumpsum and by payment in instalments (excluding from by purchase in open market), Conversion. (Question on entries. ledgers and/or Balance Sheet and /or redemption of preference shares)
4	Ascertainment and Treatment of Profit Prior to Incorporation
	Principles for ascertainment Preparation of separate, combined and columnar Profit and Loss Account including different basis of allocation of expenses/ incomes

1. Elective Courses (EC)

Direct Tax- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Clubbing of Income	05
2	Set Off & Carry Forward of Losses	05
3	Computation of Tax liability of Individual & HUF	05
4	Computation of Income of Partnership Firm in Relation to Sec: 40(b) & Tax Thereon With Applicable Rate of Tax	15
5	Return of Income - Sec 139	10
6	Tax Deduction at Source Advance Tax Interest Payable	15
7	DTAA U/S 90 & 91	5
	Total	60

Sr. No.	Modules/Units
1	Clubbing of Income - Section 60 to 65
2	Set Off & Carry Forward of Losses
	Sec: 70 - Set off Loss from one Source against Income from another Source under the Same Head of Income Sec: 71 - Set Off Loss from One Head against Income of another Head Sec: 71B - Carry Forward & Set off Losses from House Property Sec: 72 - Carry Forward & Set Off of Losses of Business Losses Sec: 73- Losses in Speculation Business Sec: 74- Loss under the head Capital Gains
3	Computation of Tax liability of Individual & HUF
4	Computation of Income of Partnership Firm in Relation to Sec: 40(b) & Tax Thereon With Applicable Rate of Tax
5	Return of Income - Sec 139
	Excluding u/s 139(4A), 139(4B), 139(4C) & 139 (4D)
6	Tax Deduction at Source Advance Tax U/S 207, 208, 209, 210 & 211 Interest Payable U/S 234A, 234B, 234C
	Basic Aspects of Deduction of Taxes at Source Sec: 192 - TDS on Salary Sec: 194A - TDS on Interest Sec: 194C - TDS on Contractor Sec: 194H - TDS on Commission Sec: 194I - TDS on Rent Sec: 194J - TDS on Professional Fees Advance Tax U/S 207, 208, 209, 210 & 211 Sec: 207 - Income Liable to Advance Tax Sec: 208 - Liability of Advance Tax Sec: 209 - Computation of Advance Tax Sec: 210 - Payment of Advance Tax by Assessee on His Own Account Sec: 211 - Due Dates of Payment of Advance Tax Interest Payable U/S 234A, 234B, 234C Sec: 234A - Interest for default in furnishing return of income Sec: 234B - Interest for default in payment of advance tax Sec: 234C - Interest for deferment of advance tax
7	**DTAA U/S 90 & 91**

Note:

1. Relevant Law / Statute in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuing examinations after relevant year.
2. The syllabus is restricted to study of particular section/s, specifically mentioned rules and notifications only.

1. Elective Courses (EC)

Indirect Tax- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Goods and Services Tax	10
2	Registration and Levy of an Exemption from Tax	15
3	Meaning, Scope and Time of Supply	15
4	Valuation & Payment of GST	20
	Total	60

Sr. No.	Modules/Units
1	Overview of Goods and Services Tax
	Overview of GST Implementation of GST Liability of the Tax Payer GST Network and GST model GST Council
2	Registration and Levy of an Exemption from Tax
	Introduction Registration Procedure Important Points Special Persons Amendments / Cancellation Levy of GST - Introduction Composition Scheme Remission of Tax / Duty
3	Meaning, Scope and Time of Supply
	Taxable Supply Supply of Goods and Supply of Services Course or Furtherance of Business Special Transactions Time of Supply - Goods Time of Supply -Services Other Points
4	Valuation & Payment of GST
	Transaction Value Valuation Rules Input Tax Credits Time of GST Payment How to make payment Challan Generation & CPIN TDS & TCS

1. Elective Courses (EC)

Merchant Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Merchant Banking	15
2	Initial Public Offering (IPO)	15
3	Issue of DRs, ADRs and CPs	15
4	Issue of Bond and Debentures	15
	Total	60

Sr. No.	Modules/Units
1	Introduction to Merchant Banking
	Introduction to Merchant banking, Importance, need, functions, Merchant banking services - Project counselling, Loan syndication and Corporate counselling; Pre-issue merchant banking activities - Obtaining stock exchange approvals, action as per SEBI guide lines, Finalizing the appointments with - manager/advisers, Underwriters, Brokers, Bankers, Advertising agency, Drafting and approval of prospectus; Post-issue merchant banking activities - Issue subscription, Allotment of shares, Refunds, Periodical reports to SEBI.
2	Initial Public Offering (IPO)
	Initial Public Offering - Issuance Process, Role of registrar, SEBI guidelines for IPO eligibility, IPO grading, Draft Red Herring Prospectus (DRHP), Listing agreement, Pricing the issue, Book building process, Allotment; SEBI Guidelines in Drafting the Offer Document; Pre and Post launch activities in IPO, SEBI Guidelines on QIP, Rights and Bond Issues
3	Issue of DRs, ADRs and CPs
	Types and Process of Issuing of Depository Receipts (DRs) - American Depository Receipts (ADRs), Global Depository Receipts (GDRs), European Depository Receipts (EDRs), Indian Depository Receipts (IDRs), ADR structure and norms, Indian Depository Receipts (IDRs) and Guidelines; Procedure for issue of Commercial Paper - Credit Rating, Redemption process.
4	Issue of Bond and Debentures
	Procedure for Issue of Bond and Debentures, Foreign currency convertible bonds

1. Elective Courses (EC)

Cost Accounting- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Classification of Costs And Cost Sheets	20
2	Reconciliation of Cost and Financial Accounts	10
3	Contract Costing	15
4	Process Costing	15
	Total	60

Sr. No.	Modules/Units
1	Classification of Costs and Cost Sheet
	Classification of costs, Cost of Sales, Cost Centre, Cost Unit, Profit Centre and Investment Centre Cost Sheet, Total Costs and Unit Costs, Different Costs for different purpose Simple practical problems on preparation of cost sheet
2	Reconciliation of cost and financial accounts
	Practical problems based on reconciliation of cost and Financial accounts.
3	Contract Costing
	Progress payments, Retention money, Contract accounts, Accounting for material, Accounting for Tax deducted at source by the contractee, Accounting for plant used in a contract, treatment of profit on incomplete contracts, Contract profit and Balance sheet entries. Excluding Escalation clause Note- Simple practical problems
4	Process Costing
	Process loss, Abnormal gains and losses, Joint products and by products. Excluding Equivalent units, Inter-process profit Note- Simple Practical problems Process Costing and joint and by products

2. Ability Enhancement Course (AEC)

Information Technology in Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business Process	15
2	Electronic Commerce	15
3	Concept of MIS Reports in Computer Environment	15
4	Computerized accounting system and Auditing	15
	Total	60

Sr. No.	Modules/Units
1	Business Process
	Introduction, Definition and Meaning of business process Flow of business process for accounting, purchase, sales and finance Classification of business processes Introduction, Definition and Meaning of Business Process Management Principles and practices of Business Process Management Business Process Management life cycle Theories of Business Management Process Implementation of Business process Management - need, key factors and importance Automation of business Processes - benefits, risks, challenges Accounting systems automation IT and Business Process Management Information systems - Meaning, Use of IT in Management
2	Electronic Commerce
	Meaning, Advantages and Limitations of E Commerce, The role of Strategy in E Commerce, Value chains in E Commerce, Infrastructure for Electronic Commerce Web Based Tools for Electronic Commerce, Electronic Commerce software, Security Threats to electronic Commerce , Implementing Security for Electronic Commerce, Electronic Payment Systems, Strategies for Marketing, Sales & Promotion Strategies for Purchasing Logistics & Support Activities, Electronic Markets & Communities, Business Plans for Implementing Electronic Commerce
3	Concept of MIS Reports in Computer Environment
	Introduction Concept of MIS Need for MIS Characteristic of MIS Outputs of MIS Role of MIS Guidelines for Developing MIS reports Functional Aspects of the MIS: Problems in MIS Knowledge required for studying MIS MIS and Computer
4	Computerized accounting system and Auditing
	Role & Need and requirements of computerized accounting Basic requirements of computerized accounting system Limitations of computerized accounting system Understand the development and design of a computerized accounting system; determining how the accounting data will be processed, i.e. what accounts and books are needed and what are the desired output i.e. financial reports and other reports. Introduction of accounting software Advantages, uses and various types of accounting software Accounting software TALLY - Accounting and reports Need and importance of IT in auditing Auditing in IT environment

3. Core Courses (CC)

Corporate Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Corporate Finance- an overview	15
2	Planning the Corporate Financial Activities	15
3	Capital Structure	15
4	Sources and Methods of raising Corporate Finance	15
	Total	60

Sr. No.	Modules/Units
1	Corporate Finance- an overview
	Function of Finance in a business enterprise Emergence of corporate finance as an integral part of business finance Need for professional approach in managing corporate finance Role and functions of a Corporate Financial Manager Requirements of an efficient Corporate Financial Manager
2	Planning the Corporate Financial Activities
	Theories of Capitalisation Owned Capital and borrowed Capital- Cost of Capital Break even analysis
3	Capital Structure
	Meaning and Definition of Capital structure Factors affecting Capital structure- trading on equity Watered Capital, over capitalization and under capitalization NPV, IRR, DCF analysis and payback period
4	Sources and Methods of raising Corporate Finance
	Types and features of corporate securities currently available Management of new issues including pricing of securities Role of commercial banks and investment banks in financing the corporate sector Leasing a s method of corporate finance

3. Core Courses (CC)

Corporate Law

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Companies Act - 2013	15
2	Indian Partnership Act - 1932	15
3	Consumer Protection Act, 1986 & Competition Act 2002	15
4	Intellectual Property Rights	15
	Total	60

Sr. No.	Modules/Units
1	Indian Companies Act - 2013
	· Company -Concept, Features, Role of Promoters (S. 2(69) S. 92), Duties and liabilities of the Promoter Effects of Pre-Incorporation contracts, Consequences of non-registration, and Lifting of Corporate Veil. · Classification of Companies Distinction between Private Company and Public Company, Advantages and disadvantages of Private company and Public Company. -Common Procedure for Incorporation of Company, · Memorandum of Association (MOA) & Article of Association(AOA) - Concept , Clauses of MOA, AOA- Contents, Doctrine of constructive notice, Doctrine of Ultra Vires, Doctrine of Indoor Management. · Prospectus - Concept, Kinds, Contents, Private Placement
2	Indian Partnership Act - 1932
	· Partnership - Concept, Essentials, True Test of Partnership, Partnership Deed, Types of Partnership, Rights and Duties of Partners, Distinguish between Partnership & Hindu Undivided Family (HUF). · Dissolution - Concept, Modes of Dissolution, Consequences of Dissolution. · Limited Liability Partnership (LLP) 2008 - Concept, Characteristics, Advantages & Disadvantages, Procedure for Incorporation. · Extent of L.L.P.- Conversion of LLP, Mutual rights & duties of partners, Winding up of LLP, Distinction between LLP and Partnership
3	Consumer Protection Act, 1986 & Competition Act 2002
	· Consumer Protection Act - Concept , Objects, Reasons for enacting the Consumer Protection Act, Definition of Consumer, Consumer Dispute, Complaint, Complainant, Defect, Deficiency, Consumer Dispute, Unfair Trade Practices, Goods and Services. · Consumer Protection Councils & Redressal Agencies - District, State & National. · Competition Act 2002 - Concept, Salient Features, Objectives & Advantages. · Abuse of Dominant Position, Competition Commission of India, Anti-Competition Agreements,
4	Intellectual Property Rights
	· Intellectual Property Right (IPR) - Concept, Nature, Introduction & background of IPR in India. · IPR relating to Patents - Concepts of Invention and discovery, Comparison (S2 (j)), Concept of Patents, General principles applicable to working of patented inventions, Term of Patent. Infringement of Patent Rights & Remedies. (Ss. 104-115) · IPR relating to Copyrights- Concept of Copyright (Ss. 14, 16, 54,) Concept of author and authorised acts, (S.2) Ownership of Copy right (S.17) Duration or term of Copy right. (S. 22-27), Original work and fair use, Rights of Copyright holder, Infringement of Copyrights & Remedies. (Ss. 51, 52) · IPR relating to Trademarks -Concept, Functions of Trade Mark, types, trademarks that cannot be registered, Registration of Trade Marks and rights of the proprietor of Trade Marks. Procedure for registration of Trade Marks., Infringement of Trademarks & Remedies.

3. Core Courses (EC)

Office Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Office Accommodation and Environment	15
2	Office Automation	15
3	HRM for office Management	15
4	Planning and Scheduling Office Work	15
	Total	60

Sr. No.	Modules/Units
1	Office Accommodation and Environment
	Office building : size, layout, safety and security measures Reception : Importance, shape and size, control Communication: Feature, classification, barriers. Arrangement and adjustment: Furniture, allotment of seats, chambers, cabins rooms etc.
2	Office Automation
	Uses and abuses of labour saving appliances. Kind of office machines (typewriter, duplicating computers and word processors), calculators, etc. Objectives and advantages of various machines. Use of machines, installing, handling, maintenance. Objectives and advantages of office manuals charts, preparation and play of manuals and charts. Kind of reports, report preparation, enquiries
3	HRM for office Management
	Recruitment, selection, training and development of office staff. Office supervision-Importance, span, duties and responsibilities of supervisory staff. Motivation- Financial and non-financial incentives to subordinates. Discipline : Importance and manner of office control, work control and work distribution
4	Planning and Scheduling Office Work
	Office routine, flow of work and office manual Control over stationery, forms and supplies Routine of handling mail Importance of correspondence in business and Govt. offices. Essentials of good business and official correspondence. Various forms of correspondence.

Reference Books
Corporate Accounts-I & II
· Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi · Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi · Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi · Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai · Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi · Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai · Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi · Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc · Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida · Compendium of Statement and Standard of Accounting, ICAI · Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai · Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai · Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi · Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi · Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi · Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi · Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi
Direct Tax-I & II
· Direct Taxes Law & Practice by V.K. Singhania - Taxman · Systematic Approach to Direct Tax by Ahuja & Gupta - Bharat Law House · Income Tax Ready Recknoner by Dr .V.K. Singhania - Taxman · Direct Tax Laws by T.N. Manoharan - Snow White · Wealth Engine: Indian Financial Planning and Wealth Management Handbook by Sankaran S · WEALTH MANAGEMENT, by N/A Dun & Bradstreet
Indirect Tax-I & II
· Indirect Taxes: Law and Practice by V.S. Datey, Taxmann, New Delhi · Commentary on M.V.A.T. ACT, 2002 by M.S. Mathuria and Dilip Phadke by Maharashtra Sales Tax Vat News, Mumbai · Indirect Taxes by V.S. Balchandra, Sultan Chand and Sons, New Delhi · Maharashtra Value Added Tax by Shah Shantilal, Snow White Publications Pvt. Ltd., Mumbai · GST Act
Investment Banking
· *Joshua Rosenbaum and Joshua Pearl, Investment Banking: Valuation, Leveraged Buyouts, and Mergers and Acquisitions, Wiley Publication; 2 edition (May 28, 2013)* · *2. Matthew Krantz and Robert Johnson, Investment Banking for Dummies, 1 edition (February 10, 2014)* · *3. Michel Fleuriet, Investment Banking Explained: An Insider's Guide to the Industry,*

McGraw-Hill Education; 1 edition (July 17, 2008)

- *4. Tom Lott, Vault Career Guide to Investment Banking, Vault Publication, 5th edition (February 2, 2005)*
- *5. K. Thomas Liaw, The Business of Investment Banking: A Comprehensive Overview, Wiley Publication; 3 edition (November 1, 2011)*

Cost Accounting-I & II

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- Cost Accounting by C.S. Rayudu, Tata Mc. Grow Hill and Co. Ltd., Mumbai
- Cost Accounting by JawaharLal and Seema Srivastava, Tata Mc. Grow Hill and Co. Ltd., Mumbai
- Cost Accounting by Ravi M. Kishore, Taxmann Ltd., New Delhi
- Principles and Practices of Cost Accounting by N.K. Prasad, Book Syndicate Pvt. Ltd., Calcutta
- Cost Accounting Theory and Practice by B.K. Bhar, Tata Mc. Grow Hill and Co. Ltd., Mumbai
- Cost Accounting Principles and Practice by M.N. Arora, Vikas Publishing House Pvt. Ltd., New Delhi
- Advanced Cost and Management Accounting: Problems and Solutions by V.K. Saxena and C.D. Vashist, S. Chand and Company (P) Ltd., New Delhi
- Cost Accounting by S.P. Jain and K.L. Narang, Kalyani Publishers, Ludhiana
- Modern Cost and Management Accounting by M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi

Entrepreneurial Development

- Dr. Vasant Desai "Small Scale Industries and Entrepreneurship" Himalaya Publishing House.
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- S.K. Mohanty "Fundamentals of Entrepreneurship" Prentice Hall of India
- E. Gordon and K. Natrajan "Entrepreneurship Development" Himalaya Publishing House.
- Robert D. Hisrich & Micheal P. Peters "Entrepreneurship", Tata Mc. Graw Hill.
- James Lam "Enterprise Risk Management - From Incentives to Control" John Wiley and Sons , New Jersey.
- Mukhtar Amhed Khan "Entrepreneurial development Programmes in India" Kanishka Pub. House, 1992.

Management Accounting

- Cost Management by Saxena & Vashist
- Cost & Management Accounting by Ravi N.Kishor ,Publication Taxmonth
- Essential of Management Accounting by P.N.Reddy,Himalaye
- Advanced Management Accounting by Robert S Kailar,Holl
- Financial Of Management Accounting by S.R.Varshney,Wisdom
- Introduction Of Management Accounting by Charbs T Horngram, PHI Learnng
- Management Accounting by I.m.Pandey, Vikas
- Cost & Management Accounting by D.K.Mattal,Galgotia
- Management Accounting by Khan & Jain,Tata Megaw
- Management Accounting by R.P.Resstogi

Business Law

- Indian Contract Act, Sales of Goods Act and Partnership Act by T.R. Desai, Sarkar and Sons Pvt. Ltd., Kolkata
- The Negotiable Instrument Act by J.S. Khergamwala, N.M. Tripathi Pvt. L.td., Mumbai
- The Principles of Mercantile Law by Avtar Singh, Eastern Book Company, Lucknow

- Business Law by M.C. Kuchal, Vikas Publishing House, New Delhi
- Business Law by N.D. Kapoor, Sultan Chand and Sons, New Delhi
- Business Law by P.R. Chandha, Galotia, Dew Delhi

Business Regulatory Framework

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- Labour and Industrial1 Laws, S.N Misra, Central Law Publication
- Labour and Industrial Laws, P.K.Padhi, Eastern Economy Edition
- Commercial and Industrial Law, S.K. Dasgupta, Sterling Publishers Pvt. Ltd
- Industrial Law, Mr. N.D. Kapoor, Sultan Chand1
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- Financial Markets & Institution - Guruswamy - Thomson / Cengage Learining
- Stephen A. Ross, Wester FIELD, Jordan - Fundamentals of Corporate Finance (Mac Graw Hill)
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- Company Law by P.C. Tulsian.
- Law and practice of Intellectual Property in India by Dr.Vikas Vashishth,Bharat Law House.
- Law of Partnership along with Limited Liability Partnership by Avatar Singh , Eastern Book

Company.
- Laws Relating to Intellectual Property, Universal Law Publishing Co. Dr. B.L.Wadhera
- Consumer Protection Law and Practice by Dr.V.K.Agarwal, Bharat Law House.
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Office Management

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University of Mumbai

Revised Syllabus and Question Paper Pattern of Courses
of
B.Com. (Financial Management) Programme
at
Second Year
Semester III and IV

Under Credit, Grading and Semester System

With Effect from Academic Year 2017-2018

S.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	*Elective Courses (EC)*		*1*	*Elective Courses (EC)*	
1, 2 & 3	*Any three courses from the following list of the courses	09	1,2 & 3	*Any three courses from the following list of the courses	09
2	*Ability Enhancement Courses (AEC)*		*2*	*Ability Enhancement Courses (AEC)*	
4	Entrepreneurial Development	02	4	Information Technology in Management	02
3	*Core Courses (CC)*		*3*	*Core Courses (CC)*	
5	Management Accounting	03	5	Corporate Finance	03
6	Business Law	03	6	Corporate Law	03
7	Business Regulatory framework	03	7	Office Management	03
	Total Credits	20		Total Credits	20

*List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)		*List of Discipline Related Elective(DRE) Courses for Semester IV (Any Three)	
1	Corporate Accounts -I	1	Corporate Accounts -II
2	Direct Tax -I	2	Direct Tax -II
3	Indirect Tax-I	3	Indirect Tax-II
4	Investment Banking	4	Merchant Banking
5	Cost Accounting-I	5	Cost Accounting-II

THIRD SEMESTER
Revised Syllabus of Courses of B.Com. (Financial Management) Programme at Semester III

No. of Courses	Semester III	Credits
1	*Elective Courses (EC)*	
1, 2 & 3	*Any three courses from the following list of the courses	09
2	*Ability Enhancement Courses (AEC)*	
4	Entrepreneurial Development	02
3	*Core Courses (CC)*	
5	Management Accounting	03
6	Business Law	03
7	Business Regulatory framework	03
	Total Credits	20

List of Discipline Related Elective (DRE) Courses for Semester IV (Any Three)	
1	Corporate Accounts -II
2	Direct Tax -II
3	Indirect Tax-II
4	Merchant Banking
5	Cost Accounting-II

1. Elective Courses (EC)

Corporate Accounts- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Partnership Final Accounts based on Adjustment of Admission or Retirement / Death of a Partner during the Year	15
2	Piecemeal Distribution of Cash	15
3	Amalgamation of Firms	15
4	Conversion / Sale of a Partnership Firm into a Ltd. Company	15
	Total	60

Sr. No.	Modules/Units
1	Partnership Final Accounts based on Adjustment of Admission or Retirement / Death of a Partner during the Year
	Simple final accounts questions to demonstrate the effect on final Accounts when a partner is admitted during the year or when partner Retires / dies during the year Allocation of gross profit prior to and after admission / retirement / death when stock on the date of admission / retirement is not given and apportionment of other expenses based on time / Sales/other given basis Ascertainment of gross profit prior to and after admission/retirement / death when stock on the date of admission / retirement is given and apportionment of other expenses based on time / Sales / other given basis Excluding Questions where admission / retirement / death takes place in the same year
2	Piecemeal Distribution of Cash
	Excess Capital Method only Asset taken over by a partner Treatment of past profits or past losses in the Balance sheet Contingent liabilities / Realization expenses/amount kept aside for expenses and adjustment of actual Treatment of secured liabilities Treatment of preferential liabilities like Govt. dues / labour dues etc Excluding: Insolvency of partner and Maximum Loss Method
3	Amalgamation of Firms
	Realization method only Calculation of purchase consideration Journal/ledger accounts of old firms Preparing Balance sheet of new firm Adjustment of goodwill in the new firm Realignment of capitals in the new firm by current accounts / cash or a combination thereof Excluding : Common transactions between the amalgamating firms
4	Conversion / Sale of a Partnership Firm into a Ltd. Company
	Realisation method only Calculation of New Purchase consideration, Journal / Ledger Accounts of old firms. Preparing Balance sheet of new company

1. Elective Courses (EC)

Direct Tax- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Definitions u/s - 2: Basis of Charge	08
2	Exclusions from Total Income	07
3	Heads of Income	25
4	Deductions under Chapter VI - A	10
5	Computation of Total Income	10
	Total	60

Sr. No.	Modules/Units
1	Definitions u/s - 2 & Basis of Charge
	Definitions u/s - 2 Section 2 -Assessee, Assessment Year, Assessment, Annual value, Business, Capital asset, Income, Person, Previous Year, Transfer Basis of Charge Section 3- 9 -Previous Year, Residential Status, Scope Of Total Income, Deemed Income
2	Exclusions from Total Income
	Section 10 - restricted to, Agricultural Income, Sums Received From HUF By Member, Share of Profit from Firm, Casual & Non - Recurring Receipts, Scholarships, Income of Minor Child, Allowance to Members of Parliament and Legislative Assembly. Note -Exemptions related to specific Heads of Income to be covered with Relevant Provisions.
3	Heads of Income
	Salary Section 15 - 17, Including Section 10 relating to House Rent Allowance, Travel Concession, Special Allowance, Pension - Commutation, Leave Encashment, Compensation, Voluntary Retirement, Payment from Provident Fund Income From House Property Section 22 - 27, Including Section 2 - Annual Value Profits & Gains From Business & Profession Vocation Section 28-32, 36, 37, 40, 40A & 43B. including.: Section 2 - Business Capital Gains Section 45, 48, 49, 50, 54 and 55 Income from Other Sources Section 56 - 59
4	Deductions under Chapter VI - A
	80 A- Restriction on claim in Chapter VI- A deductions 80 C - Payment of LIC/PF and other eligible investments 80CCC - Contribution to certain Pension Fund 80D - Medical Insurance Premium 80 DD- Maintenance and medical treatment of handicapped dependent 80E - Interest on Educational Loan 80 TTA- Interest on Saving Bank account 80U - Deduction in the case of totally blind or physically handicapped or mentally retarded resident person
5	Computation of Total Income
	Computation of Total Income Of Individual & HUF

Note:

1. Relevant Law / Statute in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuing examinations after relevant year.
2. The syllabus is restricted to study of particular section/s, specifically mentioned in rules and notifications only

1. Elective Courses (EC)

Indirect Tax- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Maharashtra Value Added Tax (MVAT), Act 2002: Introduction	30
2	Maharashtra Value Added Tax (MVAT), Act 2002: Registration Procedure and Rules: Section 16	10
3	Maharashtra Value Added Tax (MVAT), Act 2002: Audit Section 22 and 61	10
4	Maharashtra Value Added Tax (MVAT), Act 2002: Penalty and Interest	10
	Total	60

Sr. No.	Modules/Units
1	Maharashtra Value Added Tax (MVAT), Act 2002: Introduction
	1. Definition Section: 2 (4) Businesses 2 (8) Dealers 2 (12) Goods 2 (13) Importer 2 (15) Manufacturer 2 (20) Purchase Price 2 (22) Resale 2 (24) Sales 2 (25) Sales Price 2 (27) Service 2 (33) Turnover of Sales and Rule 3 2. Incidence of levy of Tax Sec. 3 Incidence of Tax Sec. 4 Tax Payable Sec. 5 Tax Not Leviable on Certain Goods Sec. 6 Levy of Sales Tax on Goods specified in the Schedule Sec. 7 Rate of Tax on Packing Material Sec. 8 Certain Sale and Purchase not Liable for Tax 3. Payment of Tax and Recovery Section: 42 - Composition of Tax and Notification 1505/CR-105/Taxation-1 4. Set Off, Refund, etc. Section 48 and 49 Set Off, Refund etc. Along with Rules 52, 53, 54, 55
2	Maharashtra Value Added Tax (MVAT), Act 2002: Registration Procedure and Rules: Section 16
3	Maharashtra Value Added Tax (MVAT), Act 2002: Audit Section 22 and 61
4	Maharashtra Value Added Tax (MVAT), Act 2002: Penalty and Interest

Note:

1. Relevant Law / Statute in force on 1st April immediately preceding commencement of Academic Year is applicable for ensuing examinations after relevant year.
2. The syllabus is restricted to study of particular section/s, specifically mentioned in rules and notifications only

1. Elective Courses (EC)

Investment Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction of Investment Banking	15
2	Concepts of Investment Banking	15
3	Risk and Return	15
4	Investment Banking Activities	15
	Total	60

Sr. No.	Modules/Units
1	Introduction of Investment Banking
	Investment its meaning and scope, types of asset classes, asset allocation, creating portfolio and process of portfolio management
2	Concepts of Investment Banking
	Investment banking concepts, Private placement methods, role of venture capital firms in raising funds, due diligence methods
3	Risk and Return
	Risk and return concepts, types of risk and its application, ASBA, IPO and FPO, SEBI disclosures and other regulators.
4	Investment Banking Activities
	Industry analysis, role of IPO in value unlocking, recent trends and developments, investments banking activities

1. Elective Courses (EC)

Cost Accounting- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Cost Accounting	15
2	Material Cost	15
3	Labour Cost	15
4	Overheads	15
	Total	60

Sr. No.	Modules/Units
1	Introduction to Cost Accounting
	Evolution Objectives and Scope of Cost Accounting Importance and Advantages of Cost Accounting Difference between Cost Accounting and Financial Accounting Limitations of Financial Accounting Definitions: Cost, Costing and Cost Accounting Classification of Cost on Different Bases Cost Allocation and Apportionment Coding System Essentials of Good Costing System
2	Material Cost
	Material Cost: The Concept Material Control Procedure Documentation Stock Ledger, Bin Card Stock Levels Economic Order Quantity (EOQ)
3	Labour Cost
	Labour Cost: The Concept Composition of Labour Cost Labour Cost Records Overtime / Idle Time / Incentive Schemes
4	Overheads
	Overheads: The Concept Classification of overheads on different bases i Apportionment and Absorption of Overheads

2. Ability Enhancement Course (AEC)

Entrepreneurial Development

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Concept, meaning and definition of entrepreneur and entrepreneurship	15
2	Entrepreneurial Project Development	15
3	Legal Considerations for different forms of organization	15
4	Entrepreneurship Development Programme and Risk Management	15
	Total	60

Sr. No.	Modules/Units
1	Concept, meaning and definition of entrepreneur and entrepreneurship
	· Importance and significance of growth of entrepreneurial activity. · Concept of intrapreneur. · Characteristics and qualities of entrepreneurs · Classification and types of entrepreneurs. · Women entrepreneurs · Theories of entrepreneurship (McClelland, Max Weber and Joseph Schumpeter)
2	Entrepreneurial Project Development
	· Idea generation - sources and methods · Identification and classification of ideas. · Environmental Scanning and SWOT analysis · Preparation of project plan · Points to be considered · Components of an ideal business plan - market plan, financial plan, operational plan, & HR plan. · Project formulation -project report significance and contents · Project appraisal - Aspects and methods : (a) Economic oriented appraisal (b) Financial appraisal (c) Market oriented appraisal Technological feasibility - Managerial Competency
3	Legal Considerations for different forms of organization
	Cultural and Environmental Issues in setting up of business enterprise with respect to : (Sole trading firm, Limited Liabilites Partnership, Limited company, Public Company, Private Company, NGO) Quick Start Methods of Business: Franchising , Mergers and Takeover
4	Entrepreneurship Development Programme and Risk Management
	· SME, SHG with special reference to microfinance and woman entrepreneur · Definition of risk, types of risk, risk management strategies.

3. Core Courses (CC)

Management Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Management Accounting	05
2	Analysis and Interpretation of Accounts	10
3	Financial Statement analysis: Ratio analysis	15
4	Cash Flow Management	15
5	Working Capital Management	15
	Total	60

Sr. No.	Modules/Units
1	Introduction to Management Accounting
	Meaning, Features, Scope, Importance, Functions, role of Management Accounting, Management Accounting Framework, Tools, Management Accounting and Financial Accounting
2	Analysis and Interpretation of Accounts
	a)Vertical Forms of Balance Sheet and Profit and Loss Account suitable for analysis b) Trend Analysis. c) Comparative Statement. d) Common Size Statement. NOTE: Practical Problems based on the above (a) to (d)
3	Financial Statement analysis: Ratio analysis
	Meaning of financial Statement Analysis, steps, Objective and types of Analysis. Ratio analysis: Meaning, classification, Du Point Chart, advantages and Limitations. Balance Sheet Ratios Revenue Statement Ratios Combined Ratios
4	Cash Flow Management
	Preparation of Cash Flow Statement with reference to Accounting Standard No .3. (Indirect method only))
5	Working Capital Management
	A. Concept, Nature of Working Capital , Planning of Working Capital B. Estimation / Projection of Working Capital Requirement in case of Trading and Manufacturing Organization C. Operating Cycle Practical Problems

3. Core Courses (CC)

Business Law

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Contract Act 1872	25
2	Special Contract	10
3	The Sales of Goods Act-1930	10
4	The Negotiable Instruments (Amended) Act 2015	10
	Total	60

No.	Modules/Units
1	Indian Contract Act - 1872
	· Contract - Definition of Contract and Agreement, Essentials of Valid Contract, Classification of Contracts. · Offer and Acceptance - Rules of valid offer and acceptance, Counter offer, standing or open offer, distinguish between offer and invitation to offer. Concept of Communication and Revocation of offer and acceptance (sec. 3,5) · Capacity to Contract (S. 10-12) - Minor, Unsound Mind, Disqualified Persons. · Consideration (S. 2 & 25) - Concept and Importance of consideration, Legal rules of Consideration, Exceptions to the Rule, 'No Consideration No Contract'(Ss. 25) Unlawful Consideration (S 23) · Consent (Ss.13, 14-18, 39.53, 55, 66)-Agreements in which consent is not free - Coercion, Undue Influence, Misrepresentation Fraud, Mistake. · Void Agreements (S. 24-30) - Concept, Void Agreements under Indian Contract Act. Contingent Contract (S. 31), Quasi Contract (S.68-72), Concept of E-Contract& Legal Issues in formation and discharge of E- Contract. Concept of Performance of Contract (S 37) · Modes of Discharge of Contract, Remedies on breach of Contract.(73-75)
2	Special Contracts
	· Law of Indemnity & Guarantee (Ss. 124-125, Ss. 126-129, 132-147) - Concept, Essentials elements of Indemnity and Guarantee, Contract of Indemnity vs. Guarantee, Modes of Discharge of Surety. · Law of Bailment (S. 148, 152-154, 162, 172, 178, 178A, 179) - Concept, Essentials of Bailment, Kinds of Bailment, Rights and Duties of Bailor and Bailee · Law of Pledge - Concept, Essentials of valid Pledge, Lien - concept, Difference between Pledge and Lien, Rights of Pawnor & Pawnee.(Ss.173, 174, 177) · Law of Agency (Ss. 182-185, 201-209) - Concept, Modes of creation of Agency, Modes of termination of Agency, Rights& Duties of Principal and Agent.
3	The Sale of Goods Act - 1930
	· Contract of Sale (S.2) - Concept, Essentials elements of contract of sale, Distinction between Sale and Agreement to sell (S.4) Distinguish between Sale and Hire Purchase Agreement, Types of Goods. Effects of destruction of Goods (Ss. 6,7.8), · Conditions & Warranties (Ss. 11-25 & 62, 63) - Concept, Distinguish, Implied Conditions & Warranties, Concept of Doctrine of Caveat Emptor -Exceptions. · Property - Concept , Rules of transfer of property (Ss. 18-26) · Unpaid Seller (Ss. 45-54, 55 & 56)- Concept, Rights of an unpaid seller, Remedies for Breach of contract of Sale (Ss. 55-61),Auction sale - Concept, Legal Provisions. (S. 64)
4	The Negotiable Instruments (Ammended) Act 2015
	· Negotiable Instruments - Concept (S13), Characteristics, Classification of Negotiable Instruments (Ss. 11, 12, 17-20, 42, 43, 104,134,135) Maturity of Instruments. · Promissory Note and Bill of Exchange (Ss. 4,5, 108-116)- Concept, Essentials of Promissory Note, Bill of Exchange (Ss. 4,5), Essential features of promissory note and Bill of exchange, Kinds Promissory note and Bill of exchange, Cheque (S.6)- Concept, Types & Crossing of Cheque, Distinguish between Bill of Exchange & Cheque, Dishonour of Cheque - Concept & Penalties (Ss. 138, 139,142) · Miscellaneous Provisions (S. 8-10, 22, 99-102, 118-122, 134-137) -Parties to Negotiable instruments Holder, Holder in due course, Rights & Privileges of Holder in due course, Payment in due course, Noting & Protest (99-104A)

3. Core Courses (CC)

Business Regulatory Framework

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Laws Related to Industrial Relations and Industrial Disputes	15
2	Laws Related to Health, Safety and Welfare	15
3	Social Legislation	15
4	Laws Related To Compensation Management	15
	Total	60

Sr. No.	Modules/Units
1	Laws related to Industrial Relations & Industrial Disputes
	· Industrial Disputes Act, 1947: Definition, Authorities, Awards, Settlements, Strikes Lockouts, Lay Offs, Retrenchment and Closure · The Trade Union Act, 1926
2	Laws related to Health, Safety and Welfare
	· The Factory Act 1948: (Provisions related to Health, Safety and Welfare) · The Workmen's Compensation Act, 1923 Provisions: · Introduction: The doctrine of assumed risk, The doctrine of Common Employment, The doctrine of Contributory Negligence · Definitions · Employers liability for compensation (S-3 to 13) · Rules as to Compensation (Sec 4 to Sec 9) (14 A & 17)
3	Social Legislation
	· Employee State Insurance Act 1948: Definition and Employees Provident Fund · Miscellaneous Provision Act 1948: Schemes, Administration and determination of dues
4	Laws related to Compensation Management
	· The payment of Wages Act 1948: Objectives, Definition, Authorised Deductions · Payment of Bonus Act, 1965 · The Payment Of Gratuity Act, 1972

Revised Syllabus
of Courses of B.Com. (Financial Management) Programme
at Semester IV

No. of Courses	Semester IV	Credits
1	*Elective Courses (EC)*	
1,2 & 3	*Any three courses from the following list of the courses	09
2	*Ability Enhancement Courses (AEC)*	
4	Information Technology in Management	02
3	*Core Courses (CC)*	
5	Corporate Finance	03
6	Corporate Law	03
7	Office Management	
Total Credits		20

List of Discipline Related Elective(DRE) Courses for Semester IV (Any Three)	
1	Corporate Accounts -II
2	Direct Tax -II
3	Indirect Tax-II
4	Merchant Banking
5	Cost Accounting-II

Note: The Syllabus of Ability Enhancement and Core Courses are same at all FY level

1. Elective Courses (EC)

Corporate Accounts- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Preparation of Final Accounts of Companies	15
2	Redemption of Preference Shares	15
3	Redemption of Debentures	15
4	Ascertainment and Treatment of Profit Prior to Incorporation	15
	Total	60

Sr. No.	Modules/Units
1	Preparation of Final Accounts of Companies
	Relevant provisions of Companies Act related to preparation of Final Account (excluding cash flow statement) Preparation of financial statements as per Companies Act. (excluding cash flow statement) AS 1 in relation to final accounts of companies (disclosure of accounting policies)
2	Redemption of Preference Shares
	Provision of the Companies Act for redemption of Preference Shares (Sec 55 of the Companies Act, 2013), Companies (Share and Debentures) Rules. Methods of Redemption of fully paid up Preference Shares as per Companies Act, 2013: The proceed of a fresh issue of shares, the capitalisation of undistributed profits and a combination of both, calculation of minimum fresh issue to provide the fund for redemption, (Question on entries and/or Balance Sheet) Note: Companies governed by Section 133 of the Companies Act, 2013 and comply with the accounting standards prescribed for them. Hence, the balances in security premium account not to be utilised for premium payable on redemption of preference shares.
3	Redemption of Debentures
	Introduction: Provisions of Section 71 (1) and (4) of the Companies Act, 2013, Creation and investment of DRR including The Companies (Share Capital and Debentures) Rules, 2014, the methods of writing-off discount/loss on issue of debentures; Terms of issue of debentures Methods of redemption of debentures: By payment in lumpsum and by payment in instalments (excluding from by purchase in open market), Conversion. (Question on entries. ledgers and/or Balance Sheet and /or redemption of preference shares)
4	Ascertainment and Treatment of Profit Prior to Incorporation
	Principles for ascertainment Preparation of separate, combined and columnar Profit and Loss Account including different basis of allocation of expenses/ incomes

1. Elective Courses (EC)

Direct Tax- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Clubbing of Income	05
2	Set Off & Carry Forward of Losses	05
3	Computation of Tax liability of Individual & HUF	05
4	Computation of Income of Partnership Firm in Relation to Sec: 40(b) & Tax Thereon With Applicable Rate of Tax	15
5	Return of Income - Sec 139	10
6	Tax Deduction at Source Advance Tax Interest Payable	15
7	DTAA U/S 90 & 91	5
	Total	60

Sr. No.	Modules/Units
1	Clubbing of Income - Section 60 to 65
2	Set Off & Carry Forward of Losses
	Sec: 70 - Set off Loss from one Source against Income from another Source under the Same Head of Income Sec: 71 - Set Off Loss from One Head against Income of another Head Sec: 71B - Carry Forward & Set off Losses from House Property Sec: 72 - Carry Forward & Set Off of Losses of Business Losses Sec: 73- Losses in Speculation Business Sec: 74- Loss under the head Capital Gains
3	Computation of Tax liability of Individual & HUF
4	Computation of Income of Partnership Firm in Relation to Sec: 40(b) & Tax Thereon With Applicable Rate of Tax
5	Return of Income - Sec 139
	Excluding u/s 139(4A), 139(4B), 139(4C) & 139 (4D)
6	Tax Deduction at Source Advance Tax U/S 207, 208, 209, 210 & 211 Interest Payable U/S 234A, 234B, 234C
	Basic Aspects of Deduction of Taxes at Source Sec: 192 - TDS on Salary Sec: 194A - TDS on Interest Sec: 194C - TDS on Contractor Sec: 194H - TDS on Commission Sec: 194I - TDS on Rent Sec: 194J - TDS on Professional Fees Advance Tax U/S 207, 208, 209, 210 & 211 Sec: 207 - Income Liable to Advance Tax Sec: 208 - Liability of Advance Tax Sec: 209 - Computation of Advance Tax Sec: 210 - Payment of Advance Tax by Assessee on His Own Account Sec: 211 - Due Dates of Payment of Advance Tax Interest Payable U/S 234A, 234B, 234C Sec: 234A - Interest for default in furnishing return of income Sec: 234B - Interest for default in payment of advance tax Sec: 234C - Interest for deferment of advance tax
7	**DTAA U/S 90 & 91**

Note:

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2. The syllabus is restricted to study of particular section/s, specifically mentioned rules and notifications only.

1. Elective Courses (EC)

Indirect Tax- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Goods and Services Tax	10
2	Registration and Levy of an Exemption from Tax	15
3	Meaning, Scope and Time of Supply	15
4	Valuation & Payment of GST	20
	Total	60

Sr. No.	Modules/Units
1	Overview of Goods and Services Tax
	Overview of GST Implementation of GST Liability of the Tax Payer GST Network and GST model GST Council
2	Registration and Levy of an Exemption from Tax
	Introduction Registration Procedure Important Points Special Persons Amendments / Cancellation Levy of GST - Introduction Composition Scheme Remission of Tax / Duty
3	Meaning, Scope and Time of Supply
	Taxable Supply Supply of Goods and Supply of Services Course or Furtherance of Business Special Transactions Time of Supply - Goods Time of Supply -Services Other Points
4	Valuation & Payment of GST
	Transaction Value Valuation Rules Input Tax Credits Time of GST Payment How to make payment Challan Generation & CPIN TDS & TCS

1. Elective Courses (EC)

Merchant Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Merchant Banking	15
2	Initial Public Offering (IPO)	15
3	Issue of DRs, ADRs and CPs	15
4	Issue of Bond and Debentures	15
	Total	60

Sr. No.	Modules/Units
1	Introduction to Merchant Banking
	Introduction to Merchant banking, Importance, need, functions, Merchant banking services - Project counselling, Loan syndication and Corporate counselling; Pre-issue merchant banking activities - Obtaining stock exchange approvals, action as per SEBI guide lines, Finalizing the appointments with - manager/advisers, Underwriters, Brokers, Bankers, Advertising agency, Drafting and approval of prospectus; Post-issue merchant banking activities - Issue subscription, Allotment of shares, Refunds, Periodical reports to SEBI.
2	Initial Public Offering (IPO)
	Initial Public Offering - Issuance Process, Role of registrar, SEBI guidelines for IPO eligibility, IPO grading, Draft Red Herring Prospectus (DRHP), Listing agreement, Pricing the issue, Book building process, Allotment; SEBI Guidelines in Drafting the Offer Document; Pre and Post launch activities in IPO, SEBI Guidelines on QIP, Rights and Bond Issues
3	Issue of DRs, ADRs and CPs
	Types and Process of Issuing of Depository Receipts (DRs) - American Depository Receipts (ADRs), Global Depository Receipts (GDRs), European Depository Receipts (EDRs), Indian Depository Receipts (IDRs), ADR structure and norms, Indian Depository Receipts (IDRs) and Guidelines; Procedure for issue of Commercial Paper - Credit Rating, Redemption process.
4	Issue of Bond and Debentures
	Procedure for Issue of Bond and Debentures, Foreign currency convertible bonds

1. Elective Courses (EC)

Cost Accounting- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Classification of Costs And Cost Sheets	20
2	Reconciliation of Cost and Financial Accounts	10
3	Contract Costing	15
4	Process Costing	15
	Total	60

Sr. No.	Modules/Units
1	Classification of Costs and Cost Sheet
	Classification of costs, Cost of Sales, Cost Centre, Cost Unit, Profit Centre and Investment Centre Cost Sheet, Total Costs and Unit Costs, Different Costs for different purpose Simple practical problems on preparation of cost sheet
2	Reconciliation of cost and financial accounts
	Practical problems based on reconciliation of cost and Financial accounts.
3	Contract Costing
	Progress payments, Retention money, Contract accounts, Accounting for material, Accounting for Tax deducted at source by the contractee, Accounting for plant used in a contract, treatment of profit on incomplete contracts, Contract profit and Balance sheet entries. Excluding Escalation clause Note- Simple practical problems
4	Process Costing
	Process loss, Abnormal gains and losses, Joint products and by products. Excluding Equivalent units, Inter-process profit Note- Simple Practical problems Process Costing and joint and by products

2. Ability Enhancement Course (AEC)

Information Technology in Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business Process	15
2	Electronic Commerce	15
3	Concept of MIS Reports in Computer Environment	15
4	Computerized accounting system and Auditing	15
	Total	60

Sr. No.	Modules/Units
1	Business Process
	Introduction, Definition and Meaning of business process Flow of business process for accounting, purchase, sales and finance Classification of business processes Introduction, Definition and Meaning of Business Process Management Principles and practices of Business Process Management Business Process Management life cycle Theories of Business Management Process Implementation of Business process Management - need, key factors and importance Automation of business Processes - benefits, risks, challenges Accounting systems automation IT and Business Process Management Information systems - Meaning, Use of IT in Management
2	Electronic Commerce
	Meaning, Advantages and Limitations of E Commerce, The role of Strategy in E Commerce, Value chains in E Commerce, Infrastructure for Electronic Commerce Web Based Tools for Electronic Commerce, Electronic Commerce software, Security Threats to electronic Commerce , Implementing Security for Electronic Commerce, Electronic Payment Systems, Strategies for Marketing, Sales & Promotion Strategies for Purchasing Logistics & Support Activities, Electronic Markets & Communities, Business Plans for Implementing Electronic Commerce
3	Concept of MIS Reports in Computer Environment
	Introduction Concept of MIS Need for MIS Characteristic of MIS Outputs of MIS Role of MIS Guidelines for Developing MIS reports Functional Aspects of the MIS: Problems in MIS Knowledge required for studying MIS MIS and Computer
4	Computerized accounting system and Auditing
	Role & Need and requirements of computerized accounting Basic requirements of computerized accounting system Limitations of computerized accounting system Understand the development and design of a computerized accounting system; determining how the accounting data will be processed, i.e. what accounts and books are needed and what are the desired output i.e. financial reports and other reports. Introduction of accounting software Advantages, uses and various types of accounting software Accounting software TALLY - Accounting and reports Need and importance of IT in auditing Auditing in IT environment

3. Core Courses (CC)

Corporate Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Corporate Finance- an overview	15
2	Planning the Corporate Financial Activities	15
3	Capital Structure	15
4	Sources and Methods of raising Corporate Finance	15
	Total	60

Sr. No.	Modules/Units
1	Corporate Finance- an overview
	Function of Finance in a business enterprise Emergence of corporate finance as an integral part of business finance Need for professional approach in managing corporate finance Role and functions of a Corporate Financial Manager Requirements of an efficient Corporate Financial Manager
2	Planning the Corporate Financial Activities
	Theories of Capitalisation Owned Capital and borrowed Capital- Cost of Capital Break even analysis
3	Capital Structure
	Meaning and Definition of Capital structure Factors affecting Capital structure- trading on equity Watered Capital, over capitalization and under capitalization NPV, IRR, DCF analysis and payback period
4	Sources and Methods of raising Corporate Finance
	Types and features of corporate securities currently available Management of new issues including pricing of securities Role of commercial banks and investment banks in financing the corporate sector Leasing a s method of corporate finance

3. Core Courses (CC)

Corporate Law

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Companies Act - 2013	15
2	Indian Partnership Act - 1932	15
3	Consumer Protection Act, 1986 & Competition Act 2002	15
4	Intellectual Property Rights	15
	Total	60

Sr. No.	Modules/Units
1	Indian Companies Act - 2013
	· Company -Concept, Features, Role of Promoters (S. 2(69) S. 92), Duties and liabilities of the Promoter Effects of Pre-Incorporation contracts, Consequences of non-registration, and Lifting of Corporate Veil. · Classification of Companies Distinction between Private Company and Public Company, Advantages and disadvantages of Private company and Public Company. -Common Procedure for Incorporation of Company, · Memorandum of Association (MOA) & Article of Association(AOA) - Concept , Clauses of MOA, AOA- Contents, Doctrine of constructive notice, Doctrine of Ultra Vires, Doctrine of Indoor Management. · Prospectus - Concept, Kinds, Contents, Private Placement
2	Indian Partnership Act - 1932
	· Partnership - Concept, Essentials, True Test of Partnership, Partnership Deed, Types of Partnership, Rights and Duties of Partners, Distinguish between Partnership & Hindu Undivided Family (HUF). · Dissolution - Concept, Modes of Dissolution, Consequences of Dissolution. · Limited Liability Partnership (LLP) 2008 - Concept, Characteristics, Advantages & Disadvantages, Procedure for Incorporation. · Extent of L.L.P.- Conversion of LLP, Mutual rights & duties of partners, Winding up of LLP, Distinction between LLP and Partnership
3	Consumer Protection Act, 1986 & Competition Act 2002
	· Consumer Protection Act - Concept , Objects, Reasons for enacting the Consumer Protection Act, Definition of Consumer, Consumer Dispute, Complaint, Complainant, Defect, Deficiency, Consumer Dispute, Unfair Trade Practices, Goods and Services. · Consumer Protection Councils & Redressal Agencies - District, State & National. · Competition Act 2002 - Concept, Salient Features, Objectives & Advantages. · Abuse of Dominant Position, Competition Commission of India, Anti-Competition Agreements,
4	Intellectual Property Rights
	· Intellectual Property Right (IPR) - Concept, Nature, Introduction & background of IPR in India. · IPR relating to Patents - Concepts of Invention and discovery, Comparison (S2 (j)), Concept of Patents, General principles applicable to working of patented inventions, Term of Patent. Infringement of Patent Rights & Remedies. (Ss. 104-115) · IPR relating to Copyrights- Concept of Copyright (Ss. 14, 16, 54,) Concept of author and authorised acts, (S.2) Ownership of Copy right (S.17) Duration or term of Copy right. (S. 22-27), Original work and fair use, Rights of Copyright holder, Infringement of Copyrights & Remedies. (Ss. 51, 52) · IPR relating to Trademarks -Concept, Functions of Trade Mark, types, trademarks that cannot be registered, Registration of Trade Marks and rights of the proprietor of Trade Marks. Procedure for registration of Trade Marks., Infringement of Trademarks & Remedies.

3. Core Courses (EC)

Office Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Office Accommodation and Environment	15
2	Office Automation	15
3	HRM for office Management	15
4	Planning and Scheduling Office Work	15
	Total	60

Sr. No.	Modules/Units
1	Office Accommodation and Environment
	Office building : size, layout, safety and security measures Reception : Importance, shape and size, control Communication: Feature, classification, barriers. Arrangement and adjustment: Furniture, allotment of seats, chambers, cabins rooms etc.
2	Office Automation
	Uses and abuses of labour saving appliances. Kind of office machines (typewriter, duplicating computers and word processors), calculators, etc. Objectives and advantages of various machines. Use of machines, installing, handling, maintenance. Objectives and advantages of office manuals charts, preparation and play of manuals and charts. Kind of reports, report preparation, enquiries
3	HRM for office Management
	Recruitment, selection, training and development of office staff. Office supervision-Importance, span, duties and responsibilities of supervisory staff. Motivation- Financial and non-financial incentives to subordinates. Discipline : Importance and manner of office control, work control and work distribution
4	Planning and Scheduling Office Work
	Office routine, flow of work and office manual Control over stationery, forms and supplies Routine of handling mail Importance of correspondence in business and Govt. offices. Essentials of good business and official correspondence. Various forms of correspondence.

Reference Books
Corporate Accounts-I & II
· Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi · Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi · Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi · Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai · Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi · Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai · Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi · Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc · Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida · Compendium of Statement and Standard of Accounting, ICAI · Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai · Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai · Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi · Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi · Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi · Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi · Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi
Direct Tax-I & II
· Direct Taxes Law & Practice by V.K. Singhania - Taxman · Systematic Approach to Direct Tax by Ahuja & Gupta - Bharat Law House · Income Tax Ready Recknoner by Dr .V.K. Singhania - Taxman · Direct Tax Laws by T.N. Manoharan - Snow White · Wealth Engine: Indian Financial Planning and Wealth Management Handbook by Sankaran S · WEALTH MANAGEMENT, by N/A Dun & Bradstreet
Indirect Tax-I & II
· Indirect Taxes: Law and Practice by V.S. Datey, Taxmann, New Delhi · Commentary on M.V.A.T. ACT, 2002 by M.S. Mathuria and Dilip Phadke by Maharashtra Sales Tax Vat News, Mumbai · Indirect Taxes by V.S. Balchandra, Sultan Chand and Sons, New Delhi · Maharashtra Value Added Tax by Shah Shantilal, Snow White Publications Pvt. Ltd., Mumbai · GST Act
Investment Banking
· *Joshua Rosenbaum and Joshua Pearl, Investment Banking: Valuation, Leveraged Buyouts, and Mergers and Acquisitions, Wiley Publication; 2 edition (May 28, 2013)* · *2. Matthew Krantz and Robert Johnson, Investment Banking for Dummies, 1 edition (February 10, 2014)* · *3. Michel Fleuriet, Investment Banking Explained: An Insider's Guide to the Industry,*

McGraw-Hill Education; 1 edition (July 17, 2008)

- *4. Tom Lott, Vault Career Guide to Investment Banking, Vault Publication, 5th edition (February 2, 2005)*
- *5. K. Thomas Liaw, The Business of Investment Banking: A Comprehensive Overview, Wiley Publication; 3 edition (November 1, 2011)*

Cost Accounting-I & II

- Lectures on Costing by Swaminathan: S. Chand and Company (P) Ltd., New Delhi
- Cost Accounting by C.S. Rayudu, Tata Mc. Grow Hill and Co. Ltd., Mumbai
- Cost Accounting by JawaharLal and Seema Srivastava, Tata Mc. Grow Hill and Co. Ltd., Mumbai
- Cost Accounting by Ravi M. Kishore, Taxmann Ltd., New Delhi
- Principles and Practices of Cost Accounting by N.K. Prasad, Book Syndicate Pvt. Ltd., Calcutta
- Cost Accounting Theory and Practice by B.K. Bhar, Tata Mc. Grow Hill and Co. Ltd., Mumbai
- Cost Accounting Principles and Practice by M.N. Arora, Vikas Publishing House Pvt. Ltd., New Delhi
- Advanced Cost and Management Accounting: Problems and Solutions by V.K. Saxena and C.D. Vashist, S. Chand and Company (P) Ltd., New Delhi
- Cost Accounting by S.P. Jain and K.L. Narang, Kalyani Publishers, Ludhiana
- Modern Cost and Management Accounting by M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi

Entrepreneurial Development

- Dr. Vasant Desai "Small Scale Industries and Entrepreneurship" Himalaya Publishing House.
- Dr. Vasant Desai "Entrepreneurship and Management of Small and Medium Enterprises" Himalaya Publishing House.
- S.K. Mohanty "Fundamentals of Entrepreneurship" Prentice Hall of India
- E. Gordon and K. Natrajan "Entrepreneurship Development" Himalaya Publishing House.
- Robert D. Hisrich & Micheal P. Peters "Entrepreneurship", Tata Mc. Graw Hill.
- James Lam "Enterprise Risk Management - From Incentives to Control" John Wiley and Sons , New Jersey.
- Mukhtar Amhed Khan "Entrepreneurial development Programmes in India" Kanishka Pub. House, 1992.

Management Accounting

- Cost Management by Saxena & Vashist
- Cost & Management Accounting by Ravi N.Kishor ,Publication Taxmonth
- Essential of Management Accounting by P.N.Reddy,Himalaye
- Advanced Management Accounting by Robert S Kailar,Holl
- Financial Of Management Accounting by S.R.Varshney,Wisdom
- Introduction Of Management Accounting by Charbs T Horngram, PHI Learnng
- Management Accounting by I.m.Pandey, Vikas
- Cost & Management Accounting by D.K.Mattal,Galgotia
- Management Accounting by Khan & Jain,Tata Megaw
- Management Accounting by R.P.Resstogi

Business Law

- Indian Contract Act, Sales of Goods Act and Partnership Act by T.R. Desai, Sarkar and Sons Pvt. Ltd., Kolkata
- The Negotiable Instrument Act by J.S. Khergamwala, N.M. Tripathi Pvt. L.td., Mumbai
- The Principles of Mercantile Law by Avtar Singh, Eastern Book Company, Lucknow

- Business Law by M.C. Kuchal, Vikas Publishing House, New Delhi
- Business Law by N.D. Kapoor, Sultan Chand and Sons, New Delhi
- Business Law by P.R. Chandha, Galotia, Dew Delhi

Business Regulatory Framework

- Industrial and Labour Laws, Dr. Sanjeev Kumar, Bharat Law HP Ltd
- Labour and Industrial1 Laws, S.N Misra, Central Law Publication
- Labour and Industrial Laws, P.K.Padhi, Eastern Economy Edition
- Commercial and Industrial Law, S.K. Dasgupta, Sterling Publishers Pvt. Ltd
- Industrial Law, Mr. N.D. Kapoor, Sultan Chand1
- Employee's Provident Fund, Chopra D.S, Labour Law Agency
- Industrial Law, Mr. P.L. Mallick, Sultan Chand
- Essence of Personnel Management and Industrial Relations, Cowling, Prentice - Hall

Merchant Banking

- A Manual of Merchant Banking: J.C.Verma : Bharath Publishing House, New Delhi,
- Merchant Banking: H R Machiraju : New Age International Publishers
- Merchant Banking and Financial services : Madhu Vij and Swati Dhavan: Tata Mc Graw Hill
- Merchant Banking and Financial Services: S Guruswamy: Tata McGraw Hill

Information Technology in Management

- Fundamentals of Computers - Rajaram V - Prentice Hall
- Computer today (3rd edition) - Sanders, Donald H - McGraw Hill
- Computers and Common sense - Hunt, Roger and Shelly John - Prentice Hall
- Computers - Subramaniam N - Wheeler
- Introduction to Computers - Xavier C. - New Age
- Computer in Business - Sanders D - McGraw Hill
- Computers and Information Management - S C Bhatnagar & V Ramant - Prentice Hall
- Internet for Business - Brummer, Lavrej - Cambridge
- E-mail for Everyone - Leon Alexis & leon - Methews
- Basic Computer Programmes for Business - Sternberg C - New Jersey Hayden

Corporate Finance

- Prasanna Chandra: Financial Management (TMH),
- I. M. Pandey - Financial Management (Vikas),
- M. Y. Khan 7 P. K. Jain - Financial Management (TMH),
- Brigham & Houston - Fundamentals of Financial Mgmt., Thomson Cengage Learning
- Fundamentals of Financial Management - Vanhorns & Bhandari- Pearson evaluation.
- Contemporary Financial Management - Kothari & Dutta - Machanilan India Ltd.
- Financial Markets & Institution - Guruswamy - Thomson / Cengage Learining
- Stephen A. Ross, Wester FIELD, Jordan - Fundamentals of Corporate Finance (Mac Graw Hill)
- Vanhorne & Wachowicz, Fundamentals of Financial Management - Pearson
- Damodaran, Corporate Finance - John Wiley & Co

Corporate Law

- Guide to the Companies Act,2013 by A Ramaiya , Lexis Nexis.
- Company Law by G.K.Kapoor.
- Company Law by N.D.Kapoor.
- Company Law by P.C. Tulsian.
- Law and practice of Intellectual Property in India by Dr.Vikas Vashishth,Bharat Law House.
- Law of Partnership along with Limited Liability Partnership by Avatar Singh , Eastern Book

Company.
- Laws Relating to Intellectual Property, Universal Law Publishing Co. Dr. B.L.Wadhera
- Consumer Protection Law and Practice by Dr.V.K.Agarwal, Bharat Law House.
- Competition Law by Avatar Singh, Eastern Book Company
- Competition Law in India by T. Ramappa, Oxford University Press.
- Intellectual Property Rights by Narayan.
- Laws Relating to Intellectual Property, Universal Law Publishing Co. Dr. B.L.Wadhera

Office Management

- Office Management: A Productivity and Effectiveness Guide- Patricia Haddock, Marilyn Manning, Crisp Learning, 2001, ISBN- 9781560526049
- Office Management-R.S.N. Pillai & Bavavathi, S Chand & Company, 2010 ISBN- 978-8121922524
- Office Management- R.K. Chopra and Priyanka Gauri, Himalaya Publishing House, Mumbai, 2015, ISBN- 978-9352022861
- Office Management- Dr. P. Rizwan Ahmed, Margham Publications; 2016 edition, ISBN- 978-9383242795

University of Mumbai

Revised Syllabus and Question Paper Pattern of Courses of B.Com. (Financial Management) Programme at

Third Year

Semester V and VI

Under Choice Based Credit, Grading and Semester System

With Effect from Academic Year 2018-2019

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

T.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**	1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Financial Management-I	**04**	5	Financial Management-II	**04**
6	Research Methodology in Financial Management	**04**	6	Project Work	**04**
	Total Credits	**20**		**Total Credits**	**20**

- ✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ Study Area*

****List of Elective Courses for Semester V (Any Four)***		*****List of Elective Courses for Semester VI (Any Four)***	
1	Corporate Accounting -III	1	Corporate Accounting –IV
2	Auditing-I	2	Auditing-II
3	Management Information Systems	3	Financial Reporting
4	Business Ethics	4	Organisational Behaviour
5	Personal Financial Planning	5	Econometrics in Finance
6	Financial Analysis and Business Valuation	6	Security Analysis & Portfolio Management
Note: Course selected in Semester V will continue in Semester VI			

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Courses Structure

(To be implemented from Academic Year 2018-2019)

Semester V

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)***	
1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Financial Management-I	**04**
6	Research Methodology in Financial Management	**04**
	Total Credits	**20**

****List of Elective Courses for Semester V (Any Four)***	
1	Corporate Accounting -III
2	Auditing-I
3	Management Information Systems
4	Business Ethics
5	Personal Financial Planning
6	Financial Analysis and Business Valuation

1. Elective Courses (EC)

1. Corporate Accounts- III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Final Accounts of Banking Company	15
2	Final Accounts of Insurance Company (Excl. Life Insurance)	15
3	Investment Accounting (w.r.t. Accounting Standard - 13)	15
4	Accounting for Foreign Currency Transaction	15
	Total	**60**

Sr. No.	Modules/Units
1	**Final Accounts of Banking Company**
	Legal provision in Banking Regulation Act, 1949 relating to Accounts. Statutory reserves including Cash Reserve and Statutory Liquidity Ratio. Bill purchase and discounted, rebate of bill discounted. Final Accounts in prescribed form Non – performing assets and Income from non – performing assets. Classification of Advances, standard, sub – standard, doubtful and provisioning requirement.
2	**Final Accounts of Insurance Company (Excl. Life Insurance)**
	General Insurance – Various types of insurance, like fire, marine, Miscellaneous, Special terms like premium, claims, commission, Management expenses, Reserve for unexpired risk, reinsurance Final Accounts in a prescribed form. Revenue Statement – Form B – RA, Profit / Loss Account – Form B – PL and Balance Sheet Form B – BS.
3	**Investment Accounting (w.r.t. Accounting Standard- 13)**
	For shares (variable income bearing securities) For debentures/Preference. shares (fixed income bearing securities) Accounting for transactions of purchase and sale of investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method (Excl. brokerage). Columnar format for investment account.
4	**Accounting for Foreign Currency Transaction**
	In relation to purchase and sale of goods, services and assets and loan and credit transactions. Computation and treatment of exchange rate differences

1. Elective Courses (EC)

2. Auditing- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Auditing	15
2	Audit Planning, Procedures and Documentation	15
3	Auditing Techniques	15
4	Internal Audit	15
	Total	**60**

Sr. No.	Modules/Units
1	**Introduction to Auditing**
	• Basics Financial Statements, Users of Financial Information, Definition of Auditing, Objectives of Auditing - Primary and Secondary, Expression of Opinion, Detection of Frauds and Errors, Inherent Limitations of Audit • Errors and Frauds Concepts, Reasons and Circumstances, Types of Errors - Commission, Omission, Principle and Compensating, Types of Frauds, Risk of Fraud and Error in Audit, Auditor's Duties and Responsibilities in Respect of Fraud • Principles of Audit Integrity, Objectivity, Independence, Confidentiality, Skills and Competence, Materiality and Work Performed by Others, Documentation, Planning, Audit Evidence, Accounting System and Internal Control, Audit Conclusions and Reporting • Types of Audit Meaning, Advantages and Disadvantages of Balance Sheet Audit, Interim Audit, Continuous Audit, Concurrent Audit, Annual Audit • Miscellaneous Advantages of Independent Audit, Qualities of Auditors, Auditing Vs Accounting, Auditing V/s Investigation, View the Concept True and Fair • Accounting Concepts Relevant to Auditing Materiality, Going Concern
2	**Audit Planning, Procedures and Documentation**
	• Audit Planning Meaning, Objectives, Factors to be Considered, Sources of Obtaining Information, Discussions with Client, Overall Audit Plan • Audit Programme Meaning, Factors to be Considered, Advantages, Disadvantages, Overcoming Disadvantages, Methods of Work, Instruction before Commencing Works of Audit, Overall Audit Approach • Audit working Papers Meaning, Importance, Factors Determining Form and Contents, Main Functions / Importance, Features, Contents of Permanent Audit File, Temporary Audit File, Ownership, Custody, Access of Other Parties to Audit Working Papers, Auditors Lien on Working Papers, Auditors Lien on Client's Books • Audit Notebook Meaning, Structure, Contents, General Information, Current Information and Importance
3	**Auditing Techniques**
	• Test Check Test Checking Vs Routing Checking, Test Check Meaning, Features, Factors to be Considered, When Test Checks can be Used, Advantages, Disadvantages and Precautions. • Audit Sampling Audit Sampling, Meaning, Purpose, Factors in Determining Sample Size - Sampling Risk, Tolerable Error and Expected Error, Methods of Selecting Sample Items Evaluation of Sample Results Auditors Liability in Conducting Audit based on Sample • Internal Control Meaning and Purpose, Review of Internal Control, Advantages, Auditors Duties, Review of Internal Control, Inherent Limitations of Internal Control, Internal Control Samples for Sales & Debtors, Purchases & Creditors, Wages & Salaries • Internal Checks Vs Internal Control, Internal Checks Vs Test Checks
4	**Internal Audit**
	Meaning, Basic Principles of Establishing Internal Audit, Objectives, Evaluation of Internal Audit by Statutory Auditor, Usefulness of Internal Audit Internal Audit Vs External Audit, Internal Checks Vs Internal Audit

1. Elective Courses (EC)

3. Management Information Systems

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Management Information Systems	15
2	Information, Management and Decision Making	15
3	Systems Analysis and Design and Decision Support Systems	15
4	Management Issues in MIS	15
	Total	**60**

SN	Modules/Units
1	**Management Information Systems**
	(a) Need, Purpose and Objectives (b) Contemporary Approaches to Management Information Systems (MIS) (c) Information as a strategic resource, Use of information for competitive advantage (d) Management Information Systems as an instrument for the organizational change.
2	**Information, Management and Decision Making**
	(a) Models of Decision Making: Classical, Administrative and Herbert Simon's Models (b) Attributes of information and its relevance to Decision Making (c) Types of information.
3	**Systems Analysis and Design and Decision Support Systems**
	(a) Systems Development Life Cycle, Alternative System Building Approaches, Prototyping model Spiral Model, Rapid Development Tools, CASE Tools. (b) Decision Support Systems: Group Decision Support Systems, Executive Information Systems, Executive Support Systems, Expert Systems and Knowledge Based Expert Systems, Artificial Intelligence.
4	**Management Issues in MIS**
	(a) Information Security and Control, Quality Assurance (b) Ethical and Social Dimensions (c) Intellectual Property Rights as related to IT Services /IT Products Managing Global Information Systems.

1. Elective Courses (EC)

4. Business Ethics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Ethics and Area of Business Ethics	15
2	Business Ethics in Global Economy	15
3	Corporate Social Responsibility	15
4	Functional Ethics	15
	Total	**60**

Sr.No.	Modules/Units
1	**Introduction to ethics and area of Business Ethics**
	➢ Meaning of ethics, Moral and values ➢ Importance of Ethics ➢ Types of Ethics ➢ Theories of Ethics ➢ Business Ethics Meaning, Definition ➢ Nature and Importance of Business Ethics ➢ Types of Business Ethics ➢ Causes of Unethical behaviour ➢ Factors influencing business ethics ➢ Corporate Ethics, Individual ethics, Professional Ethics ➢ Gandhian Philosophy of ethical behaviour ➢ Ethical Challenges for managers in the 21st Century
2	**Business Ethics in Global Economy**
	➢ Concept of Globalization ➢ Global Business Network ➢ Relationship among Business, Business Ethics and Business Development ➢ Developing Business ethics in Global Economy ➢ Marketing ethics in foreign trade ➢ Role of Business Ethics in business ➢ Ethical Issues in e-commerce ➢ Measures to prevent unethical practices in e-commerce
3	**Corporate Social Responsibility**
	➢ Concept of Corporate Social Responsibility ➢ Various CSR of Business ➢ Relationship between C.S.R. and Business Ethics ➢ Business Ethics and Environment Protection ➢ Business Ethics and Consumer Protection ➢ Business Ethics and Social Justice ➢ Arguments for and against Corporate Social Responsibility
4	**Functional Ethics**
	➢ Meaning of Functional Ethics ➢ Types of Ethics according to Functions of Business, (Marketing, HRM & Finance) ➢ Patents, ➢ Copy-rights ➢ Intellectual Property Rights ➢ Trade Marks ➢ Ethical Issues in patents, copy-rights, Intellectual Property Rights and Trade Mark

1. Elective Courses (EC)

5. Personal Financial Planning

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Financial Plan and Budgeting	15
2	Managing your money and Career Planning	15
3	Financial Assets and Protection of Assets	15
4	Retirement planning and You	15
	Total	**60**

Sr. No.	Modules/Units
1	**Financial Plan and Budgeting**
	Meaning of Financial Plan, Need, Financial Literacy, Components of Financial Plan, Building Financial plans, Meaning of Budgeting, Cash inflow and outflow, Cash Flow Analysis, Importance of Budgeting. Simple practical problems
2	**Managing your money and Career Planning**
	Factors considered to manage your money, Interest Rate, Yield Curves, Real Return, Key Indicators – Leading, Lagging & Concurrent, Financial Goals and Career Planning, Life Cycle Management
3	**Financing Assets and Protection of Assets**
	Types of Investment, Risk and Return of investors, Asset Allocation Strategies – Strategic, Tactical & Life-Cycle based. Goal Based Finance, Active and Passive Investment Strategies. Meaning of Insurance, Life Insurance and General Insurance Policies, Calculation of Human Life Value- Belth Method /CPT, Return Calculation (CAGR, Post-Tax Returns), Net worth Calculation
4	**Retirement planning and You**
	Different Salary Component, Meaning of Retirement Planning, Types, Need and Purpose, Financial objective of retirement planning, Different factors and Principles for Wealth Creation, Life Cycle Planning, Evaluation and planning for retirement, Pre and Post Retirement Strategies. Pension Schemes, Tax Saving Schemes and Types of Annuity Simple Practical questions

1. Elective Courses (EC)

6. Financial Planning and Business Valuation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Analysis of Financial Statement and Statement of Shareholder's Equity	15
2	Analysis of Income, Profitability, Growth and Sustainable Earning	15
3	Business Valuation and Models	15
4	Valuation of Business for Mergers & Acquisitions and Valuation of Intellectual Property	15
	Total	**60**

Sr. No.	Modules/Units
1	**Analysis of Financial Statement and Statement of Shareholder's Equity**
	Meaning, Importance and Types of Financial Analysis, Financial Statement Analysis and its importance and Limitations, Analysis and Interpretation – Benefits, Limitations and types, Financial Statement Analysis - Traditional Approach vs. Modern Approach Reformulating the Statement of Owner's Equity, Comprehensive Income Reporting – Simple Practical problem based on Comprehensive Income reporting
2	**Analysis of Income, Profitability, Growth and Sustainable Earning**
	Analysis of Changes in income, Bond Analysis, Profitability Analysis – Sales Variance, Leverages, Theory of Growth analysis and Analysis of changes in profitability & sustainable growth Simple Practical Problems excluding Growth and Sustainable Analysis
3	**Business Valuation and Models**
	Meaning, Principles, Techniques and Role of Valuation, Free Cash Flow Valuation, Valuation of Firm (CVA & EVA), Contingent Claim Valuation. Simple Practical Problems based on EVA.
4	**Valuation of Business for Mergers & Acquisitions and Valuation of Intellectual Property**
	Basics of Merger and Acquisitions, Approaches to Valuations in case of M & A, Selection of Appropriate Cost of Capital for valuation, Forms of Consideration and Terms of Acquisition, Exchange Ratio Based used for Computation. Theory of Intellectual Property and Methods of Valuation, Valuation of Brands, Valuations of Real Estate Simple practical problems based on Consideration and Terms of Acquisition, Exchange Ratio Based used for Computation, Valuation of Brands and Real Estate

2. Core Courses (CC)

1. Financial Management -I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Financial Management	15
2	Investment Decisions	15
3	Types of Financing	15
4	Cost of Capital	15
	Total	**60**

Sr.No.	Modules/Units
1	**Introduction to Financial Management**
	(a) Introduction (b) Meaning (c) Importance (d) Scope and Objectives (e) Profit v/s Value Maximization (f) The Time Value of Money (g) Present Value (h) Internal Rate of Return (i) Bonds Returns (j) The Returns from Stocks (k) Annuity (l) Techniques of Discounting (m) Techniques of Compounding
2	**Investment Decisions**
	(a) Introduction (b) Purpose of Capital Budgeting (c) Capital Budgeting Process (d) Types of Capital Investment Decisions (e) Project Cash Flows and Net Profit Approval (f) Basic Principle of Measuring Project Cash Flows: Increment Principle, Long Term Funds Principle, Exclusion of Financial Cost Principle, Post Tax Principle, Probability Technique for Measurement of Cash Flow (g) Capital Budgeting Techniques(Only Time Adjusted/Discounted Cash Flows) Net Present Value, PI, IRR, Discounted Pay Back (h) Capital Rationing *(**Note**: Problems on Computation of Cash Inflow, Ranking of Projects on Various Techniques, Selection and Analysis with/without Capital Rationing.(Excluding Comparison of IRR with Required Rate of Return i.e. Cut off Rate, IRR and Mutually Exclusive Projects with Unequal Lives, Multiple IRR)*
3	**Types of Financing**
	(a) Introduction (b) Needs of Finance and Sources: Long Term, Medium Term, Short Term (c) Long Term Sources of Finance (d) Short Term Sources of Finance
4	**Cost of Capital**
	(a) Introduction (b) Definition and Importance of Cost of Capital (c) Measurement of Cost of Capital (d) WACC

2. Core Courses (CC)

2. Research Methodology in Financial Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Research	15
2	Data Collection and Processing	15
3	Data Analysis and Interpretation	20
4	Research Report	10
	Total	**60**

No.	Modules/Units
1	**Introduction to Research**
	• Meaning, Objectives and Importance of Research • Types of Research • Research Process • Characteristics of Good Research • Hypothesis-Meaning, Nature, Significance, • Types of hypothesis and Sources • Research Design– Meaning, Definition, Need and Importance, Steps, Scope and Essentials of a Good Research Design • Sampling– a) Meaning of Sample and Sampling, b)Methods of Sampling i) Non-Probability Sampling–Convenient, Judgment, Quota, Snow ball ii) Probability– Simple Random, Stratified, Cluster, Multi Stage.
2	**Data Collection and Processing**
	• Types of Data and Sources-Primary and Secondary Data Sources • Methods of Collection of Primary data: a. Observation- i) structured and unstructured, ii) disguised and undisguised, iii) mechanical observations (use of gadgets) b. Experimental i) Field ii) Laboratory c. Interview – i) Personal Interview ii) focused group, iii) in- depth interviews Method d. Survey– Telephonic survey, Mail, E-mail, Internet survey, Social media, and Media listening. e. Survey instrument– i) Questionnaire designing. a. Types of questions–i) structured/close ended and ii) unstructured/ open ended, iii) Dichotomous, iv) Multiple Choice Questions f. Scaling techniques- i) Likert scale, ii) Semantic Differential scale.
3	**Data Analysis and Interpretation**
	• Processing of Data– Meaning & Essentials of i) Editing ii) Coding iii) Tabulation • Analysis of Data-Meaning, Purpose, Types. • Interpretation of Data-Essentials, Importance, Significance and Descriptive Analysis, Measures of Central Tendency, Measures of Dispersion, Correlation and Regression Analysis • Testing of hypothesis– One Sample T- Test, Chi Square and Paired Sample Test
4	**Research Report**
	Report writing – i) Meaning, Importance, Structure, Types, Process and Essentials of a Good Report

Reference Books

Reference Books
Corporate Accounting- III
• Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi • Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi • Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi • Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi • Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai • Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi • Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc • Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida • Compendium of Statement and Standard of Accounting, ICAI • Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi • Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi • Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi • Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi • Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi
Auditing-I
• Contemporary Auditing by Kamal Gupta, Tata Mc-Graw Hill, New Delhi • A Hand-Book of Practical Auditing by B.N. Tandon, S. Chand and Company, New Delhi • Fundamentals of Auditing by Kamal Gupta and Ashok Arora, Tata McGraw Hill, New Delhi • Auditing: Principles and Practice by Ravinder Kumar, Virender Sharma, PHI Learning Pvt. Ltd., New Delhi • Auditing and Assurance for CA IPCC by Sanjib Kumar Basu, Pearson Education,New Delhi • Contemporary Auditing by Kamal Gupta, McGrow Hill Education Pvt. Ltd., New Delhi
Management Information Systems
• Management Information Systems - Gordon B davis and MargetheH Olson - TMGH, New Delhi • Management Information Systems - Sadagopan Prentice hall of India • Management Information Systems - W.S Jawadekar TMGH, New Delhi

- Management Information systems – Kenneth C Laudon

Business Ethics

- Business Ethics - O.C. Ferrell, John Paul Fraedrich, Linda Ferrell.
- Business Ethics – David J Fritzsche
- Prespectives in Business Ethics- Laura Hartman- Mcgraw Hill
- Ethics in Management- S A Sherlekar
- Business Ethics - GautamPherwani
- Business Ethics – Ritu Pamraj.

Personal Financial Planning

- Private Wealth Management: The Complete Reference for the Personal Financial Planner, Ninth Edition - G. Victor Hallman, Jerry S. Rosenbloom - McGraw Hill Professional
- Personal Financial Planning – Gitman, Joehnkand and Billingslay
- Personal Financial Management - Nico Swart - Juta and Company Ltd.

Financial Analysis and Business Valuation

- Valuation: Measuring and Managing the value of Companies: Thomas Copeland- Wiley
- The Handbook of Advance Business Valuation: Rovert F Reilly and Robert Swhweish: Mc Graw hill
- Business Valuation: Pitabas Mohanty- Taxmann
- Mergers Acquisitions and Business Valuation - Ravindhar Vadapalli
- Financial Statement Analysis- Sinha - Prentice-Hall Of India Pvt. Limited
- Financial Analysis and Business Valuation - Mrityunjay Acharjee, CMA Manas Kumar Thakur

Financial Management-I

- Fundamental of Financial Management – Prasanna Chandra – Tata McGraw Hill
- Fundamental of Financial Management – V Sharan Pearson Education
- Principles of Corporate Finance – R A Brealy& S C Myres - Tata McGraw Hill

Research Methodology in Financial Management

- Business Research Methodology by T N Srivastava and Shailaja Rego, Tata Mcgraw Hill Education Private Limited, New Delhi
- Methodology of Research in Social Sciences, by O.R. Krishnaswami, Himalaya Publishing House
- Research Methodology by Dr Vijay Upagude and Dr Arvind Shende
- Quantitative Techniques by Dr S. K Khandelwal, International Book House Pvt Ltd
- Statistical Analysis with Business and Economics Applications, Hold Rinehart & Wrintston, 2nd Edition, New York
- Business Research Methods, Clover, Vernon T and Balsely, Howard L, Colombus O. Grid.
- Research Methods in Economics and Business by R. Gerber and P.J. Verdoom, The Macmillan Company, New York
- Research and Methodology in Accounting and Financial Management, J.K Courtis
- Statistics for Management and Economics, by Menden Hall and Veracity, Reinmuth J.E
- Panneerselvam, R., Research Methodology, Prentice Hall of India, New Delhi, 2004.
- Kothari CR, Research Methodology- Methods and Techniques, New Wiley Ltd., 2009

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Courses Structure

(To be implemented from Academic Year 2018-2019)

Semester VI

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***	
1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Financial Management-II	**04**
6	Project Work	**04**
Total Credits		**20**

****List of Elective Courses for Semester VI (Any Four)***	
1	Corporate Accounting –IV
2	Auditing-II
3	Financial Reporting
4	Organisational Behaviour
5	Econometrics in Finance
6	Security Analysis & Portfolio Management

1. Elective Courses (EC)

1. Corporate Accounting- IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Consolidated Financial Statement	15
2	Internal Reconstruction	15
3	AS – 14 - Amalgamation, Absorption (excluding inter – company holding)	15
4	External Reconstruction	15
	Total	60

Sr. No.	Modules/Units
1	**Consolidated Financial Statement**
	Meaning, Stand Alone Financial Statements Consolidated Financial statements – Applicability, Advantages & Disadvantages Procedure of Consolidation of Balance-sheet & Profit & Loss Account (Excluding cross holding, Chain Holding & Foreign Subsidiary). **Practical Problem on Preparation of Consolidated Balance sheet)**
2	**Internal Reconstruction**
	Need for reconstruction and company law provisions Methods including alteration of share capital, variation of shareholder rights, sub division, consolidation, surrender and reissue / cancellation, reduction of share capital with relevant legal provisions and accounting treatment for same. **Practical Problem on Internal Reconstruction, Journal entry, preparation of Capital Reduction A/C and Preparation of Balance sheet in vertical form)**
3	**AS – 14 - Amalgamation, Absorption (excluding inter – company holding)**
	In the nature of merger and purchase with corresponding accounting treatments of pooling of interests and purchase method respectively. Meaning and Computation of purchase consideration. Inter-company debtors, creditors, loan, bills, loading in stock. **Practical Problem on Amalgamation and Absorption (only Purchase Method)**
4	**External Reconstruction**
	Meaning of External Reconstruction, Distinction between internal and external reconstructions. **Practical Problem related to Journal entry and preparation of ledger account, calculation of Purchase consideration, Journal entry in New company, and Preparation of Balance sheet in vertical form for new company as per AS-14**

1. Elective Courses (EC)

2. Auditing- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Vouching	15
2	Verification	15
3	Auditing Standards	15
4	Audit of Companies	15
	Total	**60**

Sr. No.	Modules/Units
1	**Vouching**
	• Audit of Income : Revenue from Sales and Services, Rental Income, Interest & Dividends Income, Royalties Income, Recovery of Bad debts written off, Commission Received • Audit of Expenditure : Purchases, Salaries & Wages, Rent, Insurance Premium, Telephone expense , Petty cash payment, Advertisement, Travelling Salesmen's Commission, Freight Carriage and Custom Duties
2	**Verification**
	• Audit of assets : Plant & Machinery, Furniture and fixtures, Accounts Receivable, Investments, Inventory, Goodwill, Patent Rights • Audit of Liabilities: Outstanding Expenses, Accounts Payable, Secured loans, Unsecured Loans, Contingent Liabilities, Public Deposits
3	**Auditing Standards**
	• Meaning Procedure of issuing Auditing Standards in India Brief overview of Auditing Standards in India Scope of SAs Significance of the Auditing Standards Responsibility of auditor for auditing standards • Understanding of following standards SA 200. SA210, SA230, SA240, SA 250, SA300,SA315, SA320, SA505
4	**Audit of Companies**
	Qualifications, Disqualifications, Appointments, Reappointment, Removal of auditors. Special auditors Branch auditors Rights and duties of company auditors

1. Elective Courses (EC)

3. Financial Reporting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Corporate Financial Reporting	15
2	Accounting and Reporting of Financial Instruments	15
3	Financial Reporting by Special Entities	15
4	Developments in Financial Reporting	15
	Total	**60**

Sr. No.	Modules/Units
1	**Corporate Financial Reporting**
	Meaning, Concepts, Objectives, Characteristics, Theories of disclosure, Issues and problems with special reference to published financial statements.
2	**Accounting and Reporting of Financial Instruments**
	(a) Meaning, recognition, De-recognition and offset (b) Compound financial instruments, Measurement of financial instruments (c) Disclosures
3	**Financial Reporting by Special Entities**
	(a) Mutual funds (b) Non-banking finance companies (c) Merchant bankers (d) Stock and commodity market intermediaries
4	**Developments in Financial Reporting**
	(a) Value Added Statement (b) Economic Value Added (c) Market Value Added (d) Shareholders' Value Added (e) Human Resource Reporting

1. Elective Courses (EC)

4. Organisational Behaviour

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Organisation Behaviour	15
2	Understanding Others: Interpersonal relationships	15
3	Group Behaviour and Team Behaviour	15
4	Stress Management and Change	15
	Total	**60**

Sr. No.	Modules/Units
1	**Introduction to Organisation Behaviour**
	• Organisational Behaviour- Organisational Behaviour Multidiscipline- Different model of Organisational Behaviour- Individual behaviour is studied through Perception- Personality - Values- Attitudes- Job satisfaction- Motivation- Learning • Understanding self-studied through- Perception and Personality • Understanding self-studied through- Values and Attitudes
2	**Understanding Others: Interpersonal relationships**
	• Conflict Management –Nature of Conflict- Level of Conflict- Source of Conflict- Effects of Conflict- Process of Conflict- Stages of Conflict- Conflict Handling Orientations • Power and Organisational Politics-Sources of Power-Organisational Politics-Influence and Political Power
3	**Group Behaviour and Team Behaviour**
	• Group Behaviour, Informal Groups – Group Dynamics- Types of Groups-Nature and effects of Informal groups-Benefits of Informal groups-Formal groups –Monitoring informal organisation- Identifying and Rewarding Informal leader-Key Roles of Informal leader –Are there multiple informal leaders? Formal Groups- Potential Outcomes of Informal Group Processes • Team and Team Building- Modern organisation- Outcomes of Modern Organisation- Team work – Task team- Difference Between Groups and Teams-Life cycle of Team –Major Factors for Effective Teams- Team Building- Need for Team building- Team Building Process- Skills Useful in Team Building
4	**Stress Management and Change**
	• Stress Management and Counselling- How it Comes About –How it Affects Various Elements of Job Performance- Extreme Product of Stress- Stress and Job Performance-Approaches to Stress Management-Characteristic of Counselling-Types of Counselling • Change and its Effects- Nature of Change – Effect of Change – Response to Change – Resistance to change – Reasons for Resistance to Change-Transformational Leadership and Change-What are Elements of Transformational Leadership- Three stage model of changes Process

1. Elective Courses (EC)

5. Econometrics for Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Overview of the Classical Linear Regression Model	15
3	Univariate Times Series Modelling and Forecasting	20
4	Modelling Volatility and Correlation	15
	Total	**60**

Sr. No.	Modules/Units
1	**Introduction**
	Meaning, Different forms of econometrics, some characteristics of financial data, Types of Data, Return in Financial Modelling, Steps in formulating econometric model.
2	Overview of the Classical Linear Regression Model
	Meaning of regression, Regression v/s correlation, assumptions of the classical linear regression model, properties of OLS estimator, precision and standard errors, generalizing the simple model to multiple linear regression.
3	**Univariate Times Series Modelling and Forecasting**
	Introduction, some notation and concepts, moving average processes, Autoregressive processes, partial autocorrelation functions, examples of time series Modelling in finance, forecasting in econometrics.
4	**Modelling Volatility and Correlation**
	Models for volatility, Historical Volatility, Implied volatility models, Exponentially weighted moving average models, Autoregressive volatility models, Stochastic volatility models, forecasting covariance and correlation in finance with examples, Multivariate GARCH model for the CAPM with time-varying covariances.

1. Elective Courses (EC)

6. Security Analysis and Portfolio Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Portfolio Management – An Introduction & Process	15
2	Portfolio Management – Valuation	15
3	Fundamental Analysis and Technical Analysis	15
4	Efficient Market Theory & CAPM	15
	Total	**60**

Sr. No.	Modules/Units
1	**Portfolio Management – An Introduction & Process**
	Investment, Meaning, Characteristics, Objectives, Investment V/s Speculation, Investment V/s Gambling and Types of Investors. **Portfolio Management** – Meaning, Evolution, Phases, Role of Portfolio Managers, Advantages of Portfolio Management. Investment Environment in India and Factors Conducive for Investment in India. **Portfolio Analysis** – Meaning and its Components, Calculation of Expected Return and Risk, Calculation of Covariance, Risk – Return Trade off. **Portfolio Selection** – Meaning, Feasible Set of Portfolios, Efficient Set of Portfolios, Selection of Optimal Portfolio, Markowitz Model, Limitations of Markowitz Model, Measuring Security Return and Portfolio Return and Risk under Single Index Model and Multi Index Model.
2	**Portfolio Management – Valuation**
	Portfolio Revision – Meaning, Need, Constraints and Strategies. Portfolio Evaluation – Meaning, Need, Measuring Returns (Sharpe, Treynor and Jensen Ratios) and Decomposition of Performance. Bond Valuation – Meaning, Measuring Bond Returns, Yield to Maturity, Yield to Call and Bond Pricing. Bond Pricing Theorems, Bond Risks and Bond Duration.
3	**Fundamental Analysis and Technical Analysis**
	Economy Analysis – Meaning, Framework, Economic Analysis, Forecasting, Barometric or Indicator Approach, Econometric Model Building and Opportunistic Model Building. **Industry Analysis** – Concept of Analysis, Industry Life Cycle, Industry Characteristics **Company Analysis** – Financial Statements, Analysis of Financial Statements, (Practical questions on Debt Equity Ratios, Total Debt Ratio, Proprietary ratios, interest coverage ratio, Profitability ratios related to sales, investment and equity shares Efficiency or Activity Ratios) and Assessment of Risk(Leverages) Meaning and Principles of Technical Analysis, Price Chart, Line Chart, Bar Chart, Japanese Candlestick Chart, Trends and Trend Reversals, Chart Patterns, Support and Resistance, Reversal Patterns, Continuation Patterns and Elliot Wave Theory, Dow Theory , Mathematical Indicators – Calculation of Moving Averages (Simple and Exponential Moving Average), Oscillators and Relative Strength Index Market Indicators, Fundamental Analysis V/s Technical Analysis
4	**Efficient Market Theory & CAPM**
	Random Walk Theory, The Efficient Market Hypothesis, Forms of Market Efficiency, Competitive Market Hypothesis CAPM – Fundamental Notions of Portfolio Theory, Assumption of CAPM, Efficient Frontier with Riskless Lending and Borrowing, Capital Market Line, Security Market Line and Pricing of Securities with CAPM. Arbitrage Pricing Theory (APT) – The Return Generating Model, Factors Affecting Stock Return, Expected Return on Stock, APT V/s CAPM.

2. Core Courses (CC)

1. Financial Management-II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Risk and Return	15
2	Capital Structure Decisions	15
3	Cash Management	15
4	Receivable Management	15
	Total	**60**

Sr. No.	Modules/Units
1	**Risk and Return**
	Introduction, Meaning of Return, Types of Return- Holding Period Return, Annualized Return, Expected Return. Meaning of Risk, Types of Risk- Business Risk, Financial Risk, Interest Rate risk, Market Risk and Liquidity Risk (Including Practical Problems)
2	**Capital Structure Decisions**
	Meaning, Choice of Capital Structure. Importance Optimal capital Structure Introduction to leverage, Types of Leverages: Operating Leverage, Financial Leverage & Composite Leverage Relationship between Operating Leverage and Financial Leverage EBIT-EPS Analysis Cost of Capital, Capital structure and Market Price of Share Capital Structure Theories Dividend Policy - Payout Ratio (Including Practical Problems)
3	**Cash Management**
	Introduction Motives for holding cash Aspects of cash management Long terms cash forecasting Reason for cash surplus Cash management: Basic strategies, Cash Management Techniques/Processes, Marketable Securities (Including Practical Problems)
4	**Receivable Management**
	Introduction Aspects of Receivable Management Credit Policy, Credit Evaluation, Credit Granting decision, Control on Accounts Receivable (Including Practical Problems)

Reference Books

Reference Books
Corporate Accounting- IV
• Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi • Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi • Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi • Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi • Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai • Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi • Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc • Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida • Compendium of Statement and Standard of Accounting, ICAI • Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi • Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi • Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi • Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi
Auditing-II
• Contemporary Auditing by Kamal Gupta, Tata Mc-Graw Hill, New Delhi • A Hand-Book of Practical Auditing by B.N. Tandon, S. Chand and Company, New Delhi • Fundamentals of Auditing by Kamal Gupta and Ashok Arora, Tata McGraw Hill, New Delhi • Auditing: Principles and Practice by Ravinder Kumar, Virender Sharma, PHI Learning Pvt. Ltd., New Delhi • Auditing and Assurance for CA IPCC by Sanjib Kumar Basu, Pearson Education,New Delhi • Contemporary Auditing by Kamal Gupta, McGrow Hill Education Pvt. Ltd., New Delhi • Textbook of Auditing by Batra and Bagradia published by Tata McGraw Hills • Practical Auditing by S V Ghatalia published by Spicer & Pegler
Financial Reporting
• G Sekar / Padhuka • D S RawatTaxxman publication • M.P. Vijay Kumar

Organisational Behaviour

- Organisational Behaviour: Ashwathappa K : Himalaya Publishing
- Organisational Behaviour: Jit S Chandran : Vikas Publishing House
- Organisational Behaviour: Fred Luthans: Mc Graw Hill
- Organisational Behaviour : Robbings, Stephen: Pearson
- Organisational Behaviour: P C Pardeshi : Everest
- Organisational Behaviour: L M Prasad: S Chand

Econometrics for Finance

- Introductory Econometrics for Finance – Chris Brooks – Cambridge University Press, 2002
- Introductory Econometrics: A Modern Approach – Jeffrey Wooldridge, 2000
- Applied Econometrics Times Series – Walter Enders- Wiley India Edition, 1995
- Financial Econometrics: Problems, Models and Methods – Christian Gourieroux, Joann Jasiak, 2001
- Basic Econometrics – Damodar N. Gujarati, 1978.

Security Analysis and Portfolio Management

- Blake, David 1992, Financial Market Analysis , McGraw Hill London
- Francis J.C Investments, Analysis and Management McGraw Hill New York.
- Pistolese Clifford Using Technical Analysis Vision Books
- Reilly Frank K and Keith Brown Investment Analysis and Portfolio Management.

Financial Management-II

- Fundamental of Financial Management – Prasanna Chandra – Tata McGraw Hill
- Fundamental of Financial Management – V Sharan Pearson Education
- Principles of Corporate Finance – R A Brealy& S C Myres - Tata McGraw Hill

Project Work

Inclusion of project work in the course curriculum of the B.Com. (Financial Markets) program me is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research analyse and scientific temperament challenging the potential of learner as regards to his/ her eager to enquire and ability to interpret particular aspect of the study. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

- There are two modes of preparation of project work
  1. Project work based on research methodology in the study area
  2. Project work based on internship in the study area

Guidelines for preparation of Project Work

1. General guidelines for preparation of project work based on Research Methodology

- The project topic may be undertaken in any area of Elective Courses.
- Each of the learner has to undertake a Project individually under the supervision of a teacher-guide.
- The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.
- University/college shall allot a guiding teacher for guidance to the students based on her /his specialization.
- The project report shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be 80 to 100 pages

Format

1st page (Main Page)

Title of the problem of the Project

A Project Submitted to

University of Mumbai for partial completion of the degree of

Bachelor in Commerce (Financial Management) Under the Faculty of Commerce

By

Name of the Learner

Under the Guidance of

Name of the Guiding Teacher

Name and address of the College

Month and Year

2nd Page
This page to be repeated on 2nd page (i.e. inside after main page)

On separate page

Index

Sr. No.	Topic	Page No.
Chapter No. 1	Title of the Chapter	
(sub point 1.1, 1.1.1, ... And so on)		
Chapter No. 2	Title of the Chapter	
Chapter No. 3	Title of the Chapter	
Chapter No. 4	Title of the Chapter	
Chapter No. 5	Title of the Chapter	

- List of tables, if any, with page numbers.
- List of Graphs, if any, with page numbers.
- List of Appendix, if any, with page numbers.
- Abbreviations used:

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work

(Model Structure of the Project Work)

- **Chapter No. 1: Introduction**

In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.

- **Chapter No. 2: Research Methodology**

This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.

- **Chapter No. 3: Literature Review**

This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue.

- **Chapter No. 4: Data Analysis, Interpretation and Presentation**

This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of information's, presentation of graphs etc. can be provided with interpretation by the learner.

- **Chapter No. 5: Conclusions and Suggestions**

In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

- **Bibliography**
- **Appendix**

On separate page

Name and address of the college

Certificate

This is to certify that Ms/Mr _____ has worked and duly completed her/his Project Work for the degree of Bachelor in Commerce (Financial Management) under the Faculty of Commerce in the subject of _____ and her/his project is entitled, "_____Title of the Project_____" under my Supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University

It is her/ his own work and facts reported by her/his personal findings and investigation.

Seal of the College

Name and Signature of

Guiding Teacher

Date of submission:

On separate page

Declaration by learner

I, the undersigned Miss/Mr. _____Name of the Learner_____ here by, declare that the work embodied in this project work titled "_____ Title of the Project_____", forms my own contribution to the research work carried out under the guidance of _____Name of the guiding teacher _____ is the result of my own research work and has not been previously submitted to any other University for any other Degree/ Diploma to this or any other University.

Wherever reference has been made to previous works of others, it has been clearly indicated as such and included in the bibliography.

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by

Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I take this opportunity to thank the **University of Mumbai** for giving me chance to do this project.

I would like to thank my **Principal, _____ _____** for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our **Coordinator_____ _____**, for her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide _____ whose guidance and care made the project successful.

I would like to thank my **College Library**, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially **my Parents and Peers** who supported me throughout my project.

2. Guidelines for Internship based project work

- Minimum 20 days/ 100 hours of Internship with an Organisation/ NGO/ Charitable
- Organisation/ Private firm.
- The theme of the internship should be based on any study area of the elective courses
- Experience Certificate is Mandatory
- A project report has to be brief in content and must include the following aspects:
    - **Executive Summary:**
      A bird's eye view of your entire presentation has to be precisely offered under this category.
    - **Introduction on the Company:**
      A Concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
    - **Statement and Objectives:**
      The mission and vision of the organization need to be stated enshrining its broad strategies.
    - **Your Role in the Organisation during the internship:**
      The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.
    - **Challenges:**
      The challenges confronted while churning out theoretical knowledge into practical world.
    - **Conclusion:**
      A brief overview of your experience and suggestions to bridge the gap between theory and practice.

    - The project report based on internship shall be prepared as per the broad guidelines given below:
        - Font type: Times New Roman
        - Font size: 12-For content, 14-for Title
        - Line Space : 1.5-for content and 1-for in table work
        - Paper Size: A4
        - Margin : in Left-1.5, Up-Down-Right-1
        - The Project Report shall be bounded.
        - The project report should be of minimum 50 pages

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
➢ **Evaluation of Project Report (Bound Copy)**	**60 Marks**
• Introduction and other areas covered	20 arks
• Research Methodology, Presentation, Analysis and interpretation of data	30 Marks
• Conclusion & Recommendations	10 Marks
➢ **Conduct of Viva-voce**	**40 Marks**
• In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
• Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
• Overall Impression (including Communication Skill)	10 Marks

Note:
The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of project shall conduct the viva-voce examination as per the evaluation pattern.

Passing Standard

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT
- examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:

A) Internal Assessment: 25 %

Question Paper Pattern

(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i. Duration: The examination shall be of 2 ½ Hours duration

ii. Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.

(Detail question paper pattern has been given separately)

--Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:
Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:
Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

University of Mumbai

Revised Syllabus and Question Paper Pattern of Courses of B.Com. (Financial Management) Programme at

Third Year

Semester V and VI

Under Choice Based Credit, Grading and Semester System

With Effect from Academic Year 2018-2019

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

T.Y.B.Com. (Financial Management)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**	1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Financial Management-I	**04**	5	Financial Management-II	**04**
6	Research Methodology in Financial Management	**04**	6	Project Work	**04**
	Total Credits	**20**		**Total Credits**	**20**

- ✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ Study Area*

****List of Elective Courses for Semester V (Any Four)***		*****List of Elective Courses for Semester VI (Any Four)***	
1	Corporate Accounting -III	1	Corporate Accounting –IV
2	Auditing-I	2	Auditing-II
3	Management Information Systems	3	Financial Reporting
4	Business Ethics	4	Organisational Behaviour
5	Personal Financial Planning	5	Econometrics in Finance
6	Financial Analysis and Business Valuation	6	Security Analysis & Portfolio Management
Note: Course selected in Semester V will continue in Semester VI			

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Courses Structure

(To be implemented from Academic Year 2018-2019)

Semester V

No. of Courses	Semester III	Credits
1	***Elective Courses (EC)***	
1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Financial Management-I	**04**
6	Research Methodology in Financial Management	**04**
	Total Credits	**20**

****List of Elective Courses for Semester V (Any Four)***	
1	Corporate Accounting -III
2	Auditing-I
3	Management Information Systems
4	Business Ethics
5	Personal Financial Planning
6	Financial Analysis and Business Valuation

1. Elective Courses (EC)

1. Corporate Accounts- III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Final Accounts of Banking Company	15
2	Final Accounts of Insurance Company (Excl. Life Insurance)	15
3	Investment Accounting (w.r.t. Accounting Standard - 13)	15
4	Accounting for Foreign Currency Transaction	15
	Total	**60**

Sr. No.	Modules/Units
1	**Final Accounts of Banking Company**
	Legal provision in Banking Regulation Act, 1949 relating to Accounts. Statutory reserves including Cash Reserve and Statutory Liquidity Ratio. Bill purchase and discounted, rebate of bill discounted. Final Accounts in prescribed form Non – performing assets and Income from non – performing assets. Classification of Advances, standard, sub – standard, doubtful and provisioning requirement.
2	**Final Accounts of Insurance Company (Excl. Life Insurance)**
	General Insurance – Various types of insurance, like fire, marine, Miscellaneous, Special terms like premium, claims, commission, Management expenses, Reserve for unexpired risk, reinsurance Final Accounts in a prescribed form. Revenue Statement – Form B – RA, Profit / Loss Account – Form B – PL and Balance Sheet Form B – BS.
3	**Investment Accounting (w.r.t. Accounting Standard- 13)**
	For shares (variable income bearing securities) For debentures/Preference. shares (fixed income bearing securities) Accounting for transactions of purchase and sale of investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method (Excl. brokerage). Columnar format for investment account.
4	**Accounting for Foreign Currency Transaction**
	In relation to purchase and sale of goods, services and assets and loan and credit transactions. Computation and treatment of exchange rate differences

1. Elective Courses (EC)

2. Auditing- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Auditing	15
2	Audit Planning, Procedures and Documentation	15
3	Auditing Techniques	15
4	Internal Audit	15
	Total	**60**

Sr. No.	Modules/Units
1	**Introduction to Auditing**
	• Basics Financial Statements, Users of Financial Information, Definition of Auditing, Objectives of Auditing - Primary and Secondary, Expression of Opinion, Detection of Frauds and Errors, Inherent Limitations of Audit • Errors and Frauds Concepts, Reasons and Circumstances, Types of Errors - Commission, Omission, Principle and Compensating, Types of Frauds, Risk of Fraud and Error in Audit, Auditor's Duties and Responsibilities in Respect of Fraud • Principles of Audit Integrity, Objectivity, Independence, Confidentiality, Skills and Competence, Materiality and Work Performed by Others, Documentation, Planning, Audit Evidence, Accounting System and Internal Control, Audit Conclusions and Reporting • Types of Audit Meaning, Advantages and Disadvantages of Balance Sheet Audit, Interim Audit, Continuous Audit, Concurrent Audit, Annual Audit • Miscellaneous Advantages of Independent Audit, Qualities of Auditors, Auditing Vs Accounting, Auditing V/s Investigation, View the Concept True and Fair • Accounting Concepts Relevant to Auditing Materiality, Going Concern
2	**Audit Planning, Procedures and Documentation**
	• Audit Planning Meaning, Objectives, Factors to be Considered, Sources of Obtaining Information, Discussions with Client, Overall Audit Plan • Audit Programme Meaning, Factors to be Considered, Advantages, Disadvantages, Overcoming Disadvantages, Methods of Work, Instruction before Commencing Works of Audit, Overall Audit Approach • Audit working Papers Meaning, Importance, Factors Determining Form and Contents, Main Functions / Importance, Features, Contents of Permanent Audit File, Temporary Audit File, Ownership, Custody, Access of Other Parties to Audit Working Papers, Auditors Lien on Working Papers, Auditors Lien on Client's Books • Audit Notebook Meaning, Structure, Contents, General Information, Current Information and Importance
3	**Auditing Techniques**
	• Test Check Test Checking Vs Routing Checking, Test Check Meaning, Features, Factors to be Considered, When Test Checks can be Used, Advantages, Disadvantages and Precautions. • Audit Sampling Audit Sampling, Meaning, Purpose, Factors in Determining Sample Size - Sampling Risk, Tolerable Error and Expected Error, Methods of Selecting Sample Items Evaluation of Sample Results Auditors Liability in Conducting Audit based on Sample • Internal Control Meaning and Purpose, Review of Internal Control, Advantages, Auditors Duties, Review of Internal Control, Inherent Limitations of Internal Control, Internal Control Samples for Sales & Debtors, Purchases & Creditors, Wages & Salaries • Internal Checks Vs Internal Control, Internal Checks Vs Test Checks
4	**Internal Audit**
	Meaning, Basic Principles of Establishing Internal Audit, Objectives, Evaluation of Internal Audit by Statutory Auditor, Usefulness of Internal Audit Internal Audit Vs External Audit, Internal Checks Vs Internal Audit

1. Elective Courses (EC)

3. Management Information Systems

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Management Information Systems	15
2	Information, Management and Decision Making	15
3	Systems Analysis and Design and Decision Support Systems	15
4	Management Issues in MIS	15
	Total	**60**

SN	Modules/Units
1	**Management Information Systems**
	(a) Need, Purpose and Objectives (b) Contemporary Approaches to Management Information Systems (MIS) (c) Information as a strategic resource, Use of information for competitive advantage (d) Management Information Systems as an instrument for the organizational change.
2	**Information, Management and Decision Making**
	(a) Models of Decision Making: Classical, Administrative and Herbert Simon's Models (b) Attributes of information and its relevance to Decision Making (c) Types of information.
3	**Systems Analysis and Design and Decision Support Systems**
	(a) Systems Development Life Cycle, Alternative System Building Approaches, Prototyping model Spiral Model, Rapid Development Tools, CASE Tools. (b) Decision Support Systems: Group Decision Support Systems, Executive Information Systems, Executive Support Systems, Expert Systems and Knowledge Based Expert Systems, Artificial Intelligence.
4	**Management Issues in MIS**
	(a) Information Security and Control, Quality Assurance (b) Ethical and Social Dimensions (c) Intellectual Property Rights as related to IT Services /IT Products Managing Global Information Systems.

1. Elective Courses (EC)

4. Business Ethics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Ethics and Area of Business Ethics	15
2	Business Ethics in Global Economy	15
3	Corporate Social Responsibility	15
4	Functional Ethics	15
	Total	**60**

Sr.No.	Modules/Units
1	**Introduction to ethics and area of Business Ethics**
	➢ Meaning of ethics, Moral and values ➢ Importance of Ethics ➢ Types of Ethics ➢ Theories of Ethics ➢ Business Ethics Meaning, Definition ➢ Nature and Importance of Business Ethics ➢ Types of Business Ethics ➢ Causes of Unethical behaviour ➢ Factors influencing business ethics ➢ Corporate Ethics, Individual ethics, Professional Ethics ➢ Gandhian Philosophy of ethical behaviour ➢ Ethical Challenges for managers in the 21st Century
2	**Business Ethics in Global Economy**
	➢ Concept of Globalization ➢ Global Business Network ➢ Relationship among Business, Business Ethics and Business Development ➢ Developing Business ethics in Global Economy ➢ Marketing ethics in foreign trade ➢ Role of Business Ethics in business ➢ Ethical Issues in e-commerce ➢ Measures to prevent unethical practices in e-commerce
3	**Corporate Social Responsibility**
	➢ Concept of Corporate Social Responsibility ➢ Various CSR of Business ➢ Relationship between C.S.R. and Business Ethics ➢ Business Ethics and Environment Protection ➢ Business Ethics and Consumer Protection ➢ Business Ethics and Social Justice ➢ Arguments for and against Corporate Social Responsibility
4	**Functional Ethics**
	➢ Meaning of Functional Ethics ➢ Types of Ethics according to Functions of Business, (Marketing, HRM & Finance) ➢ Patents, ➢ Copy-rights ➢ Intellectual Property Rights ➢ Trade Marks ➢ Ethical Issues in patents, copy-rights, Intellectual Property Rights and Trade Mark

1. Elective Courses (EC)

5. Personal Financial Planning

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Financial Plan and Budgeting	15
2	Managing your money and Career Planning	15
3	Financial Assets and Protection of Assets	15
4	Retirement planning and You	15
	Total	**60**

Sr. No.	Modules/Units
1	**Financial Plan and Budgeting**
	Meaning of Financial Plan, Need, Financial Literacy, Components of Financial Plan, Building Financial plans, Meaning of Budgeting, Cash inflow and outflow, Cash Flow Analysis, Importance of Budgeting. Simple practical problems
2	**Managing your money and Career Planning**
	Factors considered to manage your money, Interest Rate, Yield Curves, Real Return, Key Indicators – Leading, Lagging & Concurrent, Financial Goals and Career Planning, Life Cycle Management
3	**Financing Assets and Protection of Assets**
	Types of Investment, Risk and Return of investors, Asset Allocation Strategies – Strategic, Tactical & Life-Cycle based. Goal Based Finance, Active and Passive Investment Strategies. Meaning of Insurance, Life Insurance and General Insurance Policies, Calculation of Human Life Value- Belth Method /CPT, Return Calculation (CAGR, Post-Tax Returns), Net worth Calculation
4	**Retirement planning and You**
	Different Salary Component, Meaning of Retirement Planning, Types, Need and Purpose, Financial objective of retirement planning, Different factors and Principles for Wealth Creation, Life Cycle Planning, Evaluation and planning for retirement, Pre and Post Retirement Strategies. Pension Schemes, Tax Saving Schemes and Types of Annuity Simple Practical questions

1. Elective Courses (EC)

6. Financial Planning and Business Valuation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Analysis of Financial Statement and Statement of Shareholder's Equity	15
2	Analysis of Income, Profitability, Growth and Sustainable Earning	15
3	Business Valuation and Models	15
4	Valuation of Business for Mergers & Acquisitions and Valuation of Intellectual Property	15
	Total	**60**

Sr. No.	Modules/Units
1	**Analysis of Financial Statement and Statement of Shareholder's Equity**
	Meaning, Importance and Types of Financial Analysis, Financial Statement Analysis and its importance and Limitations, Analysis and Interpretation – Benefits, Limitations and types, Financial Statement Analysis - Traditional Approach vs. Modern Approach Reformulating the Statement of Owner's Equity, Comprehensive Income Reporting – Simple Practical problem based on Comprehensive Income reporting
2	**Analysis of Income, Profitability, Growth and Sustainable Earning**
	Analysis of Changes in income, Bond Analysis, Profitability Analysis – Sales Variance, Leverages, Theory of Growth analysis and Analysis of changes in profitability & sustainable growth Simple Practical Problems excluding Growth and Sustainable Analysis
3	**Business Valuation and Models**
	Meaning, Principles, Techniques and Role of Valuation, Free Cash Flow Valuation, Valuation of Firm (CVA & EVA), Contingent Claim Valuation. Simple Practical Problems based on EVA.
4	**Valuation of Business for Mergers & Acquisitions and Valuation of Intellectual Property**
	Basics of Merger and Acquisitions, Approaches to Valuations in case of M & A, Selection of Appropriate Cost of Capital for valuation, Forms of Consideration and Terms of Acquisition, Exchange Ratio Based used for Computation. Theory of Intellectual Property and Methods of Valuation, Valuation of Brands, Valuations of Real Estate Simple practical problems based on Consideration and Terms of Acquisition, Exchange Ratio Based used for Computation, Valuation of Brands and Real Estate

2. Core Courses (CC)

1. Financial Management -I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Financial Management	15
2	Investment Decisions	15
3	Types of Financing	15
4	Cost of Capital	15
	Total	**60**

Sr.No.	Modules/Units
1	**Introduction to Financial Management**
	(a) Introduction (b) Meaning (c) Importance (d) Scope and Objectives (e) Profit v/s Value Maximization (f) The Time Value of Money (g) Present Value (h) Internal Rate of Return (i) Bonds Returns (j) The Returns from Stocks (k) Annuity (l) Techniques of Discounting (m) Techniques of Compounding
2	**Investment Decisions**
	(a) Introduction (b) Purpose of Capital Budgeting (c) Capital Budgeting Process (d) Types of Capital Investment Decisions (e) Project Cash Flows and Net Profit Approval (f) Basic Principle of Measuring Project Cash Flows: Increment Principle, Long Term Funds Principle, Exclusion of Financial Cost Principle, Post Tax Principle, Probability Technique for Measurement of Cash Flow (g) Capital Budgeting Techniques(Only Time Adjusted/Discounted Cash Flows) Net Present Value, PI, IRR, Discounted Pay Back (h) Capital Rationing *(**Note**: Problems on Computation of Cash Inflow, Ranking of Projects on Various Techniques, Selection and Analysis with/without Capital Rationing.(Excluding Comparison of IRR with Required Rate of Return i.e. Cut off Rate, IRR and Mutually Exclusive Projects with Unequal Lives, Multiple IRR)*
3	**Types of Financing**
	(a) Introduction (b) Needs of Finance and Sources: Long Term, Medium Term, Short Term (c) Long Term Sources of Finance (d) Short Term Sources of Finance
4	**Cost of Capital**
	(a) Introduction (b) Definition and Importance of Cost of Capital (c) Measurement of Cost of Capital (d) WACC

2. Core Courses (CC)

2. Research Methodology in Financial Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Research	15
2	Data Collection and Processing	15
3	Data Analysis and Interpretation	20
4	Research Report	10
	Total	**60**

No.	Modules/Units
1	**Introduction to Research**
	• Meaning, Objectives and Importance of Research • Types of Research • Research Process • Characteristics of Good Research • Hypothesis-Meaning, Nature, Significance, • Types of hypothesis and Sources • Research Design– Meaning, Definition, Need and Importance, Steps, Scope and Essentials of a Good Research Design • Sampling– a) Meaning of Sample and Sampling, b)Methods of Sampling i) Non-Probability Sampling–Convenient, Judgment, Quota, Snow ball ii) Probability– Simple Random, Stratified, Cluster, Multi Stage.
2	**Data Collection and Processing**
	• Types of Data and Sources-Primary and Secondary Data Sources • Methods of Collection of Primary data: a. Observation- i) structured and unstructured, ii) disguised and undisguised, iii) mechanical observations (use of gadgets) b. Experimental i) Field ii) Laboratory c. Interview – i) Personal Interview ii) focused group, iii) in- depth interviews Method d. Survey– Telephonic survey, Mail, E-mail, Internet survey, Social media, and Media listening. e. Survey instrument– i) Questionnaire designing. a. Types of questions–i) structured/close ended and ii) unstructured/ open ended, iii) Dichotomous, iv) Multiple Choice Questions f. Scaling techniques- i) Likert scale, ii) Semantic Differential scale.
3	**Data Analysis and Interpretation**
	• Processing of Data– Meaning & Essentials of i) Editing ii) Coding iii) Tabulation • Analysis of Data-Meaning, Purpose, Types. • Interpretation of Data-Essentials, Importance, Significance and Descriptive Analysis, Measures of Central Tendency, Measures of Dispersion, Correlation and Regression Analysis • Testing of hypothesis– One Sample T- Test, Chi Square and Paired Sample Test
4	**Research Report**
	Report writing – i) Meaning, Importance, Structure, Types, Process and Essentials of a Good Report

Reference Books

Reference Books
Corporate Accounting- III
• Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi • Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi • Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi • Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi • Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai • Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi • Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc • Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida • Compendium of Statement and Standard of Accounting, ICAI • Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi • Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi • Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi • Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi • Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi
Auditing-I
• Contemporary Auditing by Kamal Gupta, Tata Mc-Graw Hill, New Delhi • A Hand-Book of Practical Auditing by B.N. Tandon, S. Chand and Company, New Delhi • Fundamentals of Auditing by Kamal Gupta and Ashok Arora, Tata McGraw Hill, New Delhi • Auditing: Principles and Practice by Ravinder Kumar, Virender Sharma, PHI Learning Pvt. Ltd., New Delhi • Auditing and Assurance for CA IPCC by Sanjib Kumar Basu, Pearson Education,New Delhi • Contemporary Auditing by Kamal Gupta, McGrow Hill Education Pvt. Ltd., New Delhi
Management Information Systems
• Management Information Systems - Gordon B davis and MargetheH Olson - TMGH, New Delhi • Management Information Systems - Sadagopan Prentice hall of India • Management Information Systems - W.S Jawadekar TMGH, New Delhi

- Management Information systems – Kenneth C Laudon

Business Ethics

- Business Ethics - O.C. Ferrell, John Paul Fraedrich, Linda Ferrell.
- Business Ethics – David J Fritzsche
- Prespectives in Business Ethics- Laura Hartman- Mcgraw Hill
- Ethics in Management- S A Sherlekar
- Business Ethics - GautamPherwani
- Business Ethics – Ritu Pamraj.

Personal Financial Planning

- Private Wealth Management: The Complete Reference for the Personal Financial Planner, Ninth Edition - G. Victor Hallman, Jerry S. Rosenbloom - McGraw Hill Professional
- Personal Financial Planning – Gitman, Joehnkand and Billingslay
- Personal Financial Management - Nico Swart - Juta and Company Ltd.

Financial Analysis and Business Valuation

- Valuation: Measuring and Managing the value of Companies: Thomas Copeland- Wiley
- The Handbook of Advance Business Valuation: Rovert F Reilly and Robert Swhweish: Mc Graw hill
- Business Valuation: Pitabas Mohanty- Taxmann
- Mergers Acquisitions and Business Valuation - Ravindhar Vadapalli
- Financial Statement Analysis- Sinha - Prentice-Hall Of India Pvt. Limited
- Financial Analysis and Business Valuation - Mrityunjay Acharjee, CMA Manas Kumar Thakur

Financial Management-I

- Fundamental of Financial Management – Prasanna Chandra – Tata McGraw Hill
- Fundamental of Financial Management – V Sharan Pearson Education
- Principles of Corporate Finance – R A Brealy& S C Myres - Tata McGraw Hill

Research Methodology in Financial Management

- Business Research Methodology by T N Srivastava and Shailaja Rego, Tata Mcgraw Hill Education Private Limited, New Delhi
- Methodology of Research in Social Sciences, by O.R. Krishnaswami, Himalaya Publishing House
- Research Methodology by Dr Vijay Upagude and Dr Arvind Shende
- Quantitative Techniques by Dr S. K Khandelwal, International Book House Pvt Ltd
- Statistical Analysis with Business and Economics Applications, Hold Rinehart & Wrintston, 2nd Edition, New York
- Business Research Methods, Clover, Vernon T and Balsely, Howard L, Colombus O. Grid.
- Research Methods in Economics and Business by R. Gerber and P.J. Verdoom, The Macmillan Company, New York
- Research and Methodology in Accounting and Financial Management, J.K Courtis
- Statistics for Management and Economics, by Menden Hall and Veracity, Reinmuth J.E
- Panneerselvam, R., Research Methodology, Prentice Hall of India, New Delhi, 2004.
- Kothari CR, Research Methodology- Methods and Techniques, New Wiley Ltd., 2009

B.Com. (Financial Management) Programme

Under Choice Based Credit, Grading and Semester System

Courses Structure

(To be implemented from Academic Year 2018-2019)

Semester VI

No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***	
1, 2, 3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Financial Management-II	**04**
6	Project Work	**04**
Total Credits		**20**

****List of Elective Courses for Semester VI (Any Four)***	
1	Corporate Accounting –IV
2	Auditing-II
3	Financial Reporting
4	Organisational Behaviour
5	Econometrics in Finance
6	Security Analysis & Portfolio Management

1. Elective Courses (EC)

1. Corporate Accounting- IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Consolidated Financial Statement	15
2	Internal Reconstruction	15
3	AS – 14 - Amalgamation, Absorption (excluding inter – company holding)	15
4	External Reconstruction	15
	Total	60

Sr. No.	Modules/Units
1	**Consolidated Financial Statement**
	Meaning, Stand Alone Financial Statements Consolidated Financial statements – Applicability, Advantages & Disadvantages Procedure of Consolidation of Balance-sheet & Profit & Loss Account (Excluding cross holding, Chain Holding & Foreign Subsidiary). **Practical Problem on Preparation of Consolidated Balance sheet)**
2	**Internal Reconstruction**
	Need for reconstruction and company law provisions Methods including alteration of share capital, variation of shareholder rights, sub division, consolidation, surrender and reissue / cancellation, reduction of share capital with relevant legal provisions and accounting treatment for same. **Practical Problem on Internal Reconstruction, Journal entry, preparation of Capital Reduction A/C and Preparation of Balance sheet in vertical form)**
3	**AS – 14 - Amalgamation, Absorption (excluding inter – company holding)**
	In the nature of merger and purchase with corresponding accounting treatments of pooling of interests and purchase method respectively. Meaning and Computation of purchase consideration. Inter-company debtors, creditors, loan, bills, loading in stock. **Practical Problem on Amalgamation and Absorption (only Purchase Method)**
4	**External Reconstruction**
	Meaning of External Reconstruction, Distinction between internal and external reconstructions. **Practical Problem related to Journal entry and preparation of ledger account, calculation of Purchase consideration, Journal entry in New company, and Preparation of Balance sheet in vertical form for new company as per AS-14**

1. Elective Courses (EC)

2. Auditing- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Vouching	15
2	Verification	15
3	Auditing Standards	15
4	Audit of Companies	15
	Total	**60**

Sr. No.	Modules/Units
1	**Vouching**
	• Audit of Income : Revenue from Sales and Services, Rental Income, Interest & Dividends Income, Royalties Income, Recovery of Bad debts written off, Commission Received • Audit of Expenditure : Purchases, Salaries & Wages, Rent, Insurance Premium, Telephone expense , Petty cash payment, Advertisement, Travelling Salesmen's Commission, Freight Carriage and Custom Duties
2	**Verification**
	• Audit of assets : Plant & Machinery, Furniture and fixtures, Accounts Receivable, Investments, Inventory, Goodwill, Patent Rights • Audit of Liabilities: Outstanding Expenses, Accounts Payable, Secured loans, Unsecured Loans, Contingent Liabilities, Public Deposits
3	**Auditing Standards**
	• Meaning Procedure of issuing Auditing Standards in India Brief overview of Auditing Standards in India Scope of SAs Significance of the Auditing Standards Responsibility of auditor for auditing standards • Understanding of following standards SA 200. SA210, SA230, SA240, SA 250, SA300,SA315, SA320, SA505
4	**Audit of Companies**
	Qualifications, Disqualifications, Appointments, Reappointment, Removal of auditors. Special auditors Branch auditors Rights and duties of company auditors

1. Elective Courses (EC)

3. Financial Reporting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Corporate Financial Reporting	15
2	Accounting and Reporting of Financial Instruments	15
3	Financial Reporting by Special Entities	15
4	Developments in Financial Reporting	15
	Total	**60**

Sr. No.	Modules/Units
1	**Corporate Financial Reporting**
	Meaning, Concepts, Objectives, Characteristics, Theories of disclosure, Issues and problems with special reference to published financial statements.
2	**Accounting and Reporting of Financial Instruments**
	(a) Meaning, recognition, De-recognition and offset (b) Compound financial instruments, Measurement of financial instruments (c) Disclosures
3	**Financial Reporting by Special Entities**
	(a) Mutual funds (b) Non-banking finance companies (c) Merchant bankers (d) Stock and commodity market intermediaries
4	**Developments in Financial Reporting**
	(a) Value Added Statement (b) Economic Value Added (c) Market Value Added (d) Shareholders' Value Added (e) Human Resource Reporting

1. Elective Courses (EC)

4. Organisational Behaviour

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Organisation Behaviour	15
2	Understanding Others: Interpersonal relationships	15
3	Group Behaviour and Team Behaviour	15
4	Stress Management and Change	15
	Total	**60**

Sr. No.	Modules/Units
1	**Introduction to Organisation Behaviour**
	• Organisational Behaviour- Organisational Behaviour Multidiscipline- Different model of Organisational Behaviour- Individual behaviour is studied through Perception- Personality - Values- Attitudes- Job satisfaction- Motivation- Learning • Understanding self-studied through- Perception and Personality • Understanding self-studied through- Values and Attitudes
2	**Understanding Others: Interpersonal relationships**
	• Conflict Management –Nature of Conflict- Level of Conflict- Source of Conflict- Effects of Conflict- Process of Conflict- Stages of Conflict- Conflict Handling Orientations • Power and Organisational Politics-Sources of Power-Organisational Politics-Influence and Political Power
3	**Group Behaviour and Team Behaviour**
	• Group Behaviour, Informal Groups – Group Dynamics- Types of Groups-Nature and effects of Informal groups-Benefits of Informal groups-Formal groups –Monitoring informal organisation- Identifying and Rewarding Informal leader-Key Roles of Informal leader –Are there multiple informal leaders? Formal Groups- Potential Outcomes of Informal Group Processes • Team and Team Building- Modern organisation- Outcomes of Modern Organisation- Team work – Task team- Difference Between Groups and Teams-Life cycle of Team –Major Factors for Effective Teams- Team Building- Need for Team building- Team Building Process- Skills Useful in Team Building
4	**Stress Management and Change**
	• Stress Management and Counselling- How it Comes About –How it Affects Various Elements of Job Performance- Extreme Product of Stress- Stress and Job Performance-Approaches to Stress Management-Characteristic of Counselling-Types of Counselling • Change and its Effects- Nature of Change – Effect of Change – Response to Change – Resistance to change – Reasons for Resistance to Change-Transformational Leadership and Change-What are Elements of Transformational Leadership- Three stage model of changes Process

1. Elective Courses (EC)

5. Econometrics for Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Overview of the Classical Linear Regression Model	15
3	Univariate Times Series Modelling and Forecasting	20
4	Modelling Volatility and Correlation	15
	Total	**60**

Sr. No.	Modules/Units
1	**Introduction**
	Meaning, Different forms of econometrics, some characteristics of financial data, Types of Data, Return in Financial Modelling, Steps in formulating econometric model.
2	Overview of the Classical Linear Regression Model
	Meaning of regression, Regression v/s correlation, assumptions of the classical linear regression model, properties of OLS estimator, precision and standard errors, generalizing the simple model to multiple linear regression.
3	**Univariate Times Series Modelling and Forecasting**
	Introduction, some notation and concepts, moving average processes, Autoregressive processes, partial autocorrelation functions, examples of time series Modelling in finance, forecasting in econometrics.
4	**Modelling Volatility and Correlation**
	Models for volatility, Historical Volatility, Implied volatility models, Exponentially weighted moving average models, Autoregressive volatility models, Stochastic volatility models, forecasting covariance and correlation in finance with examples, Multivariate GARCH model for the CAPM with time-varying covariances.

1. Elective Courses (EC)

6. Security Analysis and Portfolio Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Portfolio Management – An Introduction & Process	15
2	Portfolio Management – Valuation	15
3	Fundamental Analysis and Technical Analysis	15
4	Efficient Market Theory & CAPM	15
	Total	**60**

Sr. No.	Modules/Units
1	**Portfolio Management – An Introduction & Process**
	Investment, Meaning, Characteristics, Objectives, Investment V/s Speculation, Investment V/s Gambling and Types of Investors. **Portfolio Management** – Meaning, Evolution, Phases, Role of Portfolio Managers, Advantages of Portfolio Management. Investment Environment in India and Factors Conducive for Investment in India. **Portfolio Analysis** – Meaning and its Components, Calculation of Expected Return and Risk, Calculation of Covariance, Risk – Return Trade off. **Portfolio Selection** – Meaning, Feasible Set of Portfolios, Efficient Set of Portfolios, Selection of Optimal Portfolio, Markowitz Model, Limitations of Markowitz Model, Measuring Security Return and Portfolio Return and Risk under Single Index Model and Multi Index Model.
2	**Portfolio Management – Valuation**
	Portfolio Revision – Meaning, Need, Constraints and Strategies. Portfolio Evaluation – Meaning, Need, Measuring Returns (Sharpe, Treynor and Jensen Ratios) and Decomposition of Performance. Bond Valuation – Meaning, Measuring Bond Returns, Yield to Maturity, Yield to Call and Bond Pricing. Bond Pricing Theorems, Bond Risks and Bond Duration.
3	**Fundamental Analysis and Technical Analysis**
	Economy Analysis – Meaning, Framework, Economic Analysis, Forecasting, Barometric or Indicator Approach, Econometric Model Building and Opportunistic Model Building. **Industry Analysis** – Concept of Analysis, Industry Life Cycle, Industry Characteristics **Company Analysis** – Financial Statements, Analysis of Financial Statements, (Practical questions on Debt Equity Ratios, Total Debt Ratio, Proprietary ratios, interest coverage ratio, Profitability ratios related to sales, investment and equity shares Efficiency or Activity Ratios) and Assessment of Risk(Leverages) Meaning and Principles of Technical Analysis, Price Chart, Line Chart, Bar Chart, Japanese Candlestick Chart, Trends and Trend Reversals, Chart Patterns, Support and Resistance, Reversal Patterns, Continuation Patterns and Elliot Wave Theory, Dow Theory , Mathematical Indicators – Calculation of Moving Averages (Simple and Exponential Moving Average), Oscillators and Relative Strength Index Market Indicators, Fundamental Analysis V/s Technical Analysis
4	**Efficient Market Theory & CAPM**
	Random Walk Theory, The Efficient Market Hypothesis, Forms of Market Efficiency, Competitive Market Hypothesis CAPM – Fundamental Notions of Portfolio Theory, Assumption of CAPM, Efficient Frontier with Riskless Lending and Borrowing, Capital Market Line, Security Market Line and Pricing of Securities with CAPM. Arbitrage Pricing Theory (APT) – The Return Generating Model, Factors Affecting Stock Return, Expected Return on Stock, APT V/s CAPM.

2. Core Courses (CC)

1. Financial Management-II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Risk and Return	15
2	Capital Structure Decisions	15
3	Cash Management	15
4	Receivable Management	15
	Total	**60**

Sr. No.	Modules/Units
1	**Risk and Return**
	Introduction, Meaning of Return, Types of Return- Holding Period Return, Annualized Return, Expected Return. Meaning of Risk, Types of Risk- Business Risk, Financial Risk, Interest Rate risk, Market Risk and Liquidity Risk (Including Practical Problems)
2	**Capital Structure Decisions**
	Meaning, Choice of Capital Structure. Importance Optimal capital Structure Introduction to leverage, Types of Leverages: Operating Leverage, Financial Leverage & Composite Leverage Relationship between Operating Leverage and Financial Leverage EBIT-EPS Analysis Cost of Capital, Capital structure and Market Price of Share Capital Structure Theories Dividend Policy - Payout Ratio (Including Practical Problems)
3	**Cash Management**
	Introduction Motives for holding cash Aspects of cash management Long terms cash forecasting Reason for cash surplus Cash management: Basic strategies, Cash Management Techniques/Processes, Marketable Securities (Including Practical Problems)
4	**Receivable Management**
	Introduction Aspects of Receivable Management Credit Policy, Credit Evaluation, Credit Granting decision, Control on Accounts Receivable (Including Practical Problems)

Reference Books

Reference Books
Corporate Accounting- IV
• Introduction to Accountancy by T.S. Grewal, S. Chand and Company (P) Ltd., New Delhi • Advance Accounts by Shukla and Grewal, S. Chand and Company (P) Ltd., New Delhi • Advanced Accountancy by R.L Gupta and M. Radhaswamy, S. Chand and Company (P) Ltd., New Delhi • Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd., New Delhi • Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai • Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi • Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc • Financial Accounting by Monga, J.R. Ahuja, Girish Ahuja and Ashok Shehgal, Mayur Paper Back, Noida • Compendium of Statement and Standard of Accounting, ICAI • Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Financial Accounting by Williams, Tata Mc. Grow Hill and Co. Ltd., Mumbai • Company Accounting Standards by Shrinivasan Anand, Taxman, New Delhi • Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi • Introduction to Financial Accounting by Horngren, Pearson Publications, New Delhi • Financial Accounting a Managerial Perspective, Varadraj B. Bapat, Mehul Raithatha, Tata McGraw Hill Education Pvt. Ltd., New Delhi
Auditing-II
• Contemporary Auditing by Kamal Gupta, Tata Mc-Graw Hill, New Delhi • A Hand-Book of Practical Auditing by B.N. Tandon, S. Chand and Company, New Delhi • Fundamentals of Auditing by Kamal Gupta and Ashok Arora, Tata McGraw Hill, New Delhi • Auditing: Principles and Practice by Ravinder Kumar, Virender Sharma, PHI Learning Pvt. Ltd., New Delhi • Auditing and Assurance for CA IPCC by Sanjib Kumar Basu, Pearson Education,New Delhi • Contemporary Auditing by Kamal Gupta, McGrow Hill Education Pvt. Ltd., New Delhi • Textbook of Auditing by Batra and Bagradia published by Tata McGraw Hills • Practical Auditing by S V Ghatalia published by Spicer & Pegler
Financial Reporting
• G Sekar / Padhuka • D S RawatTaxxman publication • M.P. Vijay Kumar

Organisational Behaviour

- Organisational Behaviour: Ashwathappa K : Himalaya Publishing
- Organisational Behaviour: Jit S Chandran : Vikas Publishing House
- Organisational Behaviour: Fred Luthans: Mc Graw Hill
- Organisational Behaviour : Robbings, Stephen: Pearson
- Organisational Behaviour: P C Pardeshi : Everest
- Organisational Behaviour: L M Prasad: S Chand

Econometrics for Finance

- Introductory Econometrics for Finance – Chris Brooks – Cambridge University Press, 2002
- Introductory Econometrics: A Modern Approach – Jeffrey Wooldridge, 2000
- Applied Econometrics Times Series – Walter Enders- Wiley India Edition, 1995
- Financial Econometrics: Problems, Models and Methods – Christian Gourieroux, Joann Jasiak, 2001
- Basic Econometrics – Damodar N. Gujarati, 1978.

Security Analysis and Portfolio Management

- Blake, David 1992, Financial Market Analysis , McGraw Hill London
- Francis J.C Investments, Analysis and Management McGraw Hill New York.
- Pistolese Clifford Using Technical Analysis Vision Books
- Reilly Frank K and Keith Brown Investment Analysis and Portfolio Management.

Financial Management-II

- Fundamental of Financial Management – Prasanna Chandra – Tata McGraw Hill
- Fundamental of Financial Management – V Sharan Pearson Education
- Principles of Corporate Finance – R A Brealy& S C Myres - Tata McGraw Hill

Project Work

Inclusion of project work in the course curriculum of the B.Com. (Financial Markets) program me is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research analyse and scientific temperament challenging the potential of learner as regards to his/ her eager to enquire and ability to interpret particular aspect of the study. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

- There are two modes of preparation of project work
  1. Project work based on research methodology in the study area
  2. Project work based on internship in the study area

Guidelines for preparation of Project Work

1. General guidelines for preparation of project work based on Research Methodology

- The project topic may be undertaken in any area of Elective Courses.
- Each of the learner has to undertake a Project individually under the supervision of a teacher-guide.
- The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.
- University/college shall allot a guiding teacher for guidance to the students based on her /his specialization.
- The project report shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be 80 to 100 pages

Format

1st page (Main Page)

Title of the problem of the Project

A Project Submitted to

University of Mumbai for partial completion of the degree of

Bachelor in Commerce (Financial Management) Under the Faculty of Commerce

By

Name of the Learner

Under the Guidance of

Name of the Guiding Teacher

Name and address of the College

Month and Year

2nd Page
This page to be repeated on 2nd page (i.e. inside after main page)

On separate page

Index

Sr. No.	Topic	Page No.
Chapter No. 1	Title of the Chapter	
(sub point 1.1, 1.1.1, ... And so on)		
Chapter No. 2	Title of the Chapter	
Chapter No. 3	Title of the Chapter	
Chapter No. 4	Title of the Chapter	
Chapter No. 5	Title of the Chapter	

- List of tables, if any, with page numbers.
- List of Graphs, if any, with page numbers.
- List of Appendix, if any, with page numbers.
- Abbreviations used:

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work

(Model Structure of the Project Work)

- **Chapter No. 1: Introduction**

In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.

- **Chapter No. 2: Research Methodology**

This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.

- **Chapter No. 3: Literature Review**

This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue.

- **Chapter No. 4: Data Analysis, Interpretation and Presentation**

This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of information's, presentation of graphs etc. can be provided with interpretation by the learner.

- **Chapter No. 5: Conclusions and Suggestions**

In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

- **Bibliography**
- **Appendix**

On separate page

Name and address of the college

Certificate

This is to certify that Ms/Mr _____ has worked and duly completed her/his Project Work for the degree of Bachelor in Commerce (Financial Management) under the Faculty of Commerce in the subject of _____ and her/his project is entitled, "_____Title of the Project_____" under my Supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University

It is her/ his own work and facts reported by her/his personal findings and investigation.

Seal of the College

Name and Signature of

Guiding Teacher

Date of submission:

On separate page

Declaration by learner

I, the undersigned Miss/Mr. _____Name of the Learner_____ here by, declare that the work embodied in this project work titled "_____ Title of the Project_____", forms my own contribution to the research work carried out under the guidance of _____Name of the guiding teacher _____ is the result of my own research work and has not been previously submitted to any other University for any other Degree/ Diploma to this or any other University.

Wherever reference has been made to previous works of others, it has been clearly indicated as such and included in the bibliography.

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by

Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I take this opportunity to thank the **University of Mumbai** for giving me chance to do this project.

I would like to thank my **Principal, _____ _____** for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our **Coordinator_____ _____**, for her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide _____ whose guidance and care made the project successful.

I would like to thank my **College Library**, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially **my Parents and Peers** who supported me throughout my project.

2. Guidelines for Internship based project work

- Minimum 20 days/ 100 hours of Internship with an Organisation/ NGO/ Charitable
- Organisation/ Private firm.
- The theme of the internship should be based on any study area of the elective courses
- Experience Certificate is Mandatory
- A project report has to be brief in content and must include the following aspects:
    - **Executive Summary:**
      A bird's eye view of your entire presentation has to be precisely offered under this category.
    - **Introduction on the Company:**
      A Concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
    - **Statement and Objectives:**
      The mission and vision of the organization need to be stated enshrining its broad strategies.
    - **Your Role in the Organisation during the internship:**
      The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.
    - **Challenges:**
      The challenges confronted while churning out theoretical knowledge into practical world.
    - **Conclusion:**
      A brief overview of your experience and suggestions to bridge the gap between theory and practice.

    - The project report based on internship shall be prepared as per the broad guidelines given below:
        - Font type: Times New Roman
        - Font size: 12-For content, 14-for Title
        - Line Space : 1.5-for content and 1-for in table work
        - Paper Size: A4
        - Margin : in Left-1.5, Up-Down-Right-1
        - The Project Report shall be bounded.
        - The project report should be of minimum 50 pages

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
➢ **Evaluation of Project Report (Bound Copy)**	**60 Marks**
• Introduction and other areas covered	20 arks
• Research Methodology, Presentation, Analysis and interpretation of data	30 Marks
• Conclusion & Recommendations	10 Marks
➢ **Conduct of Viva-voce**	**40 Marks**
• In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
• Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
• Overall Impression (including Communication Skill)	10 Marks

Note:
The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of project shall conduct the viva-voce examination as per the evaluation pattern.

Passing Standard

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT
- examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:

A) Internal Assessment: 25 %

Question Paper Pattern

(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i. Duration: The examination shall be of 2 ½ Hours duration

ii. Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.

(Detail question paper pattern has been given separately)

--Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:
Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:
Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

UNIVERSITY OF MUMBAI
No. UG/18 of 2014

CIRCULAR:-

The Principals of the affiliated Colleges in Commerce and the Heads of recognized Institutions concerned are hereby informed that the recommendation made by the Faculty of Commerce at its meeting held on 28th February, 2014 has been accepted by the Academic Council at its meeting held 4th March, 2014 **vide** item No. 4.45 and subsequently approved by the Management Council at its meeting held on 4th April, 2014 **vide** item No.8 and that in accordance therewith, in exercise of the powers conferred upon the Management Council under Section 54 (1) of the Maharashtra Universities Act, 1994 and the Ordinances 6120 and 6121 and the syllabus as per the Credit Based Semester and Grading System for the Three Years Integrated B.Com (Environmental Management & Economics) /B.M.S. (Environmental Management & Economics) degree programmes are introduced, which are available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2014-15.

Sd/-
Director, B.C.U.D.

MUMBAI – 400 032
1st July, 2014

To,

The Principals of the affiliated Colleges Commerce and the Heads of Recognized Institutions concerned.

A.C/4.45/04.03.2014
M.C/8/04.04.2014

****

No. UG/18-A of 2014 MUMBAI-400 032 1st July, 2014

Copy forwarded with Compliments for information to:-

1) The Dean, faculty of Commerce,
2) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
3) The Director, Board of College and University Development,
4) The Co-Ordinator, University Computerization Centre,
5) The Controller of Examinations.

Sd/-
Director, B.C.U.D.

AC 4-3-2014
Item No. – 4.45

UNIVERSITY OF MUMBAI

Syllabus

Program: B.COM/B.M.S

Course: Environmental Management & Economics

(As per Credit Based Semester and Grading System with effect from the academic year 2014–2015)

Semester I – B.Com/B.M.S Environmental Management & Economics

Sr. No.	Subject	Teaching Hours		Assessment Pattern				
		No. of Sessions of 90 minutes	No. of Sessions of 90 minutes per week	Continuous Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Introduction to Environment Management	30	2	40 IA	60 IA	100	3	2
2	Principles of Management	30	2	40 IA	60 IA	100	3	2
3	Organisational Behaviour	30	2	40 IA	60 IA	100	3	2
4	Managerial Economics	30	2	40 IA	60 IA	100	3	2
5	Financial Accounting	30	2	40 IA	60 IA	100	3	2
6	Business Communication	30	2	40 IA	60 IA	100	3	2
			Total No of Credits					**12**

Semester II – B.Com/B.M.S Environmental Management & Economics

Sr. No.	Subject	Teaching Hours		Assessment Pattern				
		No. of Sessions of 90 minutes	No. of Sessions of 90 minutes per week	Continuous Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Ecology & Environment	30	2	40 IA	60 IA	100	3	2
2	Human Resource Management	30	2	40 IA	60 IA	100	3	2
3	Introduction to Cost Accounting	30	2	40 IA	60 IA	100	3	2
4	Economic Environment of Business	30	2	40 IA	60 IA	100	3	2
5	Production Management & Materials Management	30	2	40 IA	60 IA	100	3	2
6	Business Statistics	30	2	40 IA	60 IA	100	3	2
			Total No of Credits					**12**

Semester III – B.Com/B.M.S Environmental Management & Economics

Sr. No.	Subject	Teaching Hours		Assessment Pattern				
		No. of Sessions of 90 minutes	No. of Sessions of 90 minutes per week	Continuous Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Environmental Economics – I	30	2	40 IA	60 IA	100	3	2
2	Marketing Management	30	2	40 IA	60 IA	100	3	2
3	Research Methods in Business	30	2	40 IA	60 IA	100	3	2
4	Global Warming & Climate Change	30	2	40 IA	60 IA	100	3	2
5	Natural Resources & Management	30	2	40 IA	60 IA	100	3	2
6	Financial Management	30	2	40 IA	60 IA	100	3	2
			Total No of Credits					**12**

Semester IV – B.Com/B.M.S Environmental Management & Economics

Sr. No.	Subject	Teaching Hours		Assessment Pattern				
		No. of Sessions of 90 minutes	No. of Sessions of 90 minutes per week	Continuous Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Environmental Safety, Health & Management	30	2	40 IA	60 IA	100	3	2
2	Environmental Pollution & Management	30	2	40 IA	60 IA	100	3	2
3	Environmental Economics – II	30	2	40 IA	60 IA	100	3	2
4	Customer Relationship Management	30	2	40 IA	60 IA	100	3	2
5	Occupational Health & Safety	30	2	40 IA	60 IA	100	3	2
6	Management Information Systems	30	2	40 IA	60 IA	100	3	2
7	Project Submission – I	100 Marks						4
			Total No of Credits					**16**

Semester V – B.Com/B.M.S Environmental Management & Economics

Sr. No.	Subject	Teaching Hours		Assessment Pattern				
		No. of Sessions of 90 minutes	No. of Sessions of 90 minutes per week	Continuous Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Environmental Impact Assessment	30	2	40 IA	60 IA	100	3	2
2	Strategic Management	30	2	40 IA	60 IA	100	3	2
3	Entrepreneurship Management	30	2	40 IA	60 IA	100	3	2
4	Environmental Legislation	30	2	40 IA	60 IA	100	3	2
5	Project Management	30	2	40 IA	60 IA	100	3	2
6	Business Ethics	30	2	40 IA	60 IA	100	3	2
			Total No of Credits					**12**

Semester VI – B.Com/B.M.S Environmental Management & Economics

Sr. No.	Subject	Teaching Hours		Assessment Pattern				
		No. of Sessions of 90 minutes	No. of Sessions of 90 minutes per week	Continuous Assessment	Semester End Examination	Total Marks	Duration of Theory Paper	No of Credits
1	Corporate Social Responsibility	30	2	40 IA	60 IA	100	3	2
2	Solid & Hazardous Waste Management	30	2	40 IA	60 IA	100	3	2
3	Environment & Eco – Tourism	30	2	40 IA	60 IA	100	3	2
4	Corporate Governance	30	2	40 IA	60 IA	100	3	2
5	Environmental Problems, Hazards & Mitigation	30	2	40 IA	60 IA	100	3	2
6	Corporate Governance	30	2	40 IA	60 IA	100	3	2
7	Project Submission – II	100 Marks						4
			Total No of Credits					**16**

Semester	Total No of Credits
Semester I	12
Semester II	12
Semester III	12
Semester IV	16
Semester V	12
Semester VI	16
Total	**80**

SEMESTER I

Introduction to Environmental Management Sem I

Unit No. I

Resources and Wealth :

Meaning, Types of Resources, Exploitation of Resources. Use of Technology and its impact on Natural Environment : Wealthmeaning, Distinction between wealth and resources. Optimum Conversion of Resources into wealth : Anthropogenic Waste its effects, Man made industrial waste.

Unit No. II

Environmental Degradation :

Meaning, causes : Degradation of urban land, Forest and Agricultural land due to natural causes and human interference : Global Warming : Problems of non-degradable Waste. Electronic Devices, Plastic and Man-made fibres: Environmental Assessment Environmental Impact Assessment (EIA). Environmental Auditing, Environmental Legislation in India, Carbon Bank.

Unit No. III

Environmental Management

Meaning, development and environmental linkages. Environmental concerns in India. The need for sustainable development. Actions for environmental protection : National and international initiatives, emerging environment management strategies, Indian initiatives Environmental Protection Movements and NGOs in India.

Disaster Managementmeaning need and planning with reference to Flood, Storms, Tsunami, Cyclones and Earthquakes in India.

Reference Books :

No.	Title	Author	Publisher
1.	Centre for Science and Environment. The State of India's Environment Society 1984–85 Reprint	———	C.S.E., New Delhi
2.	Environmental Priorities in India	Khoshoo	Environmental Society, New Delhi
3.	Environment Management	N.K. Uberoi	Excel Books, Delhi
4.	Environmental Management	H.V. Jadhav	Vipul Prakashan, Mumbai
5.	The Hindu Survey of Environment	The Hindu	Chennai
6.	Environmental Economics	Karpagam M	Sterling, New Delhi

Principles of Management Sem I

Unit No. I

Management

Concept, nature, process and Significance. An overview of functional areas of management, managerial roles (Mintzberg)

Evolution of Management Theory Work of Fredrik, W. Taylor, Fayol's contribution Behavioural Science approach, Contingency approach.

Unit No. II

Management Functions Planning, Organising, Staffing, Directing and controlling.

Planning : meaningimportanceelementsprocesses limitations

Decision Making concept, importance and steps in decision making Preparation of Business Plan

Unit No. III

Organising Concept, nature and significance; Authority and responsibility relationships, centralization and decentralization, departementation, organization structure forms.

Staffing importance, sources of recruitment, selection process.

Unit No. IV

Directing meaning and steps I direction : motivation concept ; theories Maslow, Herzberg, McGregor.

Leadership concept, styles and traits

Control : concept, process: Effective control system; control techniques.

Coordination concept, Definition and importance.

Reference Books

No.	Title	Author	Publisher
1	Essentials of Management	Koontz H & W	McGraw Hill, New York
2	Principles of Management	Ramaswamy	Himayala, Mubai
3	Management Concept and Practice	Hannagain T.	McMillan, Delhi
4	Basic Managerial Skills for All	McGrath, E.H.	Prentice Hall of India
5	Management – Text & Cases	VSP Rao	Excel Books, Delhi
6	Essentials of Management	Massie Joseph	Prentice Hall of India
7	Management : Principles & Guidelines	Thomas N. Duening & John Ivancevich	Biztantra
8	Management Concepts and OB	P.S. Rao & N.V. Shah	Ajab Pustakalaya
9	Management Concepts and Strategies	J S Chandran	Vikas Publishing House
10	Principles of Management	Tripathi P.C.	Tata McGraw Hill
11	Principles of Management : Theory and Practice	Sarangi S K	V M P Publishers & Distributors
12	Principles of Management	Terry G R	AITBS

Organisational Behaviour Sem I

Chapter – 1

- Fundamentals of Organizational Behavior
- Individual differences in people
- Role of Hereditary in Environment
- Pre-natal & Post-natal Environment

Chapter – 2

- Learning – Theories & Mechanism
- Intelligence
  - Types
  - Individual verses Group Test of Intelligence, Sixth thinking hats
  - Normal distribution curve of Intelligence
  - Theories & models of Motivation
  - Motivation Cycles
  - Leadership Styles
  - Theories of Leadership
- Performance Appraisal
- Empowerment

Chapter – 3

- Dimensions & Interaction in Society
- Different types of Groups
- Team Building
- Conflict resolution strategies
- Group decision making verses Individual decision making

Chapter – 4

- Organizational Culture
- Characteristics & Techniques of Organizational Development

- Resistance to Change
- Overcoming resistance
- Stress & Counseling
- Time Management

Managerial Economics Sem I

Unit No. I

Introduction

Meaning and Scope of managerial economics relationship to economic theory relationship with decision theory role of managerial economics objectives and constraints of the firm introduction to risk, asymmetric information and game theory.

Unit No. II

Demand Analysis

Meaning of demandMarket demand function Demand curve, factors affecting demand Variation and increase/decrease in demand Elasticity of demandGraphical representation of price elasticity of demand Price income and cross elasticity of demand.
Estimation of demandNumerical problems for measurement of elasticity.

Unit No. III

Production and Costs

Meaning of production Types of production functionImportance of production function in managerial decisionmaking Application of production function in productive sectors (service and manufacturing) Economics of scale and scope.
Importance of cost in managerial decisionmaking Economic concepts of cost Functional form of short run and long run cost Estimation and alternative methods of estimation of cost LAC as a decision making tool Impact of learning curve.

Unit No. IV

Market Structures

Meaning of market structure, need for analyzing market structure, types of market

A. Perfect competition and Monopoly

Features Representative firm, and industryEquilibrium in short and long runPrice and output determination using diagramsNormal profits, losses and supernormal profits in short runLong run and normal profitMerits and limitations of perfect markets.

B. Oligopoly and Monopolistic Competition

Oligopolydefinition and characteristicsCollusion and cartelNonprice competition Price stickiness and kinked demand
Monopolistic competition definition and characteristicsEquilibriumPrice & determination.

Reference Books

No.	Title	Author	Publisher
1.	Managerial Economics	Dean Joel	Eastern Edition
2.	Managerial Economics	Almanand	Excel Books, New Delhi
3.	Managerial Economics	Hague, D.	Longman, London
4.	A study of Managerial Economics	Gopalakrishna	Himalaya Mumbai
5.	Managerial Economics	Cauvery, R. et al;	S.Chand, New Delhi
6.	Managerial Economics	Paul G Keat, K.Y. Young	Prentice Hall Publications
7.	Managerial Economics: Analysis, Problems Cases	Lila J. Truett and Dale B Truett	John Wiley and Sons
8.	The Economy Today	Bradley R Schiller	McGraw–Hill
9.	Principles of Economics	Robert H Frank and Ben Bernanke (2007)	Tata McGraw–Hill, New Delhi
10.	Managerial Economics	Ahuja HL (2007)	S.Chand & Co.Delhi
11.	The New Managerial Economics	William Boyce	Biztantra

Financial Accounting Sem I

Unit No. I

A. Meaning and Scope of Accounting : Need, development and definition; Book keeping and accounting; Persons interested in accounting; Disclosures; Branches of accounting; Objectives of accounting.

B. Accounting Transactions : Accounting cycle, journal, journal proper, Opening and closing entries, Relationship between journal & ledger; Rules regarding posting; Trial balance; Subsidiary books; Bank reconciliation statement.

C. Accounting Standards

AS 1 : Disclosures of accounting policies : Meaning of accounting policies ▪ Purpose ▪ Different policies ▪ Areas of policies ▪ Disclosure of policies ▪ Disclosure of change in policies ▪ Simple illustrations.

AS 6 : Depreciation accounting : Meaning ▪ Definitions ▪ Importance ▪ Factors ▪ Useful life of a depreciable asset ▪ Estimating useful life ▪ Additions ▪ Residual value ▪ Methods ▪ Disclosure of surplus ▪ change in method ▪ Simple illustrations.

AS 9 : Revenue recognition : Meaning and scope ▪ Transactions excluded ▪ Sale of goods ▪ Rendering of services ▪ Effect of uncertainties ▪ Disclosure ▪ Simple illustrations.

AS10: Accounting for fixed assets : Meaning ▪ Definitions ▪ Importance ▪ Cost of fixed assets ▪ Self constructed fixed assets ▪ Non-monetary consideration ▪ Improvements, repairs, additions and extensions ▪ Revaluation ▪ Sale or retirement ▪ Valuation of fixed assets in special cases ▪ Special types of fixed assets ▪ Disclosure.

Unit No. II

A.

1) Expenditure : Classification of Expenditure Capital, Revenue and Deferred Revenue Expenditure : Distinction between capital expenditure and revenue expenses : Unusual expenses : Effect of error; Critical tests
2) Receipts : Capital receipt, Revenue receipt, Distinction between capital receipts and revenue receipts.
3) Profit or Loss : Revenue profit or loss, Capital profit or loss

B. Depreciation Accounting :

Practical problem based on accounting treatment by provision for depreciation using SLM and RBM methods.

Unit No. III

Trial Balance and Final Accounts of a Sole Proprietor

Introduction to trial balance and final accounts of a sole proprietor.
Rectification of errors.
Preparation and Presentation of Final Accounts in Horizontal Form :
Manufacturing Account : Trading Account : Profit and Loss Account :
Balance Sheet

Unit No. IV

Accounting in Computerised Environment

An overview of computerised environment.
Features of computerised accounting system.
Concept of grouping of accounts
Codification of accounts.
Maintaining the hierarchy and ledgers.
Accounting packages and consideration of them in selection

Reference Books

No.	Title	Author	Publisher
1	An Introduction to financial Accounting	Andrew Thomas	McGraw Hill
2	Financial Accounting – A Managerial emphasis	Ashok Banerjee	Excel Books
3	Financial Accounting	Weugamt.	Keiso, Kimmel
4	Accounting Theory – an Introduction	L.S.S. Porwal	Tata McGraw Hill
5	Elements of Accounts	T.S. Grewal	S.Chand & Co.
6	Business Accounting	Frank Woods	Pitman Publication
7	Advanced Accountancy	R.L. Gupta & M. Radhaswamy	S. Chand & Co. (P) Ltd., New Delhi
8	Accounting Standards	– – –	Institute of Chartered Accountants of India, New Delhi
9	Financial Accounting for Managerial Texts & Cases	Dr. Dinesh D. Harsolikar	Multi-Tech. Publishing Co. Ltd., New Delhi
10	Indian Accounting Standards and US Gaap	Ashish Bhattacharya	Tata McGraw Hill & Co. Ltd., New Delhi
11	Financial Accounting	Warren	Thomson Learning
12	Company Accounting Standards	Shrinivasan Anand	Taxman
13	Financial Accounting	J. R. Monga, Girish Ahuja	Mayur Paper Back

Business Communication Sem I

Unit No. I

Fundamentals of Communication

Definition, Meaning Types, process and importance

Unit No. II

Effective Communication

Concept and Practice of Effective Communication
Barriers to Effective Communication
Methods to Improve Communication Skills

Unit No. III

Written Communication Skills

Report Writing

Letter Writing

Preparation of Promotional Material
with special reference to banks, Insurance companies and Joint stock companies

Unit No. IV (No. of Lectures 15)

Oral Communication Skills

Understanding Audience
Use of Language
Use of Tone
Understanding Body Language

Reference Books

No.	Title	Author	Publisher
1	Effective Communication	Rai Urmila	Himalaya, Mumbai
2	Business Communication	Kaul	Prentice Hall India
3	Basic Business Communication	Lesikar	TMH
4	Business Communication & Personality Development	Das	Excel Books, Delhi
5	How to Listen Better?	Pramila Ahuja & G Ahuja	Sterling Publication
6	Contemporary Business Communication	Scot	Biztantra
7	Business Communication for Managers : An Advanced Approach	Penrose	Thomson learning
8	Business Correspondence	Whitehead G & H	A.H. Wheeler, Allahabad

SEMESTER II

Ecology and Environment Sem – II

MODULE – I

Ecology – Meaning - Environmental Science – History of Ecology – Ecology Today – Scope of Ecology – The Subdivisions of Ecology – Models in Ecology – Fundamental Concepts – Environmentalism – Conservation Ethics – Air pollution- Water pollution -Noise pollution , Radioactive pollution - Solid waste pollution - Land pollution

MODULE – II

Origin of Atmosphere – Vertical Structure of the Atmosphere – Ecological Significance of Air – Horizontal Motion of Atmosphere – vertical Movements – Upper Air Circulation (Jet Streams) – Air Masses – Important Properties of the Atmosphere – Acid Rain

MODULE – III

Zonal Structure of the Earth – The Geologic Cycle – Minerals and Rocks – Soil – Pedogenesis – Soil Types – Soil Classification – Types of Rocks and Minerals – Soil profile – Soil Erosion in India – Soil Conservation – Biota of the Soil – Soil Adaptations in Animals

MODULE – IV

Hydrologic – Water Budget – Fresh Water Environment – Lakes – Eutrophication of Lakes – Reservoirs – Running Water – The Open Ocean – Physico-chemical Aspects of Marine Environment – Wetlands and Coastal Environment – Antarctic Research Programme – Coral Reef – Exclusive Economic Zone (EEZ) – Estuaries – Biosphere -Introduction – concept of Biome – Evolution and Diversity in Biomes – Major Biomes of Earth – Landforms

MODULE – V

Ecosystem Biodiversity – Species Diversity – Genetic Diversity – Global Diversity – The Value of Biodiversity – Biodiversity and Ecosystem function – Biodiversity – Hot Spots – Bio-wealth – Biotic Impoverishment – Biodiversity conservation – Biotechnology and Biodiversity – Milestones of Convention of Biodiversity (CBD) – Main Players in CBD.

MODULE – VI

Resource Cycle – Mineral Resources – Marine Resources – Mineral Resources of Antarctica – Energy Resources – Renewable Sources of Energy – Energy from Biomass – Nonrenewable Sources of Energy – Nuclear Energy – Geothermal Energy – Ocean Thermal Energy – Energy for the Future – Forest Resources – Deforestation – Water A Vital Resources – India’s Water Budget

TEXT BOOK: S.V.S.Rana – Essentials of Ecology and Environmental Science – Prentice – Hall of India – Third Edition – 2007.

Human Resource Management Sem II

Introduction to HRM

Definition, Features, Scope/Functions of HRM, Definition of Personnel Management.

Evolution of HRM/ Trends in HRM,

Difference between HRM and PM ,

Challenges before the HR manager,

Role of HR Manager,

Traits/Characteristics of the workforce,

Personnel Philosophy,

Personnel Manual.

Human Resource Planning

Definition of HRP

Process of HRP along with brief coverage of personnel demand and supply forecasting techniques

Factors affecting HRP

Human Resource Information System (HRIS),

VRS, Outsourcing, Pink slip/ termination/ retrenchment/ downsizing/ separation

Contracting and Sub- contracting

Promotions and Transfers

Job Analysis, Job Design and Job Evaluation

Job Analysis – Definition, methods of collecting job data, merits and demerits/limitations

Job Design – Definition, Factors affecting Job Design, Approaches to Job Design

Job Evaluation – Definition, methods of job evaluation, process of Job Evaluation.

Recruitment, Selection and Induction

Recruitment – Definition, sources of recruitment , merits and demerits

Selection – Definition, process of selection, types of selection tests, types of interviews

Induction/Orientation – definition, methods, process

Placement

Training and Development

Definition of Training and Development,

Methods of training managers,

Process/ procedure of conducting training programme,

How to evaluate effectiveness of training programmes,

Advantages of T&D

Performance Appraisal

Definition of Performance Appraisal,

Methods of Appraisal for managers – traditional and modern

Process / procedure of conducting performance appraisal

Advantages of performance appraisal

Limitations of Appraisal

Compensation Management

Definition of compensation,

Components of Salary / Salary slip,

Fringe Benefits – definition and types,

Performance linked incentives/ incentives- definition, advantages and disadvantages.

Career Planning And Development

Definition of Career Planning and Career Development,

Process/ Procedure of Career Planning,

Career Stages/ Career Life Cycle and how to handle personnel at each stage,

Essentials to make career planning successful,

Career Counselling,

Employee Retention techniques,

Succession planning

Participative Management

Definition of Participative Management,

Levels of participation

Trends in Participative Management

Factors essential for successful participative management

Forms of participation

Participation through Quality Circles

Empowered Teams

Industrial Relations

Definition of Industrial Relations,

Features of Industrial Relations,

Importance of Industrial Relations,

Approaches to Industrial Relations,

Parties to Industrial Relations

Trade Unions

Definition of Trade Union,

Features of Trade unions,

Trade union movement in India/ Trends in the Trade Union

Recommended Books:

*1) **K. Aswathappa**, "Human Resources & Personnel Management- Text And Cases – Fourth Edition", Tata Mc Graw Hill*

*2) **Jayashree Sadri, Sorabh Sadri "**A Strategic Approach to Human Resources Management". Jaico Publishing House, Mumbai*

*3) **Mamoria**, "Personnel Management", Himalaya Publication*

*4) **Edwin B Flippo**, "Principles of Personnel Management", Mc Graw – hill International*

*5) **M. Nair And T.V. Rao**, "Excellence Through HRD" , Tata McGraw Hill publications*

*6) **Micheal Armstrong** , "Handbook Of Human Resource Management Practice", Kogan Page*

*7) **Gary Dessler, "**Human Resource Management", Pearson Education.*

*8) **Saiyadain**, "Human Resource Management", Fourth Edition, Tata McGraw Hill publications*

*9) **William J Rothwel**l **and H.C. Kazanas** – Planning & Managing Human Resources – Jaico Publishing House, Mumabai, 2nd Edition, 2008.*

Introduction to Cost Accounting Sem II

Unit No. I

Introduction & Importance of Cost Accounting :

Cost, costing, cost accounting; Cost ascertainment : Cost control; Cost classification; Reporting : Distinction between cost and financial accountancy; Advantages of cost accounting; Objectives of cost accounting.

Unit No. II

A. Elements of cost :

Material-labour; overheads.

B. Bases of cost classification :
On the basis of :
Behavior / Variability
Element of cost including direct and indirect concept.
Functions.

C. Determination of Total cost :
Cost structure
Cost sheets
Composition of selling price

Unit No. III

Reconciliation between cost and financial records :

Meaning and definition Need for reconciliation Causes of disagreement Procedure and preparation of statement of reconciliation.

Unit No. IV

Elementary Principles and Techniques of Marginal costing
(Excluding Problems on Managerial Decisions)
A. Elementary principles of marginal costing :

Meaning features of marginal costing Advantages of marginal costing

Limitations of marginal costing concept of profit.

B. Techniques of Marginal Costing :

Contribution Profit / volume ratio Break even point Margin of safety Cost volume profit analysis.

Reference Books :

No.	Title	Author	Publisher
1.	Management Accounting	I.M. Pandey	Vikas Publishing
2.	Cost Accounting	C.S. Rayudu	Tata McGraw Hill and Co. Ltd, Mumbai
3.	Cost Accounting Theory and Practice	M.N. Aurora	S. Chand & Co. (P) Ltd., New Delhi
4.	Cost Accounting – A Managerial Emphasis	Horngren, Charles, Foster and Datar	Prentice Hall of India
5.	Advanced Problems and Solutions in Cost Accounting	Moheshwari S.N.	S. Chand and Co. (P) Ltd. New Delhi
6.	Cost Accounting	Jain S.P., Narange K.L.	Kalyani, New Delhi
7.	Cost Accounting and Financial Management	Ravi M. Kishore	Taxman's
8.	Principles of Cost Accounting	Vanderbeck	Thomson learning

Economic Environment of Business Sem II

Introduction to Macro Economics.

Macro economic aggregates and concepts

Circular flow of income.
National income and related concepts, calculation of National income, National income and social welfare, concept of Human Development Index. Supply of money, demand for money, price level. Inflation and Stagflation.

Determination of Income and Employment

Overview of classical and Keynesian analysis. Business cycles – features, causes and remedial Measures. Equilibrium in the Goods and Money markets (IS-LM)

Policy Environment

Role of state in different economic systems.
Theory of economic policy
Monetary policy – objectives and instruments.
Fiscal policy – objectives and instruments, , impact on business, concept of inclusive growth.
Economic stabilization – Fiscal v/s Monetary policy and Structural policy.
Trade policy – Protection v/s Free trade

International Trade

Overview of International trade.
Distinction between domestic and international trade.
Basis of trade – comparative cost difference, factor endowment and factor intensity.
Balance of payments – accounting structure, disequilibrium (types, causes and remedial measures), trends in India's Balance of payments.
Mechanism for international payments.
Flexible v/s Managed exchange rate systems.

Globalization

Globalization – meaning and effects (gains and problems), role of IMF and World Bank, concept of global recession with contagion effects.
World Trade Organization – agreement s and implications for India, contentious issues, disputes settlement mechanism.
Foreign Capital – need for foreign capital, role of MNCs,

FDI v/s Portfolio investment, causes of rising FDI in India.

Reference Books:

1) **Dornbusch R, Fischer and Startz** – "Macro Economics", (Tata McGraw Hill).
2) **Richard T Froyen** – "Macro Economics", (Pearson Education).
3) **Mankiw N G** – "Macro Economics", (Worth Publishers).
4) **Prabhat Patnaik (ed)** – "Macro Economics", (Oxford University Press).
5) **Andrew Abel and Ben Bernanke** – "Macroeconomics", (Pearson Education)
6) **H L Ahuja** – "Macro Economics for Business and Management" (S Chand).
7) **A Nag** – "Macro Economics for Management Students", (Macmillan)
8) **Shyamal Roy** – "Macro Economic Policy Environment – an analytical guide for managers", (
Tata McGraw Hill).
9) **Suraj B. Gupta** – "Monetary Economics: Institutions, Theory and Policy", (S. Chand)
10) **Robert J Carbaugh** – "International Economics", (Thomson Southwestern).
11) **Robert Dunn, Dana Stryck, James Ingram and Robert Dunn** Jr. – "International Economics Study Guide and Workbook", (John Wiley and Sons)
12) **Dominick Salvatore** – "International Economics", (John Wiley and sons).
13) **Paul Krugman and Maurice Obstfeld** (2005) – "International Economics: Theory and Policy", (Addison Wesley)
14) **Bo Sodersten and Geoffrey Reed**, - "International Economics", (Macmillan)
15) **J. Wild, K. Wild and J. Han** – "International Business", (PHI)
16) **Ray S K** – "The Indian Economy", (PHI).
17) **Vibha Mathur** - "Indian Economy and the WTO", (New Century).
18) **Veena K Pailwar** – "Economic Environment of Business", (PHI).
19) **Dutt and Sundaram** – "Indian Economy", (S Chand)
20) **Jagdish Bhagwati** (2004) – "In Defense of Globalisation", (Oxford University Press)
21) **Bradley Schiller**, "The Economy Today", (McGraw-Hill)
22) **M. Adhikary** – "Economic Environment of Business", (S. Chand)

Production Management & Materials Management Sem II

UNIT – I

- Introduction to the concept of operations and Operation Management
- Development of Production Function. Relation of Production with other Functions like design function, purchase function, plant layout, maintenance etc.
- Production classification, product selection (steps in identifying the product for manufacturing), Product development (market pull, technology push, inter functional approach).
- Brief description/importance of research development and design of a product

UNIT – II

- Facilities planning (how much to produce, level of automation, facilities required for manufacturing , where to produce, arranging required facilities, how to produce etc.) production systems
- Plant layout: difference between various types of layout (Product layout, process layout, Cellular layout, static layout etc)
- Various types of material Handling systems: their guidelines/principles, distinguishing features, uses
- Overview of various types of maintenance systems
- Meaning/functions/ nature of production, planning and control

UNIT – III

- Importance of materials management (corporate policy, organisation, research, planning, source selection)
- Value Analysis and Value Engineering
- Purchase Management, importance of purchasing, various R's of Purchasing, purchasing systems
- Need for forecasting price/policy on seasonal commodities and capital equipments. Simple problems on various types of forecasting including exponential smoothing
- Inventory management, its prime importance in our country today.
- Inventory control techniques- ABC, FSN, GOLF, VED, SOS, HML
- Make or Buy Decisions: Problems on inventory Management

UNIT – IV

- Warehousing and stored management- centralised and de-centralised stores. Brief introduction to various methods of stores accounting.
- Need for stock verification
- Management of scrap, waste, surplus, obsolete materials.
- JIT, KANBAN, KAIZEN, Push vs. Pull concept, MRP
- Explanation of EOQ – its advantages and disadvantages. Types of inventory systems (P-Systems and – Systems). Need for safety stock/reserve stock. Simple problems on these topics.
- SQC – techniques, Control Charts, X- Bar chart, R- chart, P- chart, C- chart. Graphical representation. Direct problems on these topics

Reference Books:

Sr. no.	Title	Author	Publisher
1.	Principles of Operation Management	Jay Heizer	Prentice Hall
2.	The Lean Manufacturing Pocket handbook	Kenneth W. Dailey	D W Publishing
3.	The Toyota Product Development System: Integrating people, process and technology	James M. Morgan and Jeffrey K. Liker	Productivity Press
4.	The Toyota Production System: Beyond large scale production	Taiiehi Ohno and Norman Bodek	Productivity Press
5.	Operations management: Processes and Value Chains	Lee J. Krajewski, Larry P. Ritzmann and Manoj K. Malhotra	Prentice Hall
6.	Productivity and Inventory Management	Donald Fogarty, John H Blackstone, Thomas R Hoffman	Douth – Western College
7.	Production and inventory Control : Principles and Techniques	George W Plossl	Prentice Hall
8.	Production Planning and Control	W Bolton	Addison Wesley Longman Limited
9.	Journal on Material and Supply chain, materials management Review (MMR), Indian Institute of Materials Management, Bangalore		
10.	Material Management: An Integrated approach	P Gopalakrishnan and M Sunderesan	Prentice Hall – international

Business Statistics Sem II

Unit No. I

Descriptive Statistics for Univariate Data :

Introduction to Statistics : Types of data. Data collection methods Census and Sample Survey :
Presentation of data : Tabular (Frequency distribution) and Graphical (Frequency Curve Ogives. Histogram).
Measures of Central Tendency : Arithmetic mean, median, mode, geometric mean – their properties and applications.

Measures of Dispersion : Absolute measures Range, Quartile deviation, Standard deviation, Variance and Relative measures coefficient of quartile range, coefficient of deviation, coefficient of variation.

Unit No. II

Forecasting Techniques

Correlation and Regression : Karl Pearson's coefficient of correlation (Properties and calculation); Spearman's Rank Correlation coefficient, Regression equation Statement and use.
Time Series : Components. Additive and multiplicative models,
Estimation of linear trend by (i) least squares method
(ii) moving average method
Determination of seasonal trend using simple average method.

Index Numbers : Meaning and uses, Simple and composite index number.
Aggregative and average of price relatives simple and weighted index number.
Construction of index number fixed and chain base.
Laspayre's Paasche's Kelly's and Fisher's index numbers.
Construction of (i) consumer price index
(ii) Cost of living index numbers
Deflating, Splicing, Shifting of Base Year, Conversion from fixed base to chain base index numbers and vice-a-versa.

Unit No. III

Probability and Probability Distribution :

Probability : Sample space as a concept, different types of events.
Definition of probability.
Addition and Multiplication Laws of probability (Statements and use only) conditional probability, Bayes' Theorem (concept only).
Random Variable, Expectation and Variance. Probability distributions – Binomial and Normal.

Unit No. IV

Testing of Hypotheses

Sampling distribution : Sample mean and sample proportion.
Determination of sample size. Central Limit Theorem (Statement only).

Hypothesis : Simple and composite, null and alternative. Two types of errors, level of significance (concepts only Large sample test. Tests based on Normal distribution (Tests for mean and difference in two means, proportion and difference in two proportions). Internal estimation, t-test (concept only).

Reference Books :

No.	Title	Author	Publisher
1.	Statistics for Management	Richard Levin and David S. Rubin	Prentice Hall of India, New Delhi
2.	Statistics for Business & Economic	David R Anderson, Dennis J Sweney	Thompson Publication (Scuta Eastern)
3.	Fundamentals of Statistics	S.C. Gupta	Himalaya Publishing House
4.	Business Statistics	Bhardwaj	Excel Books, Delhi
5.	Introduction to Probability theory and its application	Feller W.	Wiley
6.	Data Analysis for Managers	Roberts H.	Scientific Press
7.	Statistics for Management	Sharma	Himalaya Publishing House
8.	Theory and Problems of Statistics	M.R. Spiegel	McGraw Hill Publishing Company
9.	Elementary Statistics	S.P. Gupta and Archana Gupta	Sultan Chand and Sons, New Delhi
10.	Business Statistics	J.S. Chandan	Vikas Publishing House
11.	Mathematics for Business and Social Sciences	Mizrahi and Sullivan	John Wiley and sons
12.	Mathematics for Business Studies	J.K. Thukral	Mayur Publications
13.	Business Mathematics	S.K. Singh & J.K. Singh	Brijwasi Book distributors and publishers
14.	Theory and problems of Business statistics	Schaum's Outline Series	McGraw Hill Book Company

SEMESTER III

Environmental Economics – I Sem III

- Introductory micro-economic theory such as: supply and demand; price formulation; political means of control; environmental economic theories;

- Valuation methods; political means of control (administrative and incentive based) and their applicability on environmental problems;

- Natural resourse economics; renewable and non-renewable resources resource management regimes;

- Ecological economics; the ecological system; technological pessimism vs technological optimism;

- International trade and the environment; Economic growth and the environment; and

- Case Studies

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Marketing Management Sem III

Introduction to Marketing-

(a) The 4 Ps and 3Cs of Marketing
(b) Marketing as an activity, function, and philosophy
(c) Needs, wants and demands; transactions, transfers & exchanges
(d)Orientation of a firm: Production concept; product concept; selling concept; and marketing concept.
New Trends in Marketing: E-Marketing, Internet Marketing, and Marketing using social networks
Societal Marketing/Relationship Marketing

Marketing Research; MIS; & Consumer Behaviour
The micro environment of business (management structure; marketing channels: markets in which a firm operates; competitors and stakeholders.
Macro Environment: political factors; economic factors; socio-cultural factors; technological factors (pest analysis)

Marketing Research:

Importance of Marketing Research
Types of Marketing Research:
Product research; sales research; consumer/customer research; promotion research.

Consumer Behaviour:

Basic stimulus response model
Influence on consumers decision-making process
High involvement and low involvement products
Influences on buying behaviour: cultural factors, social factors, personal factors and psychological factors (Maslow's Hierarchy)
Methods of sales forecasting

Industrial Buying Behaviour; Product & Brand Management; STP
Industrial buying behaviour
Decision making process
DMUs and its composition Factors influencing purchasing: economic environment; organizational factors; inter-personal characteristics; and individual buyer characteristics
Key differences between Consumer and Organizational Buying

Product and Brand Management

(a) Products: core, tangible and augmented products
Product mixed decisions: product line decisions; strategic filling, line modernization decisions
New product development process: idea generation, screening, concept development and testing, marketing strategy, product development, market testing, test marketing, and commercialization.
product life cycle: Introduction growth, marketing decline,

(b) **Brand Management**

Brand equity; branding decisions; brand extensions; brand portfolios
Segmentation, Targeting and Positioning (STP):

Segmentation variables for consumer markets:

Geographic, demographic, psychographic, behavioural
Segmentation variable for industrial markets: customer location, type of industry, size of the firm, purchase criteria, etc.

Targeting: undifferentiated marketing; single segment and multi segment structures; guidelines for selecting target markets

Positioning:
Identifying frame of reference; points of parity and points of difference; choosing category membership; product and brand differentiation for identifying of position

Pricing Decisions, Channel Decisions; Promotion Mix; Strategies; Integrated Marketing; Communications; Marketing Services; & Ethics in Marketing

Pricing Decisions

Pricing objectives; factors influencing pricing decisions
Ttypes of pricing: Mark up/cost plus pricing; perceived value pricing; value pricing; geographic pricing; etc.
Responding to competitors
Action through price and non price variables.
Impact of the products: stage in the PLC on pricing decisions.

Channel Decisions:

Types of channels: Intensity of distribution, channel conflict and channel management.
Retailing importance, and types of retail formats, Indian Retail Scenario
Promotion mix
Advertising: Importance and scope
Sales promotion: objectives; consumer promotions
PR and publicity
Personal Selling: recruitment, selection, training, motivation and evaluation of sales reps.

Integrated Marketing Communication:

Definition of target audience; determining communication objectives; designing communication and selection of channels

Marketing Services:

Characteristics of services; ways of improving services, delivery, managing service maturity.

Ethics in Marketing

Advertising Standards Council of India code of ethics in advertising; promotion to children; unfair practices in marketing

Reference Books

1. **Kotler, Keller, Koshy, and Jha, "**Marketing Management: A South Asian Perspective" 12e, Pearson/Prentice Hall
2. **Etzel, Stanton, Walker & Pandit, "**Marketing Concepts & Cases", 13e, Tata McGraw Hill
3. **Russel S. Winer, "**Marketing Management", 3e, Pearson Education
4. **Kurtz Boone**, "Principles of Marketing", Thomson
5. **S H H Kazmi**, "Marketing management", Excel
6. **Kerin Hartley**, "Marketing Management" ,Tata McGraw Hill
7. **Ramaswamy &Namakumari**, "Marketing Management", Macmillan India
8. **Roger Kerin/Robert A**, "Peterson Strategic Marketing Problems", Prentice Hall
9. **Roger A. Kerin, Steven W. Harl**ey, "Marketing" ,Tata McGraw Hill
10. "Marketing Planning and Strategy", Thomson
11. "Kellogg on Integrated market",Wiley India
12. **Philip Kotler**, "Marketing Management",Pearson Education
13. **William Stanton**, "Fundamentals of Marketing", Tata McGraw Hill
14. **Rustom Davar**, "Modern Marketing Management" ,Universal Books
15. **Kotler, Keller, Kozhy, Jha**, "Marketing Management- South Asian Perspective", Pearson
Education
16. **V.S. Ramaswami and S Namakumari**, "Marketing: Planning, Implementation and Control",

Macmillan India
17. **Theodore Levitt** , “Marketing Management”
18. **Rajan Saxena,** “Marketing Management”, Tata McGraw Hill

Research Methods in Business Sem III

Fundamentals of Research: - Meaning, Objectives and Significance.
Types of Research: - Basic research, Applied, Descriptive, historical, Exploratory, Experimental, Ex-post-factor and Case study approach.

Approaches to Research: -
a. Quantitative approach: -
i Inferential
ii Experimental
iii Simulation
b. Qualitative approach: -
i Ethnographic
ii Phenomenological
iii Field Research
Importance of research in management decisions: -
Various areas of research in business:
a) Marketing Research
b) Government policies and economic systems
c) Social relationship
d) Planning and operational problems of research in business

2 **Research process: -**
Selecting the topic, defining the research problem, objectives of research, literature survey, sample design, data collection, execution of project, analysis of data and hypothesis testing, generalization and interpretation and preparation of research report.
Features of good research
Research design – Meaning, need, features of good research design, types of research design –
a) For exploratory research b) For descriptive research
b) For causal research studies

3 **Hypothesis: -**

Meaning, importance and types. Formulation of hypothesis and testing of hypothesis.
Chi-square test, Correlation Co-efficient, Regression analysis.

Sampling: -
Meaning , Sample and sampling, essentials of good sample. Sample size, methods of sampling: -
a) Probability sampling – cluster sampling, stratified sampling, multi stage sampling.
b) Non-probability sampling: - Purposive sampling, Quota sampling, Convenience sampling.

4 **Sources and Methods of data collection: -**
Primary and Secondary data.
a) Primary sources: -
i. Observation
ii. Interview
iii. Questionnaire
iv. Interview schedules
b) Secondary sources
Data processing – Tabulation - Data analysis and Interpretation
Report writing – layout of research report

Reference Books

1. **C.R.Kothari**, "Research Methodology - Methods & Techniques" , New Age International Publishers
2. **Krishnaswamy O R, "**Research Methodology, Himalaya Publishing House
3. **Donald R Cooper & Pamela S Schindler**, "Business Research Methods"
4. **Nandagopal /Rajan,** "Research methods in Business", Excel
5. **Uma Sekaram,** "Research Method for Business- A skill building approach"
6. **Donald H McBurney,** "Research Methods", CRC Press
7. **Levin & Reuben**, "Statistics for Management" , Prentice Hall
8. **Dr S Shajahan**, "Research methods for Management", Jaico

Global warming and climate change Sem III

UNIT-I

Role of ozone in environment-ozone layer-ozone depleting gases-Green House Effect

UNIT-II

Temperature profile of the atmosphere- Laps rates-Temperature inversion- effects of inversion on pollution dispersion.

UNIT-III

Causes o f Climate change : Change of Temperature in the environment-melting of ice Pole-sea level rise-role of fossil fuels

UNIT-IV

Mitigation Measures- Cleaner production-alternative fuel measures

UNIT – V

Kyoto Protocol-Intergovernmental Panel on Climate change (IPCC)-

REFERENCES

Annon 1996. Climate change 1995: Adaptation and mitigation of climate change-Scientific Technical Analysis. Cambridge University Press, Cambridge. Annon. 2001.Inter governmental Panel on Climate change (IPCC) Climate change 2001.

Third Assessment Report (Volume I). Cambridge University Press, Cambridge Annon.2005. World Health Organization. Climate and Health. Fact sheet. July. Gosain, A.K. and Rao,S. 2003.

Climate change and India: Vulnerability Assessment and Adaptation. Eds. Shukla,P.R. Universities Press Pvt. Ltd.Hyderabad. pp462

Houghton,J. 2005. Global warming: The Complete Briefing. Cambridge: Cambridge University Press.Cambridge.

Saha,T.K. 2008. Ecology and Environmental Biology. Books and Allied (P) Ltd. Kokata. Pp610.

Lakshmipathy,M., S.R.Ramanan, R.Sathyanathan and J.S.Sudarsahn. 2009. Proceedings of the National Conference on Effect of climate change and sustainable resource management .SRM University, Kattankallathur. pp316.

Rao,M.N, Datar,M.Y. and Reddy,S. 1997. Vermicomposting-A Technological option for solid waste management .Ujjain, India.

Natural Resources and Management Sem III

UNIT-I

Introduction to Natural Resources – Classification of natural resources – List of natural resources – Values of natural resources - Demands on Natural Resources - Population, lifestyle and natural resources - Impact of poor natural resource management.

UNIT-II

Land resources – Land: Definition - Land use pattern in India. Waste Land: Types. Desertification: Definition - Causes and impacts.

UNIT-III

Water resources – Hydrological cycle – Surface water - Ground water:. Dams: Uses and impacts on environment. Marine resources: Biotic and abiotic resources.

UNIT-IV

Living Resources-Agriculture-types of cultivation-high yielding varieties –HYV chemicals fertilizers& their impacts-Microbes-useful& harmful bacteria in soil , water ,Air – fungi beneficial & harmful.

UNIT-V

Forest and Mineral Resources forest produce – food- fodder – fuel wood. Fiber – Timber – Minerals –Metal & non metal resources, non – conventional energy resources

References

1. Bali, S (2000) Land Resource Management in India. Souvenir of International Conference on Land Resource Management for food, employment and environmental security, 9 – 13 November, 2000. Organized by Soil Conservation Society of India. Pp. 29 – 48.

2. Department of Land Resources (2000) Ministry of Rural Development, Government of India, New Delhi.

3. Kovda, V. A. (1977) Arid land Irrigation and soil fertility: Problems of salinity, alkalinity, compaction. In Arid land Irrigation in Developing Countries: Environmentl Problems and Effects. Ed., by E. Barton Worthington. Oxford: Pergamon Press.

4. Agarwal, K.M., Sikdar, P.K., Deb., S.C (2005) A Text Book of Environment, Macmillan India Limited.

Financial Management Sem III

Introduction:

Meaning and Scope of Financial Management

Functions and Objectives of Financial Management

Changing Role of Finance Managers

Working Capital Management

Definition - GWC & NWC (Explain Core Assets & Non Core Assets)

Components of Working Capital

Factors Determining Working capital

Receivables Management

Meaning and Importance

Credit Policy Variables

Case Study on Credit Evaluation

Methods of Credit Evaluation

- Traditional and Numerical Credit Scoring

Monitoring the Debtors – Techniques

- DSO, Ageing Schedule, Collection Matrix

Cash Management

Motives Of Holding Cash

Strategies Of Cash Management

Cash Budget: Meaning and objectives

Budgeting of receipts and payments- Trading, non trading and capital

Preparation of monthly budget and finding out closing cash Balance (Excl. Financial Statements to be made From the Working Capital Estimation)

Cost Of Capital & Capital Structures:

Types of capital

Debt

Equity

Retained Earnings

Preference

Cost of Capital for each type of capital

Weighted Cost of Capital

Marginal Cost of Capital (w.r.t. Expansion).

Designing Capital Structure Alternatives

Types of Leverages (Combined , Operating , Financial)

Capital Budgeting:

Introduction, types of capital, sources of capital

Evaluation of capital expenditure proposal from given cash flow, concept of present value

Techniques of appraisal of investment proposal

Payback period method, Average rate of return method

Net present value method

Profitability index method

Business Restructuring

Importance

Financial Implication

Valuation

Types of Business Restructuring

Merger

Amalgamation

De-Merger

Other Restructurings

(Elementary accounting problems – testing fundamental knowledge only)

Long Term & Short Term Sources Of Finance

Traditional & Modern instruments of Finance Including Securitizations.

Reference Books:

1) ***Chandra Prasana, "****Financial Management" , Tata Mc Graw*

2) ***Khan M & Jain, "****Financial Management", Tata Mc Graw*

3) ***James , C, "****Financial Management & Policy", Prentice Hall of India*

4) ***Pandey, I.M,*** *"Financial Management", Tata Mc Graw Hill*

5) ***Horne, J., Walchowicz, J.,*** *"Fundamentals of Financial Management", Prentice Hall of India*

6) ***Bhalla V,*** *"Investment Management", S. Chand*

7) ***Diwan P, "****Financial Management", Pentagon*

8) ***Bhalla V.K,*** *"Financial Management", Amol*

9) ***Kapur S****., "Financial Management", S. K. Publishers*

10) ***Alexander Hamilton, "****Financial Management Handbook", Global Books*

11) ***Helfert, "****Techniques of Financial Management", Jaico Publishing House.*

SEMESTER IV

Environmental Safety, health and Management (B.Sc. Environment Management Sem IV

UNIT-I

Definition- need for good health- factors affecting health. Types of diseases {deficiency, infection, pollution diseases}. Personal hygiene- food (balanced diet). Food habits & cleanliness, food adulterants, avoiding smoking, drugs & alcohols.

UNIT-II

Public health: communicable diseases, mode of transmission (epidemic and endemic diseases). Management of hygiene in public places (railway stations, bus stands and other public places).

UNIT-III

Occupational health and safety. Occupational health and hazards-physical-chemical and biological. Occupational diseases- prevention and control.

UNIT-IV

Industrial safety and management techniques: Industrial safety standards and regulations. Accidents-definitions-prevention and control.

UNIT-V

Safety management system- concepts of safety management systems- EMS ISO 14000 and 14001. OSHA. PUBLIC LIABILITY INSURANCE ACT- MINING ACT.

REFERENCES

1. Scoot, R..M. 1997.Basic concepts of industrial hygiene, Lewis Publisher, New York

2. Diberardins L.J. , 1998.Hand book of occupational safety and health, John Willey, New York

3. Park J.E. and Park, Preventive and social medicine.

4. Schilling R.S.E. 1973.Occupational health practice, Buffer Worth, London,

5. Khan M.A.O., John.P, Bederka.S. , 1974. Survival in toxic environment, Academic Press, New York .

Environmental Pollution and Management (B.Sc. Environment Management) Sem IV

UNIT-I

Water pollution – sources & types of water pollution – physical, chemical & biological – effect of water pollution. Drinking water quality standards waste water treatment – primary, secondary, tertiary-water pollution prevention & control act – 1974.

UNIT-II

Air pollution –structure and composition of atmosphere – classification, sources & effects of air pollution – Acid rain –green house effect – global warming – Ozone depletion.

UNIT-III

Prevention and control of air pollution particulate control – settling chamber, scrubber, bag filter, cyclones electrostatic precipitators. Gaseous emission control methods. Air pollution prevention and control Act 1981.

UNIT-IV

Soil Pollution – soil pollutants – types – sources, effects & Control. Noise Pollution – sources effects & Control.

UNIT-V

Government Agencies & Programs – The Tiwari committee – creation of NCEPC, Department of Environment & Forest – Function of State Pollution Control Board.

References

1. Rao, M. N and H.V.N. Rao (1993) Air Pollution, Tata McGraw – Hill Publishing Company Limited. New Delhi.
2. Kudesia, V.P and Ritu Kudesia (1992) Water Pollution, Pragati Prakashan Publication, Meerut.
3. Sawyer, C. N., P.L McCarty and G.F. Perkin (1994) Chemistry for Environmental Engineers, II Edition. McGraw-Hill.
4. Sharma, B.K and H.Kaur (1994) Soil and Noise Pollution. Goel Publishing House, Meerut.
5. Kumarasawmy, K., A. Alagappa Moses and M. Vasanthy (2004) Environmental Studies (A Text Book for All Under Graduate Students) Bharathidasan University Publications.

Environmental Economics – II Sem IV

Social Choice: Individual Preferences Regarding Environmental Protection; Biocentrism; Anthropocentrism; Sustainability; Pareto Criterion; Potential Pareto Improvement; Social Welfare Functions; Arrows Impoossibility Theorem; Criticism of Utilitariasm

- Efficiency and Markets: Efficiency in the Exchange of Goods and Bads; Efficiency in Production; First Welfare Theorem; Second Welfare Theorem; Consumer and Producer Surplus; Cost Benefit Analysis

- Market Failure: Public Bads and Externalities - Public Goods and Bads; Pricing of Private versus Public Goods and Bads; Lindahl Prices and free riding; Externalities

- Methods to derive the Demand for Environmental Goods: Hedonic Price Method; Property Values; Wage Regressions and Value of Statistical Life; Household Production; Defensive Expenditures; Travel Cost Method; Stated Preferences via Contingent Valuation;
- Use versus Non-use values; Willingness to Pay versus Willingness to Accept

- Regulating Pollution: Command and Control vs.Environmental Taxes vs.Cap and Trade vs.Liability

- Pigouvian Fees: Single Polluter single damage; Single Polluter multiple damages; Multiple Polluter and the Equimarginal Principle; Fees Versus Subsidies; Fees and Imperfect Competition

- Regulation with Unknown Control Costs: Prices versus Quantities (Environmental Taxes versus Cap and Trade); Coase Theorem and Allocation of Property Rights.

Customer relationship management Sem IV

MODULE I

Changing Nature of Marketing and Customer Service – Marketing – An Introduction –The Marketing Orientation – Factors Necessitating a Re-look at Marketing Methods – Changing Social Trends – Lesser Government Controls Rising Income Levels – Threats from New Forms – Character tics of the Empowered Customer – Increased Demand –Easy Access to Information – Emerging Trends in Marketing –Shorter Product Life Cycles.

MODULE II

Emergence of Permission Marketing – Experimental Marketing – Offering Complete Solution – Rewarding Loyal Customers- Disruptive Innovations – The Changing Nature of Customer Service – Challenges In Modern Day Customer Service -Emerging Trends in Services Marketing Mix –Customer Experience –The New Differentiator – Managing Service Better – Emergence of CRM –Economics of Building Customer Relationship – Customer Lifetime Value – Benefits of Customer Loyalty – Benefits of Choosing The Right Customers – Customer Value and Customer Satisfaction:Precursors to CRM – Customer Value.

MODULE III

Enhancing Value of Products and Services – Customer Satisfaction – CRM and Customer Satisfaction – Delighting the Customer – Measuring Relationship at Risk Effects on Customer Loyalty – Role of CRM on Various Stages of the Studies – The Customer Lifecycle – Role of CRM in Pre-purchase Stage – Role of CRM in Purchase Stage – Role of CRM in Usage Stage - Role of CRM In Re-purchase Stage – Role of CRM in Winning Back Lost Customers – CRM – The Basis Concepts – Consideration to Decide the Key Customers – Strategies for Key Customers

MODULE IV

Segmentations Campaign Management – Cross-selling and Up-selling – Multi – Channels – Sales Force Automation – Operational and Analytical CRM – Planning for CRM – Building Customer Centricity – Setting CRM Objectives – Defining Data Requirements – Planning The Requirements Elements in the CRM Plan – Revalant Issues in the CRM Plan - CRM Strategy – Strategic Orientation for CRM - Extending the Concept of Relationship

MODULE V

The Technology Orientation - A Strategic F5rame work for CRM - Planning for Success – Change Management – Selling Change –Training – Role of IT and Tools for CRM – CRM Strategy and Technology – Capturing Data – Steps in Preparing the IT Systems for CRM – Choosing The CRM Tool – Using IT Systems for Better CRM – Isuses for Consideration In CRM Tools Selection – Tools for CRM – e CRM – Basic Concepts of e CRM – Benefits of e CRM.

MODULE VI

Steps in e CRM – Success Factors in e CRM – Establishing Customer Relationship on the Internet – Complete Information for Customers – CRM Implementations – Preparing for CRM Implementation – Dimensions of CRM Implementations – Technology Issues in CRM Implementation – Steps in CRM Implementations – Expected Benefits of CRM Implementations – CRM Implementations –Best Practices - Guarding against CRM Failures – A Clearly defined CRM Stratergy – Creating the Right Culture – Proper use of Knowledge Management – Ensuring that the CRM Implementation is Done Right – CRM In Practice – CRM In Manufacturing –CRM in Insurance – CRM In Airlines – CRM IN Hotels – CRM in Telecom – CRM in SMB Segment

TEXT BOOK:

Kaushik Mukerjee, "Customer Relationship Management", PHI, New Delhi, 2007.

Occupational Health & Safety Sem IV

- Health and safety foundations, Policy, Organizing for health and safety, Promoting a positive Health and Safety Culture;
- Risk assessment, Principles of control, Incident investigation, Recording and Reporting;
- Movement of people and vehicles, Hazards and Control, Manual and Mechanical Handling Hazards and Control;
- Work Equipment Hazards and Control, Electrical hazards and control, Fire Hazards and Control;
- Chemical and Biological Health Hazards and Control;
- Physical and Psychological Health Hazards and Control;
- Construction activities - Hazards and Control;
- Monitoring, Review and Audit; and
- Cases, presentations and exercises.

Management Information Systems Sem IV

1	❖ Basic Information Concepts and Definitions ❖ Need for Information and Information Systems (IS) in an organization ❖ Characteristics of Information and Organisation with respect to organization form, structure , philosophy, hierarchy etc
2	❖ Types of IS – Transaction ❖ Operational Control ❖ Management Control ❖ Decision Support ❖ Executive Information Systems
3	❖ Determining Information Needs for an Organisation/Individual Manager ❖ Overview of use of data flow method, analysis of information for decision processes etc.
4	❖ Strategic use of Information and IS – Use of Information for Customer Bonding ❖ For Knowledge Management ❖ For innovation, ❖ For Managing Business Risks ❖ For Creating a new business models and new business reality.
5	❖ Information Security – ❖ Sensitize students to the need for information security ❖ Concepts such as confidentiality, Integrity and Availability. Types of threats and risk, overview of some of the manual, procedural and automated controls in real life IT environments.
6	❖ Case Studies and Presentations

Reference Text:

1. MIS a Conceptual Framework by Davis and Olson
2. Analysis and Design of Information Systems by James Senn
3. Case Studies : Case on ABC Industrial Gases – Author : Prof Pradeep Pendse
Mrs Fields Cookies – Harvard Case Study
Select Business Cases identified by each Group of Students for work thru the entire subject
2-3 Cases on Requirements Management – Author : Prof Pradeep Pendse
4. O'brien: MIS (TMH)
5. Ashok Arora & Bhatia: Management Information Systems (Excel)
6. Jessup & Valacich: Information Systems Today (Prentice Hall India)
7. L. M. Prasad : Management Information Systems (Sultan Chand)

Project Submission – I

SEMESTER V

Environmental Impact Assessment Sem V

UNIT-I

EIA – Introduction – Concept of EIA- Scope and object of EIA – Organization responsible for EIA – Site selection and area classification- Siting and setting criteria for EIA projects.

UNIT-II

Description of the environmental setting – Inclusion or Exclusion of environmental Items – Some suggested approaches for developing a list of environmental Factors – Informational Sources for Environmental factors.

UNIT-III

Various steps of EIA – Content of EIA – Assessment methodology- Ad-hoc, Overlay, Network, Matrix and checklist . Cost benefit analysis - Case studies, Hydroelectric projects , Mining, Power plant Roads and airports.

UNIT-IV

Environmental Impact Assessment Notification (1994): Procedure for Environmental Clearance, List of the projects requiring Environmental Clearance, Composition of Expert Committee for Impact Assessment, Public hearing Committee, Procedure for public hearing - Project clearance.

UNIT-V

Detailed content of EIS – Use of visual display methods – Statement documentation – general writing suggestion.

Reference books

1. Rau, J.G. and Wooten, D.C (1980) Environmental Impact Analysis Hand Book, Mc Graw Hill, USA.

2. Canter, L. W. (1977) Environmental Impact Assessment. McGraw-Hill, New York.

3. Erickson, P.A. (1977) Environmental Impact Assessment – Principles an Applications McGraw-Hill, New York.

4. Munn, R. E. (1982) Environmental Impact Assessment. McGraw-Hill, New York.

Strategic Management Sem V

Introduction to Strategic Management
Definitions & concepts
(Company / Business / Management levels)
Nature, importance & benefits of Strategic Management Strategic Management models & guidelines for effective Strategic Management
Overview of Strategic Management Process

Strategy Formulation
 Setting objectives (Vision, Mission, goals)
 Analysing internal and external environment (SWOT)
 Strategy making
 Entrepreneurial Model
 Adaptive Model
 Planning Model
Types of strategies
Analysing and choosing the right strategy

Strategy Implementation

Implementation of strategy to functional areas
 Production
 Operations
 Marketing
 Finance
 Human Resource Management
 Others (R & D, Innovation, Quality enhancement etc)

Strategy Evaluation
 Review
 Feedback
 Control
General Characteristics of an effective Evaluation System
Contingency planning and Auditing

Reference Books

1. **Fred. R. David**, “Strategic Management - Concepts and Cases”, Prentice Hall India
2. **Thomas.L.Wheelen, J.David Hunger,Krish Rangarajan**,”Concepts in Strategic Management and Business Policy”, Pearson Education
3. **Andrews**, “Strategic Management”
4. **Guillick**, “Strategic Management - Concepts and Cases”
5. **Philip Sadler**, “Strategic Management”, Kogan Page
6. **Parnell John A**, “Strategic Management:Theory and Practice”, Biztantra
7. **McCain Roger A,** “Game Theory : A Non-Technical Introduction to the Analysis of Strategy”, Thomson Learning
8. **Black J Stewart, Gregersen Hall B**, “Leading Strategic Change: Breaking through the Brain Barrier”, Pearson Education
9. **Forgang William G,** “Strategy Specific Decision Making: A Guide for Executive Competitive
Strategy”, Prentice Hall India
10. **Gupta Vipin,Gollakota, Kamala Srinivasan R**, “Business Policy and Strategic Management: Concepts and Application”, Prentice Hall India
11. **Mellahi Kamel Frynas, Jedrzej G, Finlay Paul**, “Global Strategic Management”, Oxford
12. **Rinkie Wofl J,** “6 Proven Strategies for building High Performance organizations Winning
Management”, Jaico Publicaton House
13. **Namakumari, Ramaswamy**, “Strategic Management”, Macmillan India

Entrepreneurship Management Sem V

Unit – 1

- Concept, meaning and definition of entrepreneur and entrepreneurship.
- Importance and significance of growth of entrepreneurial activity.
- Concept of intrapreneur.
- Characteristics and qualities of entrepreneurs
- Classification and types of entrepreneurs.
- Women entrepreneurs
- Theories of entrepreneurship
- Contribution of Mc Clelland and Joseph Schumpeter

Unit – 2

- Factors influencing entrepreneurial development and motivation.
- Role of culture in entrepreneurial development.
- Entrepreneurial development programme (EDP), **Managing the problems faced by entrepreneurs**
- Development of women entrepreneurs-with reference to SHGs
- Options available to entrepreneurs,-ancillarisation franchising and
- outsourcing. **Cases on takeover, mergers and acquisitions in India and at global level.**
- Social Entrepreneurship-Definition,importance and social responsibilities- NGOs

Unit – 3

Entrepreneurial Project Development

- Idea generation – sources and methods
- Identification and classification of ideas.
- Environmental Scanning and SWOT analysis
- Preparation of project plan –Points to be considered
- Components of an ideal business plan – market plan, financial plan,
- operational plan, and HR plan.
- Project formulation –project report significance and contents
- Project appraisal –Aspects and methods :
- Economic oriented appraisal
- Financial appraisal
- Market oriented appraisal
- Technological feasibility
- Managerial competency

Reference Books

1) ***Dr. Vasant Desai,*** *"Small scale industries and entrepreneurship", Himalayan Publishing House*

2) ***Dr. Vasant Desai,*** *"Management of small scale industries" , Himalayan Publishing House*

3) ***J.C. Saboo,Megha Biyani,*** *"Management of small scale industries", Himalayan Publishing House*

4) ***Dr. Vasant Desai****, "Dynamics of entrepreneurial development and Management" ,Himalayan Publishing House*

5) ***Moharanas and Dash C.R****., "Entrepreneurship development", RBSA Publishing , Jaipure*

6) ***Collins and Lazier W,*** *"Beyond entrepreneurship", Prentice Hall , New Jersey, 1992*

7) ***Hisrich Peters Shephard, "****Entrepreneurship", Tata McGraw Hill*

8) ***S. K. Mohanty,*** *"Fundamentals of entrepreneurship" , Prentice Hall of India*

9) ***David Oates, "A Guide to Entrepreneurship" ,*** *Jaico Publishing House, Mumbai, Edn 2009*

Environmental Legislation Sem V

1. Constitutional Provisions for Environmental Protection: Specific Provisions for Environmental Protection in the Constitution of India, Provisions in the Directive Principles of State Policy.

2. Environmental Acts, Rules and Notifications:
The following environmental Acts/Rules will be discussed in details; the rest of the acts, rules and
notifications will be referred to:
a) Water (Prevention & Control of Pollution) Act and the corresponding Rule
b) Water (Prevention & Control of Pollution) Cess Act and the corresponding Rule
c) Air (Prevention & Control of Pollution) Act and the corresponding Rule
d) Environment (Protection) Act and Rule
e) Hazardous Waste (Management & Handling) Rules
f) Manufacture, Storage and Import of Hazardous Chemicals Rules
g) Public Liability Insurance Act and Rule

Refer to MoEF Website (http://envfor.nic.in) for the latest revisions, amendments etc.

3. Important Judgments and Cases: Discussion on landmark cases: Sriram Chemicals Oleum Leak Case, Bhopal Gas Leak case, Ganga Action Plan case etc. Green Benches.

Reference books

1. R. K. Trivedy – Handbook of Environmental Laws, Guidelines, Compliance & Standards, Vol. 1 & 2 Environ – Media karad, India
2. Mhaskar A. K. Environmental Laws

PROJECT MANAGEMENT Sem V

MODULE I

Project Definition – Project Life Cycle – Project objectives – purpose of Project Management – Project Management Maturity – Project Selection and Choice – Types of Project – Selection Models – Analysis under Uncertainty and Rise – Project Portfolio Process.

MODULE II

Functional Manager vs. Project Manager – Project Responsibilities – Demands on the Project Manager – Project Manger Selection – Culture and the Project impact of Institutional Environments – Need for Multicultural Communications.

MODULE III

Project Organization – Pure Project Organization – Matrix – Mixed Organizational Systems – choosing a Firm – Risk Management – Project Management Office – The Project Team – Human Factors and the Project Team – Sources of Conflict.

MODULE IV

Project Planning and Coordination – Systems Integration – Action Plan – Work Breakdown Structure – Partnering - Chartering – Categories of Conflict – Principles of Negotiation – Top Down and Bottom Up Budgeting – Activity vs. Program Budgeting.

MODULE V

Network Techniques PERT and CPM – Precedence Programming – Resource Loading – Leveling – Goldratts' Critical Chain – Monitoring System Design – Reporting Process – Project Management Information Systems (PMIS).

MODULE VI

Project Control – Purposes, Types – Three Types of Control Processes – Post Control – critical Ratio and Control Charts – Balance in Control System – Project Auditing – Purpose of Evaluation – use of Audit Report Product Audit Life Cycle – Measurement varieties of Project Termination.

TEXTBOOK

Jack.R Meredith and Samuel J.Mantel Jr, "Project Management, A Managerial Approach",

Business Ethics Sem V

Introduction to Business Ethics

- Normative ethics, Prescriptive ethics and Applied ethics
- Ethics, Morality and Legality
- Concept of Right and Duty : Business – Western and Indian
- Perspectives, Definition and Scope Relevance in social changes
- Ethical organism and corporate code of conduct

Business Ethics – Conceptual Background

- Conceptual Approaches to Business Ethics
- Egoism vs. Altruism
- Entrepreneur and Manager – Role and Responsibilities
- Responsibilities towards stakeholders: an overview
- Profit – making; An Objective with an ethical dimension

Indian Perspective of Ethics

- Purusharthas: Dharma, Artha, Kama, Moksha
- Concept of Dharma

Ethics: A Global Perspective:

- Ethics in Global Marketing & Advertising
- Ethical perspective in Employment including in the international labour Organization Standards.
- Ethics and IT : E-commerce, Privacy Codes.
- Environmental Ethics: Indian and Western perspectives
- Ethics and Cross- culture influences
- Ethical issues and functional aspects of business

Reference Books

1) ***William Lillie,*** *"An Introduction to Ethics", Universal Paperbacks*
2) ***S.K. Chakrabroty,*** *"Wisdom leadership : Dialogues and Reflections", Wheeler Publishing*
3) ***Kenneth Blanchard & Norman Vincent Peale, "****The Power of Ethical Management", William Morrow & Co, Inc,*
4) ***R.M. Lala,*** *"In search of Ethical Leadership", Vision Books Pvt. Ltd*
5) Living within – The Yoga Approach to Psychological Heath and Growth (Sri Eurobond Ashram, Pond cherry.)
6) ***Dr. R.R.Khan, "****Management and HRD", Fine Publishing House*
7) ***Stuart Rainer*** *Key Management ideas : Thinking that changed the Management world – Macmillan India Ltd.*
8) ***Susan J. Bethanis, "****Leadership Chronicles of a Corporate Sage : Five Keys to Becoming a more Effective leader", Ed corpus Colossus Learning Pvt. Ltd.*
9) ***R.R. Prasad, S.R.P. Shukla, Ashok Kumar,*** *"Indian Management Emerging Responses", Tata McGraw- Hill Publishing Company Limited*

10) Buried Treasure – Discovering and Implementing the Value of Corporate Social Responsibility – Caleb Wall – Greenleaf Publishing – 2008.
11) ***Jayashree Sadri, Sorab Sadri and Dhun Dastoor, "****The Theory and Pracitce of Managerial Ethics", 2nd Edn, 2006, Jaico Publishing House, Mumbai.*
12) ***Joseph Des Jardins,*** *"An Introduction to Business Ethics", Tata Mc Graw Hill, 2nd Edition,*
2009.

SEMESTER VI

Corporate Social Responsibility (CSR) Sem VI

I. Building Blocks of CSR / Sustainability

1. Overview of
CSR/Sustainability
2. The Triple Bottom-line Approach
3. Philanthropy – Conventional and Strategic
4. Environmental issues
5. Social issues
6. Labour and related issues
7. Ethical and Governance issues
8. Human Rights – UN Charter

II. Standards and Codes

1. ISO – 14001
2. OHSAS – 18001
3. SA – 8000
4. OECD Guidelines for Multinational Companies
5. Global Compact
6. AA – 1000
7. BS / ISO Guideline on CSR Management (ISO-26000)

III. Engaging the stakeholder

1. Global Reporting Initiative Guideline G-3
2. NGO and CSR
3. Programmes for the neighborhood
4. Markets at the BOP
5. Communication
6. Dilemmas
7. Dow Jones Sustainability Index / FTSE4GOOD Index

IV. Cases and Papers

1. What is a Business for? Charles Handy, Harvard Business Review, December 2002
2. The Competitive Advantage of Corporate Philanthropy, Michael E Porter and Mark R Kramer,
Harvard Business Review, pp 6-16, December 2002
3. Green and Competitive: Ending the Stalemate, Michael E Porter and Class van der Linde, Harvard Business Review, pp 120-133, September-October 1995
4. What Matters Most: Corporate Values and Social Responsibility, Jeffrey Hollender, California
management Review, pp 111-119, Volume 46(4), 2004
5. Corruption in International Business, Harvard Business Case 9-701-128, December 2001
6. Corporate Social Responsibility: Whether or How? N. Craig Smith, California Management
Review, pp 52-76, Volume 45(4), Summer 2003

7. The Discipline of building character, Joseph L. Badaracco Jr., Harvard Business Review, pp
115-124, March – April 1998
8.Accounting Fraud at Worldcom, Robert S Kaplan and David Kiron, Harvard Business School
Case study 9-104-071, May 2005, Management Lessons from Enron, B. Bowonder, TMTC, 2006
9. The Parable of the Sadhu, Bowen H. McCoy, Harvard Business Review, May-June 1997
10. Corporate Social Responsibility: the WBCSD, Geneva, 2004

General Reading:

1.Changing Course, Stephan Schmidheiny & BCSD, MIT Press, 1992
2.Harvard Business Review on Business & the Environment, Harvard Business School Press, 2000
3.The fortune at the Bottom of the Pyramid, C.K. Prahalad, Wharton School Publishing, 2005
4.The Skeptical Environmentalist: Measuring the real estate of the World, Bjorn Lomborg, Cambridge University Press, 2001
5.Cradle to Cradle: Remarking the Way We Make things, William KcDonough and Michael Braungart, North Point Press, 2002
6.Natural Capitalism: Creating the next Industrial Revolution, Paul Hawken, Amory Lovins & L.
Hunter Lovins, 1999
7. The Sustainability Wave: Building Boardroom Buy-in (Conscientious Commerce), Bob Willard,
2007.

Solid & Hazardous waste management Sem VI

UNIT I SOLID WASTE:

Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health – Concepts of waste reduction, recycling and reuse.

UNIT II COLLECTION, SEGREGATION AND TRANSPORT OF MUNICIPAL SOLID WASTES:

Handling and segregation of wastes at source. Collection and storage of municipal solid wastes;
analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes.

UNIT III MUNICIPAL SOLID WASTE MANAGEMENT :

Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and
chemical techniques for energy and other resource recovery: composting, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of
municipal solid waste management.

UNIT IV HAZARDOUS WASTES:

Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization categories and control. Sampling and analysis of hazardous wastes – analytical approach for hazardous waste characterization – proximate analysis – survey analysis – directed analysis – analytical methods.

UNIT V HAZARDOUS WASTES MANAGEMENT:

Sources and characteristics: handling, collection, storage and transport, TSDF concept. Hazardous waste treatment technologies - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills - Site selections, design and operation. HW reduction, recycling and
reuse, Regulatory aspects of HWM.

UNIT VI BIOMEDICAL WASTE MANAGEMENT:

Biomedical waste: Definition, sources, classification, collection, segregation Treatment and disposal.

UNIT VII RADIOACTIVE WASTE MANAGEMENT:

Radioactive waste: Definition, Sources, Low level and high level radioactive wastes and their management, Radiation standard by ICRP and AERB

UNIT VIII E-WASTE MANAGEMENT:

Waste characteristics, generation, collection, transport and disposal.

Book Recommended

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Sammuel A. Vigil.
3. Criteria for hazardous waste landfills – CPCB guidelines 2000.
4. Hazardous waste management by Prof. Anjaneyulu.
5. Environmental Sciences by Daniel B. Botkin and Edward A. Keller, Wiley student, 6th edition- 2009.
6. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
7. Management of Solid waste in developing countries by FrankFlintoff , WHO regional publications 1976.

Environment and eco tourism Sem VI

UNIT-I

Agriculture – Contribution to Economic development – food problem – land reforms in India, Bhoodan movement – Green revolution – Panchayat Raj – Community development Projects – Co – Operative movement.

UNIT-II

Rural social structure – caste system, joint family- religion caste, cultural social & psychological barriers to economic development – over coming – resistance to change.

UNIT-III

Concepts of Tourism – Classification – Religious tourism – Cultural tourism – Heritage tourism – Monumental tourism – Adventure tourism – Mars tourism – Sustainable tourism – Consumptive & non consumptive tourism.

UNIT-IV

Principles of Ecotourism – Types of Ecotourism – Concepts of Ecotourism – Objectives of Ecotourism – benefits of Ecotourism – trends affecting ecotourism.

UNIT-V

Impact of Ecotourism – Economic impacts (fiscal impacts, concepts & Methods) – Types and degree of impacts from Ecotourism activities – Socio cultural impacts – Eco tourism related organization – Ecotourism Research disasters & Ecotourism.

References

1. Agarwal, A. N (1980) Indian Agriculture, Vikas publishing House, New Delhi,
2. Weaver, D. B (2001) The Encyclopedia of Ecotourism, CABI, Publishing, U.K.
3. Sinha, P. C (2003) Encyclopedia of Ecotourism, Vol – I, II & III, Anmol publications Pvt. Ltd, New Delhi.
4. Bhatia, A. K (1978) Tourism in India

Disaster Management Sem VI

UNIT 1

Disaster – Introduction –Types of natural calamities, major and minor calamities – impact of calamities.

UNIT II

Natural disaster – cyclone – Tsunami – flood – Landslides – earth quake.

UNIT III

Manmade disaster – Wars – Biological war (introduction of pathogens) – misuse of atomic bombs –major accidents from industries e.g. Bhopal. Lov canal disaster – London Smog.

UNIT IV

Medical Management of disaster – Disaster Impacts and response – Identification of dead – Search rescue –first and relief phase – Vaccination, basic sanitation and personal hygiene.

UNIT V

Environmental Disaster – Assessment, Planning – mitigation program – preparedness – resettlement rehabilitation – role of NGOS, Gos (relief camp), Psychotherapy – simplified yoga and meditation, stress management.

References

1. Tsunami. A text book from Department of Science and Technology, New Delhi, p90.

2. Proceedings “Brainstorming seminar on Disaster Management and Mitigation programmes. Sri Venkateswara University, Tirupati, P 150.

3. Pollution control Legislations. Environmental Laws – Vol. II. Tamilnadu Pollution Control Board.

4. Shailaendra K. Singh, Subash C. Kundan and Shobu Singh (1998). Disaster Management. Mittal Publications. New Delhi.

5. Natural disasters (1980) – A guide for relief workers – JAC Adhyatma Sadhema, Kendra Mehrani, New Delhi.

Environmental Problems, Hazards and Mitigation Sem VI

Unit 1: Natural and Man made Environmental Problems:

Environmental problems associated with urbanization, industrialization, modernization of agriculture

Unit 2: Global and Regional Environmental Issues:

Green House effect – causes and associated hazards, Ozone layer depletion – causes and associated hazards, Acid rain, Deforestation and loss of bio-diversity; Major environmental problems in India

Unit 3: Problems of Urban Environment:

Municipal waste, domestic waste, industrial waste; Biomedical wastes; Road traffic and noise pollution problem, Air pollution problem, Problem of housing, drinking water and sanitation, slum areas

Unit 4: Problems of Rural Environment:

Drinking water, Domestic fuel, Food and Fodder, Sanitation, Health and Hygiene, Land degradation

Unit 5: Environmental problems related to forest and wetlands:

Human intervention, Degradation, encroachment, loss of habitats and biodiversity

Corporate Governance Sem VI

- Corporate Governance: Meaning scope & Reporting
- The Agency Theory : Principal – Agent Relationship
- Role of CEO, Board and Senior Executives
- Right of Investors and Shareholders
- Financial Regulations and their scope in CG
- Corporate governance from Cadbury committee to Narayan Murthy
- committee

Project Submission II

University of Mumbai

No. UG/ 59 of 2021

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Faculty of Science & Technology.

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in **Computer Science** at its meeting held on 13th July, 2020 and subsequently approved by the Board of Deans at its meeting held on 20th July, 2020 **vide** item No. **39** have been accepted by the Academic Council at its meeting held on 23rd July, 2020 **vide** item No. **4.115** and subsequently approved by the Management Council at its online meeting held on 28th August, 2020 **vide** item No. **2** and that in accordance therewith, in exercise of the powers conferred upon the Management Council under Section 74(4) of the Maharashtra Public Universities Act, 2016 (Mah. Act No. VI of 2017) the Ordinance **6605 & 6606** Regulations **9350 & 9350-A** and the syllabus of **B.Sc Data Science (Sem I & II)** has been introduced and the same have been brought into force with effect from the academic year **2020-21**. (The said course might be introduced from the academic year 2021-2022 in the wake of prolonged Covid-19 pandemic situation in the country and subsequent delay in the commencement of the new academic year) accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
21st January, 2021

(Dr. B.N.Gaikwad)
I/c. REGISTRAR

To ,

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Faculty of Humanities. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.115/23/07/2020
M.C/2/28/08/2020

****

No. UG/ 59-A of 2021 MUMBAI-400 032 21st January, 2021

Copy forwarded with Compliments for information to:-

1) The Dean Faculty of Science & Technology,
2) The Chairman, Ad-hoc Board of Studies in Computer Science,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. B.N.Gaikwad)
I/c. REGISTRAR

Copy to :-

1. **The Director of Board of Student Development.,**
2. **The Deputy Registrar (Admissions, Enrolment, Eligibility and Migration Department (AEM)**
3. **The Director of Students Welfare,**
4. **The Executive Secretary to the to the Vice-Chancellor,**
5. **The Pro-Vice-Chancellor**
6. **The Registrar and**
7. **The Assistant Registrar, Administrative sub-centers, Ratnagiri, Thane & Kalyan**
8. **The Deputy Registrar Research Administration & Promotion Department (RAPC) for information.**

1. **The Director of Board of Examinations and Evaluation**
2. **The Finance and Accounts Officers**
3. **Record Section**
4. **Publications Section**
5. **The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM)**
6. **The Deputy Registrar (Accounts Section), Vidyanagari**
7. **The Deputy Registrar, College Affiliation & Development Department (CAD).**
8. **The Professor-cum- Director, Institute of Distance and Open Learning Education,**
9. **The Director University Computer Center (IDOL Building), Vidyanagari,**
10. **The Deputy Registrar (Special Cell),**
11. **The Deputy Registrar, (PRO)**
12. **The Deputy Registrar, Academic Authorities Meetings and Services (AAMS) (1 copy) and**
13. **The Deputy Registrar, Executive Authorities Unit**

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. **The Assistant Registrar Constituent Colleges Unit**
2. **BUCTU**
3. **The Deputy Accountant, Unit V**
4. **The In-charge Director, Centralize Computing Facility**
5. **The Receptionist**
6. **The Telephone Operator**
7. **The Secretary MUASA**
8. **The Deputy Registrar Research Administration & Promotion Department (RAPC)**

for information.

AC_____
Item No:_____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1.	Title of the Course O.6605	**B.Sc. (Data Science)**
2.	Eligibility for Admission O.6606	HSC or equivalent from any stream / 3 years Diploma from MSBTE or equivalent
3.	Passing Marks	40%
4.	Ordinances / Regulations (if, any)	As applicable for all B.Sc. Courses
5.	Number of years / Semesters Duration R.9350	Three years – Six Semesters
6.	Level	~~P.G.~~ / U.G. /~~Diploma / Certificate~~ (Strike out which is not applicable)
7.	Pattern	~~Yearly /~~ Semester, Choice Based (Strike out which is not applicable)
8.	Status	New / ~~Revised~~
9.	To be implemented from Academic year	From the Academic Year **2020 – 2021**

Date: April 17, 2020 **Signature: _____**

Name of the BoS Chairperson ~~/ Dean~~: **Dr. Jagdish Bakal**
(bakaljw@gmail.com)

Academic Council _____
Item No: _____

UNIVERSITY OF MUMBAI

Syllabus for B.Sc. Data Science First Year Semester I and II Programme: B.Sc. Subject: Data Science CHOICE BASED(REVISED) with effect from the academic year 2020 – 2021

B.Sc. Data Science under Computer Science

1. **Necessity of starting the course.**

   Data science can be defined as a blend of mathematics, business acumen, tools, algorithms and machine learning techniques, all of which help us in finding out the hidden insights or patterns from raw data which can be of major use in the formation of big business decisions.

   In data science, one deals with both structured and unstructured data. The algorithms also involve predictive analytics in them. Thus, data science is all about the present and future. That is, finding out the trends based on historical data which can be useful for present decisions and finding patterns which can be modelled and can be used for predictions to see what things may look like in the future.

   Data Science is an amalgamation of Statistics, Tools and Business knowledge. So, it becomes imperative for a Data Scientist to have good knowledge and understanding of these.

   With the amount of data that is being generated and the evolution in the field of Analytics, Data Science has turned out to be a necessity for companies. To make most out of their data, companies from all domains, be it Finance, Marketing, Retail, IT or Bank. All are looking for Data Scientists. This has led to a huge demand for Data Scientists all over the globe. With the kind of salary that a company has to offer and IBM is declaring it as trending job of 21st century, it is a lucrative job for many. This field is such that anyone from any background can make a career as a Data Scientist.

2. **Whether UGC has recommended to start the said course?**
   Yes, UGC in its recommendation and curriculum design mentions about the data science programme.

3. **Whether all the courses have commenced from the academic year 2019-20?**
   The B.Sc. in Data Science course has commenced from the academic year 2020 – 21.

4. **The courses started by University are self-financed, whether adequate number of permanent faculties are available.**
   The field being very new, there are faculties available in various colleges and as the Data Science is amalgamation of various fields, many of the permanent faculties are available for the course.

5. **To give details regarding the duration of the course and is it possible to compress the course?**
   Present Duration: 3 years (Six semesters)
   To give proper justice to the teaching learning, it is essential to have 3-year, 6-semester course. The contents cannot be compressed nor the duration can be reduced. Lot of practical exposure is needed ad hence it cannot be compressed.

6. **Intake capacity of the course and the number of admissions given in the current academic year 2020 – 21**
   The intake capacity per batch in any college is 60. The number of admissions given during the current academic year (2020 – 21) is _____.

7. **Opportunities of Employability / Employment available after undertaking these courses.**
   The course has extensive hands-on practical training and various job roles and recruiters are as follows:

Business Analytics Professional

A business analytics professional has the skills to make use of the information from the data to generate insights about the business. To be a data focused business analytics professional, you must know the technical components related to managing and manipulating data.

Recruiters: Walmart, Conduent, Genpact etc.

Business Intelligence Professional

A Business Intelligence Professional analyse the past trends using Data Visualization tools like Tableau, Power BI etc to develop and implement business strategies. They also monitor all the performance metrics of the company and provide insight to the respective department.

Recruiters: Accenture, ZS Associates, Sun Pharma etc.

Data Scientist

Data Scientists help build complicated data models and simulations in a Big Data environment. Focusing more on math and statistics, these data scientists have a particular interest in reading statistics and building & deploying machine learning models.

Recruiters: HDFC Bank, Amdocs, Oyo etc.

Big Data Analysts

Job responsibilities of a Big Data Analyst include collaborating with data scientists and data architects to ensure streamlined implementation of services and executing big data processes.

Recruiters: Novartis, Allerin Tech, Amazon AWS etc.

HR Analytics Professionals

HR Analytics is the hottest trends in the Industry. HR Analytics professionals are working on how to reduce employee attrition rate, finding out the best recruitment channels and solving appalling problems related to HR Function.

Recruiters: Lenskart, Mearsk, Ericsson etc.

Marketing Analytics Professionals

Due to the abundance of data in all the marketing campaign., Analytics enable the marketing professionals to evaluate the success of their marketing initiatives. This is accomplished by measuring performance.

Recruiters: Microsoft, Deloitte, Reliance etc.

hree Year Bachelor of Science Degree in Data Science

Preamble

Data Science refers to extraction of knowledge from large volumes of data that are structured or unstructured, which is continuation of data mining and predictive analytics. It involves different categories of analytical approaches for modelling various types of business scenarios and arriving at solution and strategies for optimal decision-making in marketing, finance, operations, organizational behaviour and other managerial aspects. This new field of study breaks down into a number of different areas, from constructing big data infrastructure and configuring the various server tools that sit on top of the hardware, to performing the analysis and developing the right transformations to generate useful results.

Data Science is an interdisciplinary field that combines the magic of programming, mathematics and business. Combined with Machine Learning, it helps to identify a future trend which can be used to derive actionable insights for creating future impact. These skills will help for the role of a Data Scientist. As a Data Science aspirant, learner will be emphasising of the knowledge to share from the quantitative analysis to programming concept and extended to business intelligence. Data science can add value to any business which can use the data well.

Data Science consists of 3 parts namely:

Machine Learning: Machine Learning involves algorithms and mathematical models, chiefly employed to make machines learn and prepare them to adapt to everyday advancements.

Big Data: Everyday, we are producing so much of data in the form of clicks, orders, videos, images, comments, articles, RSS Feeds etc. These data is generally unstructured and is often called as Big Data. Big Data tools and techniques mainly help in converting this unstructured data into a structured form.

Business Intelligence: Each business has and produces too much data every day. This data when analysed carefully and then presented in visual reports involving graphs, can bring good decision making to life. This can help the management in taking the best decision after carefully delving into patterns and details the reports bring to life.

What Does a Data Scientist Do?

- Empower the management and controlling officers to make better decisions
- Direct actions based on trends, which in turn help to define new goals
- Identify opportunities
- Making decisions with quantifiable, data-driven evidence
- Test the decisions taken
- Identify and refine the target audiences
- Recruit the right talent for the organisation

Programme Specific Outcomes

- Build a strong foundation of statistics for data science.
- Use all the features and new updates of Python and R for data science.
- Perform scientific and technical computing using the Python SciPy package and its sub-packages Integrate, Optimize, Statistics, IO, and Weave.
- Gain expertise in mathematical computing using the NumPy and Scikit-Learn package
- Gain an in-depth understanding of data structure and data manipulation
- Understand and use linear and non-linear regression models and classification techniques for data analysis
- Obtain a comprehensive knowledge of supervised and unsupervised learning models such as linear regression, logistic regression, clustering, dimensionality reduction, K-NN and pipeline
- Master the concepts recommendation engine, time series modelling, gain practical mastery over principles, algorithms, and applications of Machine Learning
- Learn to analyse data using Tableau and Power BI and become proficient in building interactive dashboards
- Understand deep reinforcement learning techniques applied in Natural Language Processing
- Understand the different components of the Hadoop ecosystem and learn to work with HBase, its architecture and data storage, learning the difference between HBase and RDBMS, and use Hive and Impala for partitioning
- Understand MapReduce and its characteristics and learn how to ingest data using Sqoop and Flume

Courses

SEMESTER 1				
Course Code	**Course Type**	**Course Name**	**Credits**	**Marks**
USDS101	**DSC**	Descriptive Statistics	**2**	**100**
USDS1P1	**DSC**	Descriptive Statistics Practical	**2**	**50**
USDS102	**DSC**	Introduction to Programming	**2**	**100**
USDS1P2	**DSC**	Introduction to Programming Practical	**2**	**50**
USDS103	**DSC**	Web Technology	**2**	**100**
USDS1P3	**DSC**	Web Technology Practical	**2**	**50**
USDS104	**AECC**	Business Communication and Information Ethics	**2**	**100**
USDS1P4	**AECC**	ICT Practical	**2**	**50**
USDS105	**DSC**	Precalculus	**2**	**100**
USDS1P5	**DSC**	Precalculus Tutorials	**2**	**50**
		Total	**20**	**750**

SEMESTER 2				
Course Code	**Course Type**	**Course Name**	**Credits**	**Marks**
USDS201	**DSC**	Probability and Distributions	**2**	**100**
USDS2P1	**DSC**	Probability and Distributions Practical	**2**	**50**
USDS202	**DSC**	Database Management	**2**	**100**
USDS2P2	**DSC**	Database Management Practical	**2**	**50**
USDS203	**DSC**	R Programming	**2**	**100**
USDS2P3	**DSC**	R Programming Practical	**2**	**50**
USDS204	**AECC**	Environmental Science	**2**	**100**
USDS2P4	**AECC**	Project Presentation on Data Science in Environmental Science.	**2**	**50**
USDS205	**DSC**	Calculus	**2**	**100**
USDS2P5	**DSC**	Calculus Tutorials	**2**	**50**
		Total	**20**	**750**

Proposed Courses in Semester 3, 4, 5 and 6 (Subject to change)

SEMESTER 3

Course Code	Course Type	Course Name	Credits	Marks
USDS301	**DSC**	Testing of Hypothesis	**2**	**100**
USDS3P1	**DSC**	SPSS Practical	**2**	**50**
USDS302	**DSC**	Data Structures	**2**	**100**
USDS3P2	**DSC**	Data Structures Practical	**2**	**50**
USDS303	**SEC**	Microeconomics / Principles of Management	**2**	**100**
USDS3P3	**SEC**	Case Studies on Microeconomics	**2**	**50**
USDS304	**DSC**	Data Warehousing	**2**	**100**
USDS3P4	**DSC**	Data Warehousing Practical	**2**	**50**
USDS305	**DSC**	Linear Algebra and Discrete Mathematics	**2**	**100**
USDS3P5	**DSC**	Tutorials on Linear Algebra and Discrete Mathematics	**2**	**50**
		Total	**20**	**750**

SEMESTER 4

Course Code	Course Type	Course Name	Credits	Marks
USDS401	**DSC**	Optimization Techniques	**2**	**100**
USDS4P1	**DSC**	Optimization Techniques Practical	**2**	**50**
USDS402	**DSC**	Big Data	**2**	**100**
USDS4P2	**DSC**	Big Data Practical	**2**	**50**
USDS403	**SEC**	E-Commerce and Business Ethics / Fundamentals of Accounting	**2**	**100**
USDS4P3	**SEC**	MATLAB Practical	**2**	**50**
USDS404	**DSC**	Algorithms in Data Science	**2**	**100**
USDS4P4	**DSC**	Algorithms in Data Science Practical	**2**	**50**
USDS405	**DSC**	Numerical Methods	**2**	**100**
USDS4P5	**DSC**	Numerical Methods Practical	**2**	**50**
		Total	**20**	**750**

SEMESTER 5

Course Code	Course Type	Course Name	Credits	Marks
USDS501	**DSC**	Artificial Intelligence	**2**	**100**
USDS5P1	**DSC**	Artificial Intelligence Practical	**2**	**50**
USDS502	**DSC**	Business Research Methods	**2**	**100**
USDS5P2	**DSC**	Business Research Methods Practical	**2**	**50**
USDS503	**DSC**	Data Mining	**2**	**100**
USDS5P3	**DSC**	Data Mining Practical	**2**	**50**
USDS504	**SEC**	Campus to Corporate	**2**	**100**
USDS5P4	**DSC**	Project Dissertation	**2**	**50**
Elective 1 (Select Any one of the following)				
USDS505a	**DSE**	Reinforcement Learning	**2**	**100**
USDS505b	**DSE**	Marketing and Retail Analytics		
USDS505c	**DSE**	Supply Chain and Logistics Analytics		
USDS505d	**DSE**	Robotic Process Automation		
Compulsory Practical				
USDS5P5	**DSC**	Data Visualisation with Power BI / Tableau	**2**	**50**
		Total	**20**	**750**

SEMESTER 6

Course Code	Course Type	Course Name	Credits	Marks
USDS601	**DSC**	Machine Learning	**2**	**100**
USDS6P1	**DSC**	Machine Learning Practical	**2**	**50**
USDS602	**DSC**	Cloud Computing	**2**	**100**
USDS6P2	**DSC**	Cloud Computing Practical	**2**	**50**
USDS603	**SEC**	Internet of Things	**2**	**100**
USDS6P3	**SEC**	Internet of Things Practical	**2**	**50**
USDS604	**DSC**	Business Forecasting	**2**	**100**
USDS6P4	**DSC**	Business Forecasting Practical	**2**	**50**
Elective 2 (Select Any one of the following)				
USDS605a	**DSE**	Financial Analytics	**2**	**100**
USDS605b	**DSE**	Social Media Analytics		
USDS605c	**DSE**	Knowledge Management		
USDS605d	**DSE**	Data Security and Compliance		
Compulsory (Project Implementation)				
USDS6P5	**DSC**	Project Implementation	**2**	**100**
		Total	**20**	**800**

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Semester I

USDS101: Descriptive Statistics

B. Sc. (Data Science)		Semester – I	
Course Name: Descriptive Statistics		**Course Code: USDS101**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- To understand the use of data for tabulating and analyze statistical information given in descriptive form with attributes.
- To use graphical techniques as well as to compute various measures of central tendency.
- To compute various measures of dispersion, skewness and kurtosis and to calculate range of variables and the deviation of specific data point.
- To compute the correlation coefficient for bivariate data and Calculate the simple linear regression equation for a set of data.
- To Describe and verify mathematical considerations for analyzing time series.

Unit	Details	Lectures
I	**1. Introduction to Statistics and Use in Business:** a) Meaning of Statistics as a Science, Importance of Statistics, b) Scope of Statistics : In the field of Industry, Biological Sciences, Medical Sciences, Economics Sciences, Social, Sciences, Management Sciences, Agriculture, Insurance, Information Technology, Education and Psychology. c) Statistical organizations in India and their functions: CSO, ISI, NSS, IIPS (Devnar, Mumbai), Bureau of Economics and statistics. d) Case Study **2. Types of Data and Data Condensation:** a) Method of sampling: Concept of population and sample. Finite ,Infinite population ,Notion of SRS,SRSWOR and SRSWR b) Types of Characteristics, Different types of scales: nominal, ordinal, interval and ratio scale. Linear and circular scale. c) Types of Data: Primary data, Secondary data, Collection of data and concept of a questionnaire and a schedule, Cross-sectional data, time series data, failure data, industrial data, and directional data. d) Tabulation. e) Dichotomous classification- for two and three attributes, Verification for consistency. f) Association of attributes: Yule's coefficient of association Q. Yule's coefficient of Colligation, g) Notion of a statistical population: Finite population infinite population, homogeneous population and heterogeneous population. Notion of sample, random sample and non-random sample.	**12**

	3. Presentation of Data a) Univariate frequency distribution of discrete and continuous variables. Cumulative frequency distribution and relative frequency distribution. b) Graphical representation of frequency distribution by Histogram, frequency polygon, Cumulative frequency curve. Stem and leaf diagram c) Check sheet, Parato diagram	
II	**4. Measures of central tendencies** a) Concept of central tendency of data. Requirements of good measure b) Locational averages: Median, Mode, and Partition Values: Quartiles, Deciles, and Percentiles, Box Plot, Percentile ranks c) Mathematical averages Arithmetic mean (Simple, weighted mean, combined mean), Geometric mean, Harmonic mean d) Empirical relation between mean, median and mode e) Merits and demerits of using different measures &their applicability f) Partition Values : Quartiles, Deciles and Percentiles, Box Plot, Percentile ranks **5. Measures of Dispersion, Skewness & Kurtosis** a) Concept of dispersion. Requirements of good measure. b) Absolute and Relative measures of dispersion: Range, Quartile Deviation, Mean absolute deviation, Standard deviation. c) Variance and Combined variance, raw moments and central moments and relations between them. Their properties d) Concept of Skewness and Kurtosis: Measures of Skewness: Karl Pearson's, Bowley's and Coefficient of skewness based on moments. Measure of Kurtosis	**12**
III	**6. Mean square deviation**: a) Definition, minimality property of mean square deviation (with proof), b) Variance and standard deviation: Definition, merits and demerits, effect of change of origin and scale, combined variance (derivation for 2 groups), combined standard deviation, generalization for *n* groups. c) Measures of dispersion for comparison: coefficient of range, coefficient of quartile deviation and coefficient of mean deviation, coefficient of variation (C.V.)	**12**
IV	**7. Correlation and regression analysis** a) Scatter Diagram, Product moment correlation coefficient and its properties. Spearman's Rank correlation. (With and without ties) b) Concept of linear regression. Principle of least squares. Fitting a straight line by method of least squares. c) Relation between regression coefficients and correlation coefficient. d) Fitting of curves reducible to linear form by transformation. Concept and use of coefficient of determination (R^2).	**12**

	e) Fitting a quadratic curve by method of least squares. f) Case study	
V	**Time Series** a) Definition of time series .Its component. Models of time series. b) Estimation of trend by: **i)** method of Freehand curve **ii)** method of semi average **iii)** Method of Moving average iv) Method of least squares (linear trend only) c) Estimation of seasonal component by **i)** method of simple average **ii)** Ratio to moving average **iii)** Ratio to trend method d) Case Study	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Statistical Methods, An Introductory Text,	Medhi J.	New Age International Ltd.	Second Edition	
2.	Basic Statistics	Agarwal B.L.	New Age International Ltd.		
3.	Theory and Problems of Statistics,	Spiegel M.R.	Tata McGraw-Hill.		
4.	Fundamentals of Statistics, Volume II	Goon A.M., Gupta M.K., Dasgupta B.	The World Press Private Limited, Calcutta.		
5.	Complete Business statistics	Aczel Sounderpandian	Tata McGraw Hill		
6.	Excel Data Analysis Modeling and simulation	Hector Gurrero	Springer	Second Edition	
7.	Data Analysis and Decision Making	Albright,Wilston,Zappe	Thomson		

Course Outcomes:
After completion of the course, a student should be able to:

- To understand the use and importance of statistical data by tabulating and implementing sampling methods.
- Able to identify association between the variables as well as computing consistent and inconsistent data.
- Able to compute level of measures and apply as well as interpret data into graphs.
- Apply measure of central tendency to minimize the sum of squared deviation.
- Able to understand the basic assumption behind regression analysis and determine the model is significance as well as able to apply various techniques for the modelling.

USDS1P1: Descriptive Statistics Practical

B. Sc (Data Science)		**Semester – I**	
Course Name: Descriptive Statistics Practical		**Course Code: USDS1P1**	
Periods per week (1 Period of 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- To enhance excel based data modeling skills.
- To understand Data Conversion, data categorization, selection of appropriate data category and Collection and to utilize excel based data modeling skills.
- To compute Logical and Mathematical Averages, measures of dispersion, compute skewness, moments and kutosis and to use graph from graphical tool.
- To represent data on the graph, Cumulative frequency, subgroup of data with Histogram and subgroup of data with Histogram as well as with bar chart.
- To analyze data about the frequency of problems /Cause of problem and to use financial function.
- To compute variance, coefficient of variation, standard deviation two subgroups, correlation and co-variance.
- To implement statistical function on series of data and forecasting techniques.

List of Practical: (Can be done in MS-Excel-or any Spreadsheet)	
1.	**Introduction to Excel**
a.	Understanding Data Tools
b.	Understanding Formula Tools, insert functional library using insert function
c.	Add-Ins Analysis Tool packs
2.	**Using Formulae and Charts**
a.	Formula writing, Functions, using Cell reference
b.	Understanding Insert Tool: Chart Tools, Different types of charts and their use
3.	**Data Entry and manipulation**
a.	Tools for data entry and accuracy: Quick Access Toolbar customization, Form tool.
b.	Data Transposition to Fit Excel (as An Array).
c.	Data Conversion with the Logical IF, VLOOKUP, HLOOKUP. Pivot table, Pivot chart.
d.	Data Conversion of Text from Non–Excel Sources, Using Text To Column(From Data tool)
e.	Data Queries with Sort, Filter, and Advanced Filter Exact function data entry comparison
4.	**Data Validation**
a.	Specifying a valid range of values for a cell
b.	Specifying a list of valid values for a cell
c.	Specifying custom validations based on formula for a cell

5.	**Measures of central tendency**
a.	Calculating Mean, Median, Mode, Minimum, Maximum, range with cell reference
b.	Using Summary statistics
c.	Calculate A.M., G.M., H.M.
d.	State the Findings of all above exercise.
6.	**Measures of Dispersion, Skewness & Kurtosis**
a.	Calculate Range, Quartile Deviation, Mean absolute deviation, Standard deviation with cell reference
b.	Using summary statistics Measures of Skewness Coefficient of skewness based on moments. Measure of Kurtosis.
c.	Graphical representation of Skewness.
d.	State the Finding of exercise.
7.	**Graphical Presentation with Excel -1**
a.	Producing a Histogram
b.	Improving the Graph
c.	Producing a Cumulative Frequency Diagram
d.	Producing a Histogram of subgroups of data
8.	**Graphical Presentation with Excel – 2**
a.	Producing a bar chart of subgroups of data
b.	Perato chart
c.	Combined variance (derivation for 2 groups), Combined standard deviation.
d.	Coefficient of variation (C.V.).
9.	**Correlation**
a.	Use of formula for calculating correlation and Co-variance.
b.	Use of error checking (Using Exact( ), IF)
c.	Use of frequently used financial functions (e.g. NPV) with suitable example of correlation.
d.	State the Findings of all above exercise.
10.	**Regression analysis**
a.	Using Summary statistics/Cross sectional Data: Descriptive Statistic
b.	Linear Regression and visual analysis(Chart)
c.	Multiple Regression equation with coefficient standard error and visual chart
d.	State the Findings of all above exercise.

Course Outcomes:
After completion of the course, a student should be able to:

- Use Microsoft Excel for business and data analytics, applying insert function library, make use of "Add-Ins Tool pack" for different statistical and mathematical function, learn to use formula and function with cell reference and able to use different types of chart suitable to the data.
- Do Data Entry and manipulation using data context, to transpose the tabular data, convert data in to tabular format and able to use the excel tools for data categorization.
- Discover Measures of central tendency by using analysis tools and formula and able state the conclusion.

- Find Measures of Dispersion, Skewness & Kurtosis by using formula, calculate statistics measures using add-ins analytical tools, Able to use graph/chart from chart tool and deriving the conclusion of the experiment.
- Display Graphical Presentation with Excel by using graph/Chart, templates to improve presentation of data, represent cumulative frequency, data analysis, understand “cause analysis”, make use of formula and analytical tools to compute combined variance and Standard Deviation and compute coefficient of variation.
- Find Correlation by applying statistical formula and analytical tool, identifying wrong data entries, make use of financial function using insert and deriving conclusion of the experiment.
- Do Regression analysis by predicting using data analysis tools, make use of forecasting techniques, Able to use multiple regression using time series data and deriving conclusion of the experiment.

USDS102: Introduction to Programming

B. Sc (Data Science)		Semester – I	
Course Name: Introduction to Programming		**Course Code: USDS102**	
Periods per week (1 Period is 50 minutes)		**5**	
Credit		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- Learn Programming fundamentals using Python
- Understand the concepts and usage data types, variables and other basic elements
- Learn about using operators and control statements in Python
- Learn about using arrays and strings in Python.
- Learn about using IPython architecture for Python.
- Introduce data Science Tools and plot data using appropriate Python visualization libraries

Unit	Details	Lectures
I	**Introduction to Python Language**: Overview, Features of Python, Execution of a Python Program, Innards of Python, Frozen Binaries, Python Interpreter, Comparison of Python with C and Java, Installing Python, Writing & Executing, IDLE **Data Types, Variables And Other Basic Elements**: Comments, Docstrings, Data types-Numeric, Compound, Boolean, Dictionary, Sets, Mapping, Basic Elements of Python, Variables **Input and Output Operations**: Input Function, Output Statements, Command Line Arguments **Control Statements:** Control Statements- Loop Statement, The else Suite, break Statement, continue Statement, pass Statement, assert Statement, return Statement	**12**
II	**Functions**: Defining & Calling a Function, Returning Results, Returning Multiple Values, Built-in Functions, Parameters and Arguments, Recursive Functions, Anonymous or Lambda Functions **Operators**: Arithmetic operators, Assignment operators, Unary minus operator, Relational operators, Logical operators, Bitwise operators, Membership operators, Identity operators, Precedence of Operators, Associativity of Operators **Arrays**: Creating Arrays, Indexing and Slicing, Basic Array Operations, Arrays Processing, Mathematical Operations on Array, Aliasing Arrays, Slicing and Indexing in NumPy Arrays, Basic Slicing. Advanced Indexing. Dimensions of Arrays, Attributes of an Array	**12**

	Strings: Creating Strings, Functions of Strings, Working with Strings, Length of a String, Indexing & Slicing, Repeating & Concatenation of Strings, Checking Membership, Comparing Strings, Removing Spaces, Finding Substrings, Counting Substrings, Strings are Immutable, Splitting and Joining Strings, Changing Case, Checking Starting and Ending of a String, Sorting & Searching in the Strings, Formatting the Strings, Working with Characters	
III	**Lists and Tuples**: Lists, List Functions and Methods, List Operations, Tuples **Dictionaries**: Creating a Dictionary, Operators in Dictionary, Dictionary Methods, Using for Loop with Dictionaries, Operations on Dictionaries, Ordered Dictionaries **Regular Expressions**: What is a Regular Expression? Sequence Characters in Regular Expressions, Quantifiers in Regular Expressions, Special Characters in Regular Expressions, Using Regular Expression on Files, Retrieving Information from an HTML File **Date and Time in Python:** Date and Time, Date and Time Now, Combining Date and Time, Formatting Dates and Times, Finding Durations using "timedelta", Comparing Two Dates, Sorting Dates, Stopping Execution Temporarily, Knowing the Time taken by a Program, Working with Calendar Module	**12**
IV	**IPython:** Beyond Normal Python, Help and Documentation in IPython, Keyboard Shortcuts in the IPython Shell, IPython Magic Commands, Input and Output History, IPython and Shell Commands, Errors and Debugging, Profiling and Timing Code **Introduction to NumPy**: Understanding Data Types in Python, The Basics of NumPy Arrays, Computation on NumPy Arrays: Universal Functions, Aggregations: Min, Max, and Everything In Between, Computation on Arrays: Broadcasting, Comparisons, Masks, and Boolean Logic, Fancy Indexing, Sorting Arrays, Structured Data: NumPy's Structured Arrays	**12**
V	**Data Manipulation with Pandas**: Introducing Pandas Objects, Data Indexing and Selection, Operating on Data in Pandas, Handling Missing Data, Hierarchical Indexing, Combining Datasets: Concat and Append, Combining Datasets: Merge and Join, Aggregation and Grouping, Pivot Tables, Vectorized String Operations, Working with Time Series. High-Performance Pandas: eval( ) and query( ) **Visualization with Matplotlib**: Simple Line Plots, Simple Scatter Plots, Visualizing Errors, Density and Contour Plots, Histograms, Binnings, and Density, Customizing Plot Legends, Customizing Colorbars, Multiple Subplots, Text and Annotation, Customizing Ticks, Customizing Matplotlib: Configurations and Stylesheets, Three-Dimensional Plotting in Matplotlib, Geographic Data with Basemap, Visualization with Seaborn	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Programming through Python	M. T. Savaliya, R.K Maurya, G.M Magar	Staredu Solutions	1st	2018
2.	Python Data Science Handbook	Jake VanderPlas	O'Reilly Media	1st	2016
3.	Let Us Python	Y. Kanetkar,	BPB	1st	2019
4.	Programming in Python 3	Mark Summerfield	Pearson Education	2nd	2018
5.	Learning Python	Lutz M	O'Reilly-Shroff	5th	2013
6.	Beginning Python	Magnus Lie Hetland	Apress	2nd	2009
7.	Star Python	Star Certification	Star Certification	1st	2018

Course Outcome:

Upon the successful completion of this course, the student will be able to achive:

- Proficiency in using and applying various data types including, string, array list, tuple and dictionary.
- Ability to use regular expressions to perform complex operations in less code.
- Learning to make use of date and time in Python for various applications.
- Proficiency in using IPython architecture for Data Science Applications.
- Knowledge about use of various data science tools

USDS1P2: Introduction to Programming Practical

B. Sc (Data Science)		Semester – I	
Course Name: Introduction to Programming Practical		**Course Code: USDS1P2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- To explore Python Programming elements for developing interactive programs.
- To gain insight about the concept of functions and to explore the data storage of similar types with their features.
- To learn about special operators, Arrays and lists and operation on them in Python.
- To explore Dictionaries, Sets, Text processing and operation on them.
- To learn about date and time module in Python
- To explore popular data science tool, packages for data visualization.

List of Practical:	
1.	**Introduction to Python Language**
a.	Write a Python program to explore various data types including numeric types, Boolean types and compound types.
b.	Write a Python program to perform Input and Output Operations.
c.	Write a Python program to demonstrate looping in python and use of break statement and continue statement
2.	**Functions**
a.	Write a Python program to define and use functions
b.	Write a Python program to demonstrate the use of Built-in Functions.
c.	Write a Python Program to implement Lambda Functions.
3.	**Arrays and String**
a.	Write a Python Program to implement arrays for storing homogeneous data items. Apply indexing and slicing operations to access elements of array.
b.	Write a Python Program to demonstrate operations and properties of string data types.
c.	Write a Python Program implement and demonstrate the use of Membership operators and Identity operators
d.	Write a Python Program to implement Numpy for handling multidimensional arrays.
4.	**List and Tuples**
a.	Write a Python Program to create list, apply various functions to it.
b.	Write a Python Program to demonstrate concept of aliasing and cloning.
c.	Write a Python Program to implement tuples for storing data. Verify the immutability property on tuples.

5.	**Dictionaries and Sets**
a.	Write a Python Program to implement Dictionary and operations on dictionaries
b.	Write a Python Program to create sets and various operations on it.
6.	**Regular Expressions**
a.	Write a Python Program for implementing various methods for searching and replacing operations.
b.	Write a Python Program for Retrieving Information from an HTML File
7.	**Date and Time**
a.	Write a Python Program to compare dates and implement calendar module
8.	**Using IPython**
a.	Using IPython and Jupyter notebook
b.	Debugging errors in IPython.
9.	**Using the NumPy Package**
a.	Programs using NumPy Package and different functions available in it.
10.	**Using the pandas package**
a.	Programs using Pandas Package and different functions available in it.

Course Outcomes:

After completion of the course, a student should be able to:

- Knowledge about input and output functions in python and have ability to use loops and control their execution.
- Ability to develop modular Programs using functions and data types like string, array and list of Python.
- Ability to develop modular Programs using Date and Time of Python.
- Interact with IPython and Jupyter notebook.
- Make use of NumPy Package and different functions available in it.
- Able to write code using Pandas Package and different functions available in it.

USDS103: Web Technology

B. Sc (Data Science)		Semester – I	
Course Name: Web Technology		**Course Code: USDS103**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- Introducing the basic concepts of Internet and web design to learners.
- Providing brief knowledge about HTML5 concepts.
- Giving insight of the Page layout and navigation with HTML5.
- Making students aware about use of Tables, Forms and Media with HTML5.
- Providing knowledge of web page design using CSS.
- Teaching data validation using Java Script.
- Giving knowledge about transmission of data on web page using JSON object.

Unit	Details	Lectures
I	**Internet and the World Wide Web:** What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, **World Wide Web (WWW):** World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol **What Is Web Design?:** Defining Web Design, Web Design Themes, Learning Web Design. **User-Centered Design:** Usability, Who Are Web Users? Common User Characteristics, Memory, Response and Reaction Times, Dealing with Stimulus, Movement Capabilities, The User's World, General Types of Users, Web Conventions, Accessibility, Building a Usable Site **HTML5:** Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors.	**12**
II	**HTML5 Page layout and navigation:** Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions. **HTML5 Tables, Forms and Media:** Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms:	**12**

	creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.	
III	**Introduction to Style Sheets** : Understanding Styles, Constructing Style Rules, Creating Styles for Nested Tags, Creating Classes and IDs for Applying Styles, Applying Styles to Hyperlinks, Creating and Linking to External Style Sheets **Formatting Text by Using Style Sheets:** Specifying a Font Family, Specifying a Font Size and Color, Applying Bold and Italics, Applying Strikethrough and Underlining, Creating Inline Spans , Adjusting Spacing Between Letters **Formatting Paragraphs by Using Style Sheets:** Indenting Paragraphs, Applying a Border to a Paragraph, Specifying a Border Style, Setting Border Padding, Specifying Border Width and Color, Formatting Border Sides Individually, Setting All Border Attributes at Once, Specifying the Horizontal Alignment of a Paragraph, Specifying Vertical Space within a Paragraph **Displaying Graphics:** Selecting a Graphics Format, Preparing Graphics for Web Use, Inserting Graphics, Arranging Elements on the Page, Controlling Image Size and Padding, Hyperlinking from Graphics, Using Thumbnail Graphics, Including Alternate Text for Graphics, Adding Figure Captions	**12**
IV	**Java Script:** Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp **Document and its associated objects:** document, document object methods, Link, Area, Anchor, Image, Layer **Events and Event Handlers** : General Information about Events, Defining Event Handlers, event, onAbort, onBlur, onChange, onClick, onDblClick, onDragDrop, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload	**12**
V	**JSON**: Introduction, JSON Grammar, JSON Values, JSON Tokens, Syntax, JSON vs XML, Data Types, Objects, Arrays, Creating JSON, JSON Object, Parsing JSON, Persisting JSON, Data Interchange, JSON HTML, JSONP	**12**

Books and References:

Sr. No.	**Title**	**Author/s**	**Publisher**	**Edi^{n}**	**Year**
1.	HTML5 Step by Step	Faithe Wempen	Microsoft Press		2011
2.	Web Design The Complete Reference	Thomas Powell	TMH		2009
3.	Head First HTML 5 programming	Eric Freeman	O'Reilly		2013

4.	JavaScript 2.0: The Complete Reference	Thomas Powell and Fritz Schneider	TMH	2nd	2004
5.	Beginning JSON	Ben Smith	Apress	1st	2015

Course Outcomes:

After completion of the course, a student should be able to:

- Understand the meaning of the basic terminologies of web technology and explore, use the HTML5 concepts. Understand the basic requirement of web design.
- Understand and use the Page layout, Navigation, Tables, Forms and Media features of HTML5.
- Understand and use Cascading Style sheet for beatifying the web pages.
- Understand and use the Java Script for validation of user forms in web pages.
- Understand and use the technique of transmitting data between a server and web application using JSON.

USDS1P3: Web Technology Practical

B. Sc (Data Science)		Semester – I	
Course Name: Web Technology Practical		**Course Code: USDS1P3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

Provide the hands on the HTML5, CSS, JavaScript and JSON technologies for designing the attractive webpages with dealing user data validation and transferring the values among the web pages and servers.

- Introducing basics of HTML5 to learners.
- Giving insight of the Page layout and navigation with HTML5.
- Making students aware about use of Tables, Forms and Media with HTML5.
- Providing knowledge of web page design using CSS.
- Teaching data validation using Java Script.
- Giving knowledge about transmission of data on web page using JSON object.

List of Practical:	
1.	**Use of Basic Tags:**
a.	Design a web page using different text formatting tags.
b.	Demonstrate use of Font tag with its attributes and HTML various color options in web page.
c.	Design a web page with links to different pages and allow navigation between web pages.
2.	**Navigation, list and paragraph:**
a.	Design a web page to demonstrate text-based navigation bar.
b.	Demonstrate use of lists and backgrounds in web page.
c.	Demonstrate use of paragraph and its associated tags in web page.
3.	**Lists, images and semantics:**
a.	Demonstrate use of multiple image tag in web page.
b.	Design a web page with Imagemaps.
c.	Design a web page demonstrating use of various semantics tags
4.	**Multimedia and User controls:**
a.	Design a web page with a form that uses all types of user controls.
b.	Design a web page embedding with multimedia features.
c.	Design a 3 page static website with appropriate tags and attributes.
5.	**CSS with list, links and table:**
a.	Create and use different style rules with available types of lists.
b.	Create and use different style rules with hyperlinks.
c.	Create and use different style rules with tables.

6.	**CSS with font, paragraph and types:**
a.	Create and use different style rules with font elements.
b.	Create and use different style rules with Paragraph elements.
c.	Demonstrate the use of inline, internal and external CSS in one web page.
7.	**Java Script: Validating User fields**
a.	Demonstrate the use of Document object methods.
b.	Using java script, demonstrate validating Text Input Fields, Drop-down Lists and Checkboxes.
c.	Using java script, demonstrate validating Radio buttons and Validating Multi-Select Boxes.
8.	**Java Script : Handling the events**
a.	Using java script, demonstrate the use of onAbort, onBlur, onChange, onClick, onDblClick events.
b.	Using java script, demonstrate the use of onDragDrop, onError, onFocus events.
c.	Using java script, demonstrate the use of onKeyDown, onKeyPress, onKeyUp, onLoad, onReset, onResize, onSelect, onSubmit, onUnload events.
d.	Using java script, demonstrate the use of onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove events.
e.	Using java script, demonstrate the use of onKeyDown, onKeyPress, onKeyUp, onLoad, onReset, onResize, onSelect, onSubmit, onUnload events.
f.	Demonstrate complete validation of User Registration form using appropriate fields of html and events of java script.
9.	**JSON Basics**
a.	Creating JSON
b.	Parsing JSON
c.	Persisting JSON
10.	**Working with JSON**
a.	Demonstrate use of JSON objects in array, print array on web page using document object.
b.	Read data from json file and convert it into a JavaScript object and display the data in web page using document object.
c.	Demonstrate messages formatting using JSON.

Course Outcomes:
After completion of the course, a student should be able to:

- Use basic tags such as font, link and text formatting tags.
- Use and apply Navigation, lists, images etc in web pages.
- Use User controls and embed Multimedia in web page.
- Use and apply CSS with list, links, fonts table etc. in web page.
- Use and apply Java Script for Validating User fields on web page.
- Create, parse and persist the JSON object and extract and use its values on web page.
- Use JSON object with arrays and message formatting on web page.

USDS104: Business Communication and Information Ethics

B. Sc (Data Science)		Semester – I	
Course Name: Business Communication and Information Ethics		**Course Code: USDS104**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- To discuss various components of communication, explain how non-verbal communication techniques enhance communication and explain the barriers to communication.
- To discuss various business activities which are essential at workplace. To explain business communication covering the structure and layout of a letter, planning of a letter and use of language.
- To explain the use of agenda and minutes for effective functioning of any organisation.
- To direct the learners' attention to the significance of effective writing and the importance and structure of reports.
- To explain to interpret information ethics (IE) as the branch of the philosophy of information that investigates, in a broad sense, the ethical impact of Information and Communication Technologies (ICTs) on human life and society.

Unit	Details	Lectures
I	**Interpretation of Communication** Basics of communication, Non-verbal communication, Barriers to communication. **Business communication at workplace** Letter components and layout, Planning a letter, Process of letter writing.	**12**
II	**Business communication at workplace** Email communication, Memos and memo reports, Employment communication. Notice, Agenda and minutes of meeting, Brochures.	**12**
III	**Report Writing:** Effective writing, Types of business reports, Structure of reports, Gathering Information.	**12**
IV	**Report Writing:** Organisation of material, writing abstracts and summaries, Writing definitions, Visual aids, User Instruction Manual.	**12**
V	**Information Ethics** Ethics after the information revolution, what is information ethics? The method of abstraction.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Professional Communication	Aruna Koneru	Tata McGraw Hill	--	2008
2.	The Ethics of Information	Luciano Floridi	Oxford University Press	--	2013
3.	Business Communication	A. C.“Buddy” Krizan, Patricia Merrier, Joyce Logan, Karen Williams	Thomson	7e	2008

Course Outcomes:

After completion of the course, a student should be able to:

- Communicate effectively in non-verbal way, draft and write effective business letters.
- Effectively carryout communication activities of business by following email etiquettes, drafting memos
- Write elegant business reports and prepare user instruction manual.
- Apply the information ethics in all walks of life.
- Become a good communicator in life.

USDS1P4: ICT Practical

B. Sc (Data Science)		Semester – I	
Course Name: ICT Practical		**Course Code: USDS1P4**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Objectives:

- To help the learners become competent and confident users of ICT who can make efficient, effective and creative use of basic application software in their everyday activities.
- To encourage the learners to become critical and reflective users of ICT who can evaluate the capabilities and limitations of the technology and of social, technical, political, ethical, organisational and economical principles associated with its use.
- To prepare the learners for the society of tomorrow by making them adaptable users of ICT who have the necessary openness and flexibility of mind to be able to adjust to future changes in the technology.
- To encourage the learners to develop the appropriate social skills that are essential for co-operative and collaborative learning based around ICT.
- To empower ICT disadvantaged learners by ensuring sufficient access for those learners who have little out-of-school opportunities to use the technology

List of Practical:	
1.	**Word Processor**: Using word processor for letters, documentation and reports with proper formatting and advanced features.
2.	**Presentation Software:** Using presentation software for preparing elegant presentations with voice and videos and giving different effects to make it more interesting and catchy.
3.	**Using Google docs and forms**
4.	**Using online collaboration and video conferencing tools**
5.	**Using screen recording and audio tools**
6.	**Using video editing tools**
7.	**Using Google Maps, Google Street view, Bing Maps**
8.	**Using Social Media (Facebook, Instagram, Twitter, Linkedin, youtube, snapchat, reddit, quora, dig, Pintrest, flipboard, Wordpress, Tumblr, Medium) for business and learning**

9.	**Using plagiarism software**
10.	**Using ICT in governance, agriculture and healthcare**

Course Outcomes:

After completion of the course, a student should be able to:

- Effective use the ICT software for different purposes in all walks of life.
- Develop the appropriate personal skills that are essential for independent learning based around ICT
- Develop their potential to their fullest by facilitating the acquisition of knowledge; by helping the learner concentrate on higher order cognitive tasks rather than on lower order routine tasks and by positively affecting the attitude of the learner towards further learning
- Facilitate better communication between the learners thereby promoting greater social understanding and harmony
- Effectively use the ICT in governance, agriculture and healthcare.

USDS105: Precalculus

B. Sc (Data Science)		Semester – I	
Course Name: Precalculus		**Course Code: USDS105**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- To master the number fundamentals, equations and different types of mathematical functions.
- To review and explain the trigonometry and gain expertise trigonometric identities.
- To understand analytical trigonometry and inverse functions.
- To give the detailed knowledge about complex numbers, vectors and matrices.
- To understand the conics, sequences and series and

Unit	Details	Lectures
I	**Fundamentals:** Real Numbers, Exponents and Radicals, Algebraic Expressions, Rational Expressions, Equations, Modeling with Equations, Inequalities, Coordinate Geometry, Graphing Calculators; Solving Equations and Inequalities Graphically, Lines, Making Models Using Variation. **Functions:** What is function? Graphs of Functions, Getting Information from the Graph of a Function, Average Rate of Change of a Function, Transformations of Functions, Combining Functions, One-to-One Functions and Their Inverses. **Polynomial and Rational Functions:** Quadratic Functions and Models, Polynomial Functions and Their Graphs, Dividing Polynomials, Real Zeros of Polynomials, Complex Numbers, Complex Zeros and the Fundamental Theorem of Algebra, Rational Functions.	**12**
II	**Exponential and Logarithmic Functions:** Exponential Functions, The Natural Exponential Function, Logarithmic Functions, Laws of Logarithms, Exponential and Logarithmic Equations, Modelling with Exponential and Logarithmic Functions. **Trigonometric Functions: Unit Circle Approach:** The Unit Circle, Trigonometric Functions of Real Numbers, Trigonometric Graphs, Inverse Trigonometric Functions and Their Graphs, Modelling Harmonic Motion **Trigonometric Functions: Right Triangle Approach:** Angle Measure, Trigonometry of Right Triangles, Trigonometric Functions of Angles, Inverse Trigonometric Functions and Right Triangles, The Law of Sines, The Law of Cosines.	**12**
III	**Analytic Trigonometry:** Trigonometric Identities, Addition and Subtraction Formulas, Double-Angle, Half-Angle, and Product-Sum Formulas, Basic Trigonometric Equations, More Trigonometric Equations	**12**

	Sinusoidal Functions: A special class of functions, Sketching a sinusoidal graph, Functions not in standard sinusoidal form, sinusoidal behaviour. **Inverse Circular Functions:** Solving three equations, inverse Circular functions, applications, solving trigonometric equations	
IV	**Polar Coordinates and Parametric Equations:** Polar Coordinates, Graphs of Polar Equations, Polar Form of Complex Numbers; De Moivre's Theorem, Plane Curves and Parametric Equations **Vectors in Two and Three Dimensions:** Vectors in Two Dimensions, The Dot Product, Three-Dimensional Coordinate Geometry, Vectors in Three Dimensions, The Cross Product, Equations of Lines and Planes **Systems of Equations and Inequalities:** Systems of Linear Equations in Two Variables, Systems of Linear Equations in Several Variables, Matrices and Systems of Linear Equations, The Algebra of Matrices, Inverses of Matrices and Matrix Equations, Determinants and Cramer's Rule, Partial Fractions, Systems of Nonlinear Equations, Systems of Inequalities	**12**
V	**Conic Sections:** Parabolas, Ellipses, Hyperbolas, Shifted Conics, Rotation of Axes, Polar Equations of Conics **Sequences and Series:** Sequences and Summation Notation, Arithmetic Sequences, Geometric Sequences, Mathematics of Finance, Mathematical Induction, The Binomial Theorem **Limits: A Preview of Calculus:** Finding Limits Numerically and Graphically, Finding Limits Algebraically, Tangent Lines and Derivatives, Limits at Infinity; Limits of Sequences, Areas	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Year
1.	Precalculus–Mathematics for Calculus	James Stewart, Lothar Redlin, Saleem Watson	Cengage Learning	2013
2.	Precalculus	David H. Collingwood, K. David Prince, Matthew M. Conroy	Free Software Foundation	2011
3.	Precalculus Demystified	Rhonda Huettenmueller	Tata McGrawHill	2005
4.	Contemporary Precalculus: A Graphing Approach	Thomas W. Hungerford, Douglas J. Shaw	Thomson Higher Education	2009

Course Outcomes:

After completion of the course, a student should be able to:

- Apply the knowledge of numbers, graph and functions in real life.
- Apply trigonometry in modelling real life problems.
- Use analytic trigonometry and inverse circular functions to solve variety of problems.
- Apply complex numbers theory to different domains, use vectors and matrices to solve real life problems.
- Identify different types of conics from equations, understand sequences and series and basics of limits and derivatives.

USDS1P5: Precalculus Tutorials

B. Sc (Data Science)		**Semester – I**	
Course Name: Prrcalculus Tutorials		**Course Code: USDS1P5**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Tutorial Examination**	**2½**	**50**
	Internal	**--**	**--**

***10 Tutorials based on the Precalculus (USDS105) theory should be conducted.**

Semester II

USDS201: Probability and Distributions

B. Sc (Data Science)		Semester – II	
Course Name: Probability and Distributions		**Course Code: USDS201**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- To explore about random variables and implement various distribution functions
- To familiarize with concepts of probability and learn implementation of different types of probabilities.
- Learn and implement the concept of expectation, related theorems and generating functions
- To know the concept and implementation of discrete distributions including Bernoulli, Binomial and power series distributions
- To get acquainted with theory and practical implementation of concepts of continuous distributions

Unit	Details	Lectures
I	**Theory of Probability:** Introduction, history, different terms, mathematical tools, Axiomatic approach to probability, Mathematical notation, multiplication aw and conditional probability, Bayes theorem, Geometric probability.	**12**
II	**Random Variables and Distribution Functions:** Random Variable, distribution function, discrete random variable, continuous random variable, joint probability law, transformation of one-dimensional random variable, transformation of two-dimensional random variable	**12**
III	**Mathematical Expectation and Generating Functions:** Mathematical expectation, Expectation of a Function of a Random Variable, Addition Theorem of Expectation, Multiplication Theorem of Expectation, Expectation of a Linear Combination of Random Variables, Covariance, Variance of a Linear Combination of Random Variables, Moments of Bivariate Probability Distributions, Conditional Expectation and Conditional Variance, Moment Generating Function, Cumulants, Characteristic Function, Chebychev's Inequality, Convergence in- Probability, Weak Law of Large Numbers, Borel Canteli Lemma, Probability Generating Function	**12**
IV	**Theoretical Discrete Distributions:** Introduction, Bernoulli Distribution, Binomial Distribution, Poisson Distribution, Negative Binomial Distribution, Geometric Distribution, Hypergeomeiric Distribution, Multinomial Distribution, Discrete Uniform Distribution, Power Series Distribution	**12**
V	**Theoretical Continuous Distributions:** Rectangular or Uniform Distribution, Normal Distribution, Gamma Distribution, Beta Distribution of First Kind, Beta Distribution of Second Kind, The Exponential Distribution, Laplace Double Exponential Distribution,	**12**

	Weibul Distribution, Cauchy Distribution, Central Limit Theorem, Compound Distributions, Pearson\s Distributions, Variate Transformations, Order Statistics, Truncated Distributions	

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Fundamentals of Mathematical statistics	S. C, Gupta and V. K. Kapoor	S. Chand and Sons	Tenth	2002
2.	Applied Statistics and Probability for Engineers	Douglas C. Montgomery and George C. Runger	Wiley	Sixth	2014
3.	Probability, Statistics, and Stochastic Processes	Peter Olofsson and Mikael Andersson	Wiley	Second	2012

Course Outcomes:

After completion of the course, a student should be able to use spreadsheet/excel:

- Organize, manage and present data
- Analyse statistical data graphically using frequency distributions and cumulative frequency distributions
- Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.
- Translate real-world problems into probability models.
- Derive the probability density function of transformation of random variables.
- Calculate probabilities and derive the marginal and conditional distributions of bivariate random variables.

USDS2P1: Probability and Distributions Practical

B. Sc (Data Science)		**Semester – II**	
Course Name: Probability and Distributions Practical		**Course Code: USDS2P1**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- To provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science
- To practically learn the theory concepts and apply in real time

List of Practical: (Can be done in MS-Excel-or any Spreadsheet)	
1	**Introduction to Probability:**
a	Formulate and apply Bayes' Theorem Calculations for problems like The "Two-Supplier Example". [Hint: Use Prior Probabilities and Conditional Probabilities to compute Joint and Posterior Probabilities.]
b	Design spreadsheet to demonstrate the association Between Two Variables by Computing the Covariance and Correlation Coefficient. [Hint: Use COVAR and CORREL)]
2	**Discover Probability using formulas:**
a	Design and spreadsheet experiment to compute the probability using the geometric distribution formula.
b	Create a spreadsheet application to compute the Conditional Probability. Also **determine the probability that a randomly chosen event.**
3	**Random Variables and Distribution Functions:**
a	Create spreadsheet application to Compute the Expected Value, Variance, and Standard Deviation
b	Create a spreadsheet application to Compute Binomial Probabilities. [Hint Use BINOMDIST]
4	**Probability Distribution and Law:**
a	Create a spreadsheet application to Poisson Probability Distribution. [Hint: Use POISSON]
b	Create a spreadsheet application to implement joint probability law.
5	**Mathematical Expectation and Chebychev's Theorem:**
a	Create a spreadsheet application to compute the expectation of a Function of a Random Variable
b	Create a spreadsheet application to apply Chebychev's Theorem.

6	**Conditional Expectation and Generating Functions:**
a	Create a spreadsheet application to compute Conditional Expectation and Conditional Variance.
b	Create a spreadsheet application to demonstrate the use of Generating Functions
7	**Theoretical Discrete Distributions 1:**
a	Create spreadsheet application to demonstrate Bernoulli Distribution.
b	Create spreadsheet application to use excel function for computing hypergeometric probabilities.
8	**Theoretical Discrete Distributions 2:**
a	Create spreadsheet application to Calculate Binomial Distribution in Excel. [Hint: Use BINOM.DIST]
b	Create suitable spreadsheet application to work with Power Series Distribution.
9	**Theoretical Continuous Distributions 1:**
a	Create spread application for computing probabilities and z values for the standard normal distribution. [Use NORMSDIST and NORMSINV]
b	Create spread application for computing probabilities for the exponential probability distribution. [Hint: Use EXPONDIST]
10	**Theoretical Continuous Distributions 2:**
a	**Create spread application for** demonstrating Weibull Distribution to obtain a model for data sets. [Hint: Use **WEIBULL.DIST**]
b	**Create spread application for** demonstrating Pearson\s Distributions.

Course Outcomes:

After completion of the course, a student should be able to

- Use discrete and continuous probability distributions, including requirements, mean and variance, and making decisions.
- Define binomial outcomes and compute probability of getting X successes in N trials.
- Use the normal probability distribution including standard normal curve calculations of appropriate areas.
- Use different distributions to solve simple practical problems.

USDS202: Database Management

B. Sc (Data Science)		Semester – II	
Course Name: Database Management		**Course Code: USDS202**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives: This course concentrates the concept of the DBMS with respect to principles, design and implementation of DBMS. It aims to specify the functional and data requirements for a typical database application and to understand creation, manipulation and querying of data in databases.

- To understand Organizing, structuring and storing data
- Understand Database as Relational model
- To understand SQL to retrieve data and concept of redundancy
- To specify the functional and data requirements for a typical database application
- To understand creation, manipulation and querying of data in databases

Unit	Details	Lectures
I	**Introduction & DBMS Architecture:** Why Databases? Data versus Information, Introducing the Database, Role and Advantages of the DBMS, Types of Databases, Why Database Design Is Important, Evolution of File System Data Processing, Problems with File System Data Processing, Database Systems **Data Models** – Data Modeling and Data Models, The Importance of Data Models, Data Model Basic Building Blocks, Business Rules, The Evolution of Data Models, Degrees of Data Abstraction **Entity Relationship Model:** Entities, attributes, Relationships, Connectivity and Cardinality, Existence Dependence, Relationship Strength, Weak Entities, Relationship Participation, Relationship Degree, Recursive Relationships, Associative (Composite) Entities, Developing an ER Diagram, Database Design Challenges: Conflicting Goals.	**12**
II	**Advanced Data Modeling:** The Extended Entity Relationship Model, Entity Clustering, Entity Integrity: Selecting Primary Keys, Design Cases: Learning Flexible Database Design **Normalization of Database Tables:** Database Tables and Normalization, The Need for Normalization, The Normalization Process, Improving the Design, Surrogate Key Considerations, Higher-Level Normal Forms, Normalization and Database Design, Denormalization, Data-Modeling Checklist	**12**
III	**Structured Query Language (SQL):** Introduction to SQL, Basic SELECT Queries, SELECT Statement Options, FROM Clause Options, ORDER BY Clause Options, WHERE Clause Options, Aggregate Processing, Subqueries, SQL Functions, Relational Set Operators, Crafting SELECT Queries	**12**

IV	**Advanced SQL:** Data Definition Commands, Creating Table Structures, Altering Table Structures, Data Manipulation Commands, Virtual Tables: Creating a View, Sequences, Procedural SQL, Embedded SQL **Database Design:** The Information System, The Systems Development Life Cycle, The Database Life Cycle, Conceptual Design, DBMS Software Selection, Logical Design, Physical Design, Database Design Strategies, Centralized versus Decentralized Design	**12**
V	**Transaction Management and Concurrency Control:** What Is a Transaction? Concurrency Control with Locking Methods, Concurrency Control with Time Stamping Methods, Concurrency Control with Optimistic Methods, ANSI Levels of Transaction Isolation, Database Recovery Management **Database Performance Tuning and Query Optimization:** Database Performance-Tuning Concepts, Query Processing, Indexes and Query Optimization, Optimizer Choices, SQL Performance Tuning, Query Formulation, DBMS Performance Tuning, Query Optimization Examples **Database Administration and Security:** Data as a Corporate Asset, The Need for a Database and Its Role in an Organization, Introduction of a Database: Special Considerations, The Evolution of Database Administration, The Database Environment's Human Component, Security, Database Administration Tools, Developing a Data Administration Strategy, The DBA's Role in the Cloud, The DBA at Work: Using Oracle for Database Administration	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Fundamentals of Database Systems	Elmasri Ramez and Navathe Shamkant B,	Pearson Education	6th Edition,	2010.
2.	Database System Concepts	Silberschatz, Korth, Sudarshan,	McGraw Hill,	5 Edition,	2006.
3.	Database Management Systems,	Ramakrishnam, Gehrke,	McGraw-Hill,		2007
4.	Murach's MySQL	Joel Murach,	Murach,		2012

Course Outcomes:

After completion of the course, a student should be able to:

- Students should be able to evaluate business information problem and find the requirements of a problem in terms of data.
- Students should be able to draw database design in logical structure and can identify the entities which exist in a system
- Students should be able to construct normalized database and functional dependencies between attributes and relational algebra queries
- Students should be able to design the database schema with the use of appropriate data types for storage of data in database.
- Students should be able to create, manipulate, query and back up the databases with features of SQL.

USDS2P2: Database Management Practical

B. Sc (Data Science)		Semester – II	
Course Name: Database Management Practical		**Course Code: USDS2P2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives: Provides the hands on the SQL language for retrieving the data from the database in different scenarios. The primary focus is to understand relational database concepts and design by using SQL.

- Identify entities and its relationship with relational model structure.
- To understand relational database using SQL and constraints implementation using create table query
- To Understand DML operations and backing of database
- To understand how to retrieve data from database and learn how to retrieve single value after performing calculations on group of values
- To understand built-in functions to perform operations on data
- To understand how to fetch data from two or more tables, which is joined to appear as single set of data
- To understand nested and larger query as advanced fetching of data
- To understand concept of virtual table.
- To understand how to control user access in a database.

List of Practical: (Can be done in Oracle / SQL Server / MySQL)	
1.	**For given scenario** Draw E-R diagram and convert entities and relationships to table.
2.	**Write SQL query for given problem statement:**
a.	Viewing all databases
b.	Creating a Database
c.	Viewing all Tables in a Database
3.	**Perform the following Operations:**
a.	Creating Tables (With and Without Constraints)
b.	Inserting/Updating/Deleting Records in a Table
c.	Saving (Commit) and Undoing (rollback)
4.	**Perform the following Operations:**
a.	Altering a Table
b.	Dropping/Truncating/Renaming Tables
c.	Backing up / Restoring a Database
5.	**Perform following:**
a.	Simple Queries with Where Operators
b.	Where with Keywords and Logical Operators

c.	Simple Queries with Aggregate functions
d.	Queries with Aggregate functions (group by and having clause)
6.	**Perform Queries involving:**
a.	Date Functions
b.	String Functions
c.	Math Functions
7.	**Retrieving Data from Multiple Table:**
a.	Joining Tables (InnerJoins, Outer-Joins)
b.	Aliases for Table Names
8.	**Subqueries:**
a.	With IN clause
b.	With EXISTS clause
c.	Handling NULL
9.	**Views:**
a.	Creating Views
b.	Dropping Views
c.	Selecting from view
10.	**DCL statements:**
a.	Granting and revoking permissions

Course Outcomes:
After completion of the course, a student should be able to:

- Students able to draw relationship diagram.
- Students able to perform various operations such as insert, update delete and retrieve data from database using SQL queries.
- Students able to perform alteration in tables and can restore and take backup of the database.
- Students able to perform operations using simple SQL Queries to fetch data and learns various aggregate functions to get single value.
- Students able to perform SQL Queries using JOIN keyword for joining two or more tables.
- Students able to perform nested queries using in, exists operators.
- Students able to create new table by joining one or more tables and learn how to hide attribute from end user.
- Students able to restrict the user from accessing data in database.

USDS203: R Programming

B. Sc (Data Science)		Semester – II	
Course Name: R Programming		**Course Code: USDS203**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- Master the use of the R interactive environment and expanding by installing R packages
- Read Structured Data into R from various sources
- Understand the different data types and data structures in R
- Manipulate strings, dates in R
- Understand basic regular expressions in R
- Understand base R graphics
- Focus on GGplot2 graphics for R and be familiar with trellis (lattice) graphics.

Unit	Details	Lectures
I	**Getting started with R:** R Software: Obtaining R and RStudio, First R Encounter, Getting started: R as a big calculator, Assignment, Basic operators, Help with functions and features, Quiz, A few important points on R Working with R **R Interfaces - Using R and RStudio**: R Software, Obtaining R and RStudio, The default R interface, RStudio Interface, Example Datasets in R, R Packages, Installing new R libraries, Customizing R Start-up **Objects in R:** Using ls and rm to managing R Objects, Types of R objects, Attributes of R Objects, Creating and accessing objects, Modifying elements, Quick recap, Exercise **Reading and writing data to and from R:** Importing and reading text files data into RStudio, Importing data using R command read.table(), Exercise, Importing text files Using scan(), Parsing each line – Readlines, Writing Data table from R, Exercise, Importaing Data from other Software, Reading data from Excel into R, Import/Export from other statistical software, From a Database Connection, Sampling and Creating simulated data, Exercise	**12**
II	**Introduction to programming and writing Functions in R**: Why do we want to write functions?, Conditional statements (if, ifelse, switch), Repetitive execution: For and While loops, The Apply Functions, Exercise, Functions for parsing text, Programming in R: More advanced, Viewing Code of functions from R packages, Exercise-Parsing Real Data - World Population Data from Wikipedia, Writing functions: more technical discussion -Scoping, Options for Running memory or CPU intensive jobs in R, Efficient R coding **Introduction to graphics in R:** The R function plot(), Exercise, Customize plot with low-level plotting commands, Default parameters – par, Interacting with graphics, Saving plots, Useful Graphics Resources	**12**

III	**Advanced Graphics:** Advanced plotting using Trellis; ggplots2, Lattice, Examples that Present Panels of Scatterplots using xyplot(), Simple use of xyplot **Importing Data- readr:** Functions for Reading Data, File Headers, Column Types, String-based Column Type Specification, Function-based Column Type Specification Parsing Time and Dates, Space-separated Columns, Functions for Writing Data **Representing Tables – tibble:** Creating Tibbles, Indexing Tibbles	**12**
IV	**Reformatting Tables – tidyr:** Tidy Data, Gather and Spread, Complex Column Encodings, Expanding, Crossing, and Completing, Missing Values, Nesting Data **Pipelines – magrittr** : The Problem with Pipelines, Pipeline Notation, Pipelines and Function Arguments, Function Composition, Other Pipe Operations **Working with Strings – stringr:** Counting String Patterns, Splitting Strings, Capitalizing Strings, Wrapping, Padding, and Trimming, Detecting Substrings, Extracting Substrings, Transforming Strings **Working with Factors – forcats**: Creating Factors, Concatenation, Projection, Adding Levels, Reorder Levels	**12**
V	**Manipulating Data Frames – dplyr**: Selecting Columns, Filter, Sorting, Modifying Data Frames, Grouping and Summarizing, Joining Tables, Income in Fictional Countries **Working with Dates – lubridate**: Time Points, Time Zones, Time Intervals	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edi^{n}	Year
1.	Introduction to Programming and Statistical Modelling in R	Aedin Culhane	HARVARD SCHOOL	1st	2013
2.	R Data Science Quick Reference	Thomas Mailund	Apress	1st	2019
3.	THE BOOK OF R	Tilman M. Davies	No starch press	1st	2016
4.	Practical Data Science with R	NINA ZUMEL JOHN MOUNT	MANNING		2014
5.	Beginning Data Science in R	Thomas Mailund	Apress		2017

Course Outcomes:
After completion of the course, a student should be able to:

- To use R Studio and explore the features for R programming.
- To use R functions and graphics with in R programming for solving problems.
- To work with advanced graphics of R, import and use the data and represent the data into tables.
- To apply formatting on table, use Pipelines in application and use strings, factors in R programme.
- To manipulating Data Frames and make use of Dates in R application.

USDS2P3: R Programming Practical

B. Sc (Data Science)		Semester – II	
Course Name: R Programming Practical		**Course Code: USDS2P3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- To learn implementing expressions in R
- To learn and implement control flow using loops
- To explore and use basic data structures in R

List of Practical:	
1.	**Introduction to R Programming Elements**
a.	Write an R Program to implement expressions, assignment and decision making
b.	Write an R Program to design and implement loops.
c.	Write a R program to demonstrate the use of essential data structures in R [Hint: Vectors, Matrix, Arrays]
2.	**Using List, Data Frames and Functions in R**
a.	Write an R program to manage data and exhibit operations on it using List data structure
b.	Write an R program to manage data and exhibit operations on it using Data Frames
c.	Write an R program to demonstrate the use of : i. user-defined functions ii. built-in numeric function, character functions etc.
3.	**Implementing Strings in R**
a.	Write an R program to store and access string in R objects(vectors, matrix, arrays, data frames, and lists)
b.	Write an R program to demonstrate use of various string manipulation functions. [Hint: paste(), print(), noquote(),format(), cat(), toString(), sprint()]
4.	**Performing Statistics with R-I**
a.	Write an R program to apply built-in statistical functions. [Hint: mean, median, standard deviation and others]
b.	Write an R program to demonstrate Linear and Multiple Regression analysis.
5.	**Performing Statistics with R-II**
a.	Write an R program to implement i. Normal Distribution. [Hint: dnorm(), pnorm(), qnorm(), rnorm()] ii. Binomial Distribution: [Hint: dbinom(), pbinom(),qbinom(),rbinom()]
b.	Write an R program to perform time-series analysis for the given data.
6.	**Data Visualization and Analysis**
a.	Write an R program to learn about Tabulation and related concepts [Hint: Contingency Tables, Selection of Parts, Conversion, Complex Tables, Cross Tabulation]

b.	Write an R program to demonstrate various ways of performing Graphical analysis.[Hint: Plots, Special Plots, Storing Graphics]
7.	**Object Oriented Programming in R**
a.	Write an R program to demonstrate OOP concepts, the construction and use of S3 and S4 classes
b.	Write an R program to define reference class and operations on them.
8.	**Data Interfaces in R**
a.	Write an R program to demonstrate data interface with CSV files [Hint: creating data for CSV, analyzing, writing CSV files]
b.	Write an R program to work with spreadsheet (Excel) programs. [Hint: installing, loading, verifying, creating data for xlsx file]
c.	Write an R program to manage data using XML files. [Develop data interface for maintaining Employee Information]
d.	Write an R program to demonstrate working with RMySQL Package
9.	**Handling Errors in R**
a.	Write an R program to demonstrate various error messages in R Programming
b.	Write an R program to implement Error Handling in R [Hint: warning(),stop(),try(), tryCatch(), CallingHandlers()]
10.	**Measuring Performance**
a.	Write R program to measure the performance with the help of bult-in function like mocrobechmark().

Course Outcomes:

After completion of the course, a student should be able to:

- Use expression for decision making, get Knowledge of types of loops and loop control statements and able to create, access and manipulate essential data structures.
- Develop skills to manage multiple data through various options available in R.
- Use R object, simple statistical function for data analysis and Differentiate between linear and multiple regression analysis.
- Get the knowledge about various function for Normal and Binomial Distribution and able to implement and analyse data using different time intervals and multiple time series
- To create Tabulation for presentation of data and operation of them and get the knowledge about various ways of plotting data and saving them
- Get the knowledge of implementing class concept in R and able to define reference class, create objects, access and modify fields
- Get the knowledge about developing data interface for storing data in CSV files also knowledge about working with Excel files and able to interface with XML files and able to interface with MySQL, query and manipulate data in it.
- Get the insight into errors related to name errors, control structure error, connection errors etc., and able to identify and handle errors in R code
- To analyze performance of the R code.

USDS204: Environmental Science

B. Sc (Data Science)		Semester – II	
Course Name: Environmental Science		**Course Code: USDS204**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- To learn and sensitize learners to their environment
- To know about natural resources, ecology and ecosystem
- To learn insights of biodiversity, pollution and its impact
- Explore about Social Issues and the Environment
- To learn about Environment Management and sustainable development

Unit	Details	Lectures
I	**Introduction to Environmental Studies** Importance of Environmental Education, Environmental Literacy, Environmental Engineering, Environmentalism, Components of Environment and their Interactions, Man and the Biosphere, Impacts of Development on Environment **Natural Resources** Forest Resources, Dams, Water Resources, Food Resources Energy Resources, Land Resources	**12**
II	**Ecology** Ecosystem, Ecosystem-Anthroposystem Comparison, Biome and Ecosystem, Energy Flow through the Ecosystem, Ecological Succession, Food Chains and Webs, Ecological Pyramids, Biological Magnification or Biomagnification, Human versus Natural Food Chains, Biogeochemical Cycles, The Water Cycle (Hydrologic Cycle), Carbon Cycle, Oxygen Cycle, , Nitrogen Cycle, Forest Ecosystems, , Grassland Ecosystems, Aquatic Ecosystems **Biodiversity** Genetic Diversity, Species Diversity, Ecosystem Diversity, Value of Biodiversity, Value of Genes, Biopiracy, Biogeographical Classification of India, India as a Mega Diverse Nation, Endemic Species of India, Threats to Biodiversity, Hotspots of Biodiversity, Endangered Species, Conservation of Biodiversity, Genetic Engineering and Biodiversity	**12**
III	**Environmental Pollution** Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Solid Waste Management, Hazardous Waste Management, Pollution Prevention, Disaster Management **Human Population and the Environment** Population Growth, Human Rights, Value Education, HIV/AIDS, Environment and Human Health, Family Welfare Programmes, Women	**12**

	and Child Welfare, Role of Information Technology in Environment and Human Health	
IV	**Social Issues and the Environment** From Unsustainable to Sustainable Development, Urban Problems Related to Energy, Water Conservation, Watershed Management, Resettlement and Rehabilitation, Environmental Ethics, Acid Rain, Ozone Layer Depletion, Greenhouse Effect, Global Warming and Climate Change, Pollution Control Boards and Control Pollution Acts in India, Nuclear Hazards and Accidents, Environmental Impact Assessment, Risk Management, Precautionary Principle, Polluter-Pays Principle, The Beneficiary-Pays Principle, Role of Non-Government Organizations, ISO 14000 Series of Environmental Management Standards, Economy and Environment	**12**
V	**Environmental Management** Environmental Impact Assessment, Methodology, Waste as a Resource,Environmental Laws, Requirements of a Contract, Environmental Legislations, Powers and Functions of Pollution Control Boards, Case Studies, Environmental Management Plan, Environmental Audit, Policies for Quality Improvement, Problems, Policy **Sustainable Development** Ethics, Laws of Nature, Progress, Environmental Stress, Sustainability, Self-purification and Regeneration, Action Plan, Computerization and Information Technology	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Environmental Studies	Benny Joseph	McGrawHill	3rd	2017
2.	Principles of Environmental Science and Engineering	P. Venugopala Rao	PHI Learning	6th	2014
3.	Introduction to Environmental Engineering	Gilbert M Master	Pearson	3rd	2015
4.	Environmental Ethics: A Very Short Introduction	Robin Attfield	Oxford	1st	2019
5.	Fundamental Concept in Environmental Studies	D.D. Mishra	S. Chand	Revised Edition	2010

Course Outcomes:

After completion of the course, a student should be able to:

- Ability to recognise explain important of environment and its resources
- Knowledge about insights of ecology and biodiversity
- Recognise the cause and effects of environmental pollution and other social issues
- Knowledge about population and its impact on environment
- Insight into environment management and sustainable development.

USDS2P4: Case Studies on Environment

B. Sc (Data Science)		Semester – II	
Course Name: Case Studies on Environment		Course Code: USDS2P4	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Tutorial Examination	2½	50
	Internal	--	--

*** 10 Case studies related to Environmental Science (USDS204) should be conducted.**

USDS205: Calculus

B. Sc (Data Science)		Semester – II	
Course Name: Calculus		**Course Code: USDS205**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Course Objectives:

- To give the insight of calculus starting with continuity and derivatives.
- To gain proficiency in integration.
- To apply derivatives and integration to various domains.
- To use polar coordinates for different conics and understand multiple integrals.
- To understand partial differentiation and differential equations.

Unit	Details	Lectures
I	**Continuity and Derivatives:** Limits at Infinity; Horizontal Asymptotes, Derivatives and Rates of Change, The Derivative as a Function. **Differentiation rules:** Derivatives of Polynomials and Exponential Functions, The Product and Quotient Rules, The Chain Rule, Implicit Differentiation, Derivatives of Logarithmic Functions, Rates of Change in the Natural and Social Sciences, Exponential Growth and Decay, Related Rates, Linear Approximations and Differentials, Hyperbolic Functions.	**12**
II	**Integrals:** Areas and distances, The Definite Integral, The Fundamental Theorem of Calculus, Indefinite Integrals and the Net Change Theorem, The Substitution Rule, Integration by Parts, Trigonometric Integrals, Trigonometric Substitution, Integration of Rational Functions by Partial Fractions, Strategy for Integration, Integration Using Tables and Computer Algebra Systems, Approximate Integration, Improper Integrals.	**12**
III	**Applications of differentiation:** Maximum and Minimum Values, The Mean Value Theorem, Derivatives and Shape of a Graph, Indeterminate Forms and L'Hospital's Rule, Curve Sketching, Graphing with Calculus *and* Calculators, Optimization Problems, Newton's Method. **Applications of Integration:** Areas between Curves, Volumes, Volumes by Cylindrical Shells, Work, Average Value of a Function, Arc Length, Area of a Surface of Revolution, Applications to Physics and Engineering, Applications to Economics and Biology, Probability.	**12**
IV	**Parametric Equations and Polar Coordinates:** Curves Defined by Parametric Equations, Calculus with Parametric Curves, Polar Coordinates, Areas and Lengths in Polar Coordinates, Conic Sections, Conic Sections in Polar Coordinates. **Multiple Integrals:** Double Integrals over Rectangles, Iterated Integrals, Double Integrals over General Regions, Double Integrals in Polar Coordinates, Applications of Double Integrals, Triple Integrals,	**12**

	Triple Integrals in Cylindrical Coordinates, Triple Integrals in Spherical Coordinates, Change of Variables in Multiple Integrals	
V	**Partial Derivatives:** Functions of Several Variables, Limits and Continuity, Partial Derivatives, Tangent Planes and Linear Approximations, The Chain Rule, Maximum and Minimum Values, Lagrange Multipliers. **Differential Equations:** Modelling with Differential Equations, Direction Fields and Euler's Method, Separable Equations, Models for Population Growth, Linear Equations, Predator-Prey Systems.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edi^{n}	Year
1.	Calculus–Early Transcendentals	James Stewart	Thomson	6th	2008
2.	Calculus and Analytical Geometry	George B. Thomas Jr., Ross L. Finney Maurice D. Weir	Addision Wesley Publishing Company	--	1998
3.	Schaum's 3000 Solved Problems in Calculus	Elliot Mendelson	Tata McGraw Hill	--	1988
4.	The Advanced Calculus Problem Solver	Staff of Research & Education Association	Research & Education Association	---	2007
5.	Calculus Made easy	Silvanus P. Thompson, Martin Gardner	PALGRAVE		1998

Course Outcomes:

After completion of the course, a student should be able to:

- Quickly and easily find the derivative of a function.
- Perform integration of functions with ease.
- Apply the knowledge of derivatives and integration to different domains and obtain the results.
- Apply the knowledge of multiple integrals and polar coordinates to solve real life problems with ease.
- Use partial derivatives and differential equations to solve variety of problems.

USDS2P5: Calculus Tutorials

B. Sc (Data Science)		**Semester – II**	
Course Name: Calculus Tutorials		**Course Code: USDS2P5**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Tutorial Examination**	**2½**	**50**
	Internal	**--**	**--**

*** 10 tutorials based on Calculus (USDS205) should be conducted.**

Evaluation Scheme

1. Internal Evaluation (25 Marks).

i. Test: 1 Class test of 20 marks. (Can be taken online)

Q	Attempt *any four* of the following:	20
a.		
b.		
c.		
d.		
e.		
f.		

ii. 5 marks: Active participation in the class, overall conduct, attendance.

2. External Examination: (75 marks)

	All questions are compulsory	
Q1	(Based on Unit 1) Attempt *any three* of the following:	15
a.		
b.		
c.		
d.		
e.		
f.		
Q2	(Based on Unit 2) Attempt *any three* of the following:	15
Q3	(Based on Unit 3) Attempt *any three* of the following:	15
Q4	(Based on Unit 4) Attempt *any three* of the following:	15
Q5	(Based on Unit 5) Attempt *any three* of the following:	15

3. Practical / Tutorial Exam: 50 marks

A Certified copy journal is essential to appear for the practical examination.

1.	Practical Question 1	20
2.	Practical Question 2	20
3.	Journal	5
4.	Viva Voce	5

OR

1.	Practical Question	40
2.	Journal	5
3.	Viva Voce	5

For Tutorial Exam, a paper of 50 marks to be solved.

AC : _10 May, 2019___ Item No. 4.20

UNIVERSITY OF MUMBAI

Syllabus for Approval

Date : April 26, 2019. **Signature :**

Sr. No.	Heading	Particulars
1	Title of the Course	BA in Multimedia and Mass Communication (BAMMC)
2	Eligibility for Admission	12th pass.
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	--
5	No. of Years / Semesters	03 years & 06 semesters
6	Level	P.G. / √**U.G.**/ Diploma / Certificate **(Strike out which is not applicable)**
7	Pattern	Yearly / Semester √ **CBCS (Strike out which is not applicable)**
8	Status	New / Revised √ **CBCS (Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year __2019-20 **in Progressive manner**.

Name of BOS Chairperson√ / Dean : __Dr. Sunder Rajdeep___

CHOICE BASED CREDIT SYSTEM

BA in Multimedia and Mass Communication (BAMMC) (Choice based) Semester - I & II revised Syllabus to be sanctioned & implemented from 2019-20.

PROGRAM OUTCOME

1. The program considers media industries and their relationship to culture and society, and the understanding of how communication works. The program emphasizes the development of critical thinking, professional writing skills and effective oral communication.
2. The Communication and Media Studies major prepares students for a wide variety of careers in business and industry, advertising, public relations and journalism, or advanced study

3. This program will equip the learners with professional skills essential for making career in Entertainment industry, Cinema, Television, OTT Platforms, social media platforms etc.

4. Students would demonstrate the ability to apply rhetorical principles in a variety of creative, cinematic, organizational, professional and journalistic venues.

5. Knowledge, skills, and values that prepare them for future careers in our interconnected society, whether in mass media or advanced study

6. Learners would develop a global awareness of political, social and corporate issues influenced by communication sensitivity and skills.

7. Learners will understand mass media as a system of interrelated forces, including historical foundations, technological advances, economic dynamics, regulatory constraints, and ethical concerns.

8. This programme will also give them an improved sense of self-confidence and self-efficacy and an awareness of their responsibilities as professionals in their field

9. Learners will be able to create and design emerging media products, including blogs, digital audio, digital video, social media, digital photography, and multimedia.

10. They will be better equipped to grasp the complex relationship between communication/media theories and a diverse set of individual, social, and professional practices.

11. Learners will understand the underlying philosophical assumptions of, and be able to apply, communication research methods to address a range of media texts and audiences, production and technological practices, and relevant social issues.

12. Learners will comprehend the foundations, process, and practices of writing for and about the media, and demonstrate proficiency in writing across platforms.

13. Learners will be able to conceptualize, design, and produce one or more works in media based on effective principles and practices of media aesthetics for a target audience.

14. Learners will acquire the knowledge and skills required to pursue a career in the specialization of their choice.

Semester I	
Course code	**Course Name**
BAMMEC-101	Effective communication –I
BAMMFC-102	Foundation course –I
BAMMVC-103	Visual communication
BAMMFMC-104	Fundamentals of mass communication
BAMMCA-105	Current Affairs
BAMMHM-106	History of Media

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**I**
COURSE:	**EFFECTIVE COMMUNICATION-I**
COURSE CODE	**BAMMEC-1-101**
PAPER	**1 (LANGUAGE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER I

COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMEC-1-101	EFFECTIVE COMMUNICATION –I

COURSE OUTCOME :

1. To make the students aware of functional and operational use of language in media.
2. To equip or enhance students with structural and analytical reading, writing and thinking skills.

3. To introduce key concepts of communications.

MODULE	TOPICS	DETAILS	LECTURES
1		**Introduction to Communication**	
	1.The concept of communication	Communication, its concepts, process Importance of Communication in Media; Differences between Technical and General Communication; Barriers to Communication; Measures to Overcome the Barriers to Communication.	
	2.Types of Communication	Types of Communication; Verbal Communication-Importance of verbal communication- Advantages of verbal communication- Advantages of written communication; Significance of Non-verbal Communication.	
	3.Oral communication and media	Anchoring, voice modulation, interview, public speaking, skits/ plays, panel discussions, voice over, elocution, debates and group discussion	
	4.Listening Skills	Listening Process; Classification of Listening; Purpose of Listening; Common Barriers to the Listening Process; Measures to Improve Listening; Listening as an Important Skill in Work Place.	
2	**Reading -English, Hindi OR Marathi**		
	1.Types of Reading	Types of reading -skimming and scanning Reading -examples Newspaper / Magazine article, TV, feature and documentary, radio bulletins, advertising copy, press release in English, Hindi OR Marathi. Recognizing aspects of language particularly in media. Importance of spelling	
	2.Various aspects of Language	Recognizing various aspects of language particularly related to media , Vocabulary 100 media words	
	3.Grammar & Usage	Grammatical structure – spelling, structure of sentences, Active / Passive voice, tenses, Idioms , Phrases, proper usage of homophones, homonyms etc. (***Kindly provide practice session- Test , Quiz etc)***	
3	**Thinking and Presentation**		

	1.Thinking	Types of thinking (rational ,logical, critical , lateral etc) Errors in thinking ,Partialism, Time scale ,Egocentricity Prejudices ,Adversary Thinking	
	2 .Presentation	Presentation, its importance , Steps in Making a Presentation; Delivering a Presentation	
4	**Translation**		
	1.Introduction To Translation	Concept, importance, need for translation, challenges in translation, problems and importance of Information and Technology in translation. Interpretation: Meaning, Difference between interpretation and translation	
	2.**Interpretation**	Interpretation: Meaning, Difference between interpretation and translation	
	3Role of a translator	Translator and his role in media, Qualities , Importance of Translator, **Challenges faced by translator**	
Total Lectures			**48**

SYLLABUS DESIGNED BY:

1. Gajendra Deoda (Convenor)
2. Smita Jain.
3. Shobha Venktesh.

INTERNAL EVALUATION METHODOLOGY
(any two to be selected- one individual and one group evaluation) 20 Marks

1. Project/Assignment
2. Debate & Group discussion
3. Presentation
4. Skit /Play in any 2 languages
5. Translation of any famous short story or folk or fable

BIBLIOGRAPHY:

1. **Word Power Made Easy by Norman Lewis**
2. **Six Hats of thinking by Edward de Bono Communication Skills by Sanjay Kumar**
3. **Wren and martin for English Grammar**

02

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**I**
COURSE:	**FOUNDATION COURSE –I**
COURSE CODE	BAMMFC-101
PAPER	**2**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**

SEMESTER 1			
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**		
BAMMFC-101	FOUNDATION COURSE –I		
COURSE OUTCOME :			
1. To introduce students to the overview of the Indian Society. 2. To help them understand the constitution of India. 3. To acquaint them with the socio-political problems of India.			
Note:	Revised FC (Foundation Course) Syllabus sanctioned vide Agenda Item No. 4.49 of AC. 6.6.2012 for the B.A. Sem-1 / B.Sc. Sem-1 of University of Mumbai. The BMM BoS has unanimously decided to follow the syllabus for BAMM for Semester -I.		
MODULE	**Topics**	**COURSE OUTCOME:**	**Lectures**
Unit : 1 :	**Overview of Indian Society:**	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference.	**05**

Unit : 2 :	**Concept of Disparity - 1:**	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media; Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities.	**10**
Unit : 3 :	**Concept of Disparity - 2 :**	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences.	**10**
Unit : 4 :	**The Indian Constitution :**	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution.	**10**
Unit : 5 :	**Significant Aspects of Political Processes :**	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics.	**10**
Unit : 6 :	**Growing Social Problems in India :**	a. Substance abuse- impact on youth & challenges for the future b. HIV/AIDS- awareness, prevention, treatment and services c. Problems of the elderly- causes, implications and response d. Issue of child labour- magnitude, causes, effects and response e. Child abuse- effects and ways to prevent f. Trafficking of women- causes, effects and response. **Note: 15 lectures will be allotted for project guidance** **Unit Number 6 will not be assessed for the Semester End Exam**	15

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**I**
COURSE:	**VISUAL COMMUNICATION**
COURSE CODE	**BAMMVC 103**
PAPER	**3**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**

SEMESTER I	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMVC 103	VISUAL COMMUNICATION

COURSE OUTCOME

1. To provide students with tools that would help them visualize and communicate.
2. Understanding Visual communication as part of Mass Communication
3. To acquire basic knowledge to be able to carry out a project in the field of visual communication
4. To acquire basic knowledge in theories and languages of Visual Communication
5. The ability to understand and analyze visual communication from a critical perspective

MODULE	TOPICS	DETAILS	LECTURES
	DEVELOPMENT OF VISUAL COMMUNICATION		
I	**INTRODUCTION TO VISUAL COMMUNICATION**	1. History and development of Visuals 2. Need and importance of visual communication 3. Visual Communication as a process and as an expression, Language and visual communication 4. Visible concepts ● Plans and organisational charts ● Maps ● Chronologies 5. Invisible Concepts ● Generalisation Theories ● Feelings or attitudes	**10**
	THEORIES OF VISUAL COMMUNICATION		

II	**SENSUAL THEORIES**	a) Gestalt b) Constructivism c) Ecological	**10**
	PERCEPTUAL THEORIES	a) Semitics b) Cognitive	
	IMPACT OF COLORS		
III	**Colors and Design in Visual Communication**	1. Color theory 2. Psychological implications of color 3. Colors and visual pleasure 4. Elements of Design	**08**
	CHANNELS OF VISUAL COMMUNICATION		
IV	**Tools/Mediums of Visual communication**	1. Painting & Photography 2. Film & Television, Documentaries, Script writing & visualization 3. Comics & Cartoons, Digital Images, Animation & VFX 4. News Papers, Advertisements, Photo Journalism 5. Folk & Performing Arts , Theatre	**12**
	LANGUAGE AND CULTURE IN THE AGE OF SOCIAL MEDIA		
V	**Visual communication in the age of social media**	1. Ethics 2. Impact of Language and culture, Images and messages, Signs & Symbols (GIF, etc.) 3. Audience Behavior 4. Citizen Journalism, Going Viral 5. Visual stereotyping in social media	**08**

SYLLABUS DESIGNED BY

1. RANI D'SOUZA(CONVENOR)
2. RENU NAURIYAL
3. ARVIND PARULEKAR
4. BINCY KOSHY

INTERNAL EVALUATION METHODOLOGY
(any two to be selected- one individual and one group evaluation) 20 Marks

1. ORAL & PRACTICAL PRESENTATIONS
2. PROJECTS / ASSIGNMENTS
3. DEBATES /GROUP DISCUSSION
4. OPEN BOOK TESTS
5. QUIZ

REFERENCE BOOKS

1. HANDBOOK OF VISUAL COMMUNICATION EDITED BY KEN SMITH/SANDRA MORIARTY/GRETCHEN BARBATSIS & KEITH KENNY
2. VISUAL COMMUNICATION THEORY AND RESEARCH BY SHAHIRA FAHMY, MARY ANGELA BOCK & WAYNE WANTA
3. VISUAL COMMUNICATION BY RALPH E WILEMAN

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**I**
COURSE:	**FUNDAMENTALS OF MASS COMMUNICATION**
COURSE CODE	**BAMMFMC 104**
PAPER	**4 (CORE-I)**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**
	SEMESTER I
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMFMC-104	FUNDAMENTALS OF MASS COMMUNICATION

COURSE OUTCOME :

- **To introduce students to the history, evolution and the development of Mass Communication in the world with special reference to India.**
- **To study the evolution of Mass Media as an important social institution.**
- **To understand the development of Mass Communication models.**
- **To develop a critical understanding of Mass Media.**
- **To understand the concept of New Media and Media Convergence and its implications.**

MODULE	TOPICS	DETAILS	LECTURES
I	**Introduction and overview**	1. Meaning and importance of Mass Communication 2. Forms of Communication: Intra Personal Communication, Interpersonal Communication, Group Communication, Mass Communication: Electronic, Satellite, Interactive, Digital	**12**

		3. Communication etc. 4. Models of Communication: Gerber's Model, Sociological Model, Gatekeeping Model, Defleur's Model of the Taste-differentiated Audience Model, Hub Model, Sadharanikaran.	
II	**History of Mass communication**	1. From oral to communication (kirtan, Davandi, Powada, Nagara) 2. From Electric to Electronic communication, From electric to Digital communication, Contemporary scene in Indian communication landscape	**12**
III	**Major forms of mass media**	1. Traditional & Folk Media: 2. Print: Books, Newspapers, Magazines 3. Broadcast: Television, Radio 4. Films 5. Internet	**12**
IV	**Impact of Mass Media on Society**	**A. I. Social Impact** (With social reformers **who** have successfully used mass communication) **II. Political Impact** (With political leaders who have successfully used mass communication) **III Economic Impact** (With how economic changes were brought about by mass communication) **IV. Developmental Impact** (With how the government has successfully used mass communication) **B. Impact of mass media on** -1 Education, 2. Children, 3. Women, 4. Culture, 5. Youth, 6. Development.	**12**
V	**The New Media and media convergence**	1. Elements and features of new media, Technologies used in new media, 2. Major challenges to new media Acquisition-personal, social and national, 3. Future prospects.	**12**
SYLLABUS DESIGNED BY			
1. NAVITA KULKARNI – CONVENER 2. SAURABH DESHPANDE- MEMBER 3. RASIKA SAWANT- MEMBER			
INTERNAL EVALUATION METHODOLOGY **(any two to be selected- one individual and one group evaluation)** **20 Marks**			

1. **ORAL & PRACTICAL PRESENTATIONS**
2. **PROJECTS / ASSIGNMENTS**
3. **DEBATES /GROUP DISCUSSION**
4. **OPEN BOOK TESTS**
5. **QUIZ**

REFERENCES:

1. **Mass Communication Theory: Denis Mcquail**
2. **Mass Communication: Rowland Lorimer**
3. **The Media in Your Life: An Introduction to Mass Communication : Jean Folkerts and Stephen Lacy (Pearson Education)**
4. **Mass Communication Effects: Joseph Klapper**
5. **Mass Communication & Development: Dr. Baldev Raj Gupta**
6. **Mass Communication in India: Keval J Kumar**
7. **Mass Communication Journalism in India: D S Mehta**
8. **The Story of Mass Communication: Gurmeet Singh**
9. **Perspective Human Communication: Aubrey B Fisher.**
10. **Communication Technology & Development: I P Tiwari**
11. **The Process of Communication: David K Berlo**
12. **Cinema & Television: Jacques Hermabon& amp; Kumar Shahan.**
13. **Mass Media Today: Subir Ghosh**
14. **Mass Culture, Language & arts in India: Mahadev L Apte**
15. **Communication Facts & Ideas in Business: L. Brown (Prentice Hall).**
16. **India's Communication Revolution: ArvindSinghal and Everett Rogers.**
17. **The Myth of Mass Culture: Alan Swing wood**
18. **Communication: C.S. Rayadu,(Himalaya Publishing House, Mumbai).**
19. **Communication-concepts &Process: Joseph A Devito**
20. **Lectures on Mass Communication: S Ganesh.**

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**I**
COURSE:	**CURRENT AFFAIRS**
COURSE CODE	**BAMMCA 105**
PAPER	**5 (CORE-II)**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**
	SEMESTER I
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**

BAMMCA 105	CURRENT AFFAIRS

COURSE OUTCOME

1. To provide learners with overview on current developments in various fields.
2. To generate interest among the learners about burning issues covered in the media
3. To equip them with basic understanding of politics, economics, environment and technology so that students can grasp the relevance of related news.
4. Twenty minutes of newspaper reading and discussion is mandatory in every lecture

Syllabus

Module		Details	Lectures
1	**Current National stories**		**10**
	1.	Three political stories of national importance.	*04*
	2.	Political leaders : news makers of the season (Brief profile of any three)	*02*
	3.	One dominating economic /business news	*02*
	4.	One dominating environment news stories	*01*
	5.	One story of current importance from any other genre.	*01*
2	**Polity and governance**		**08**
	1	Ministries of Government of India Autonomous government bodies	*01*
	2.	**Ministry of Home Affairs** Enforcement Organizations Internal Security Police	*01*
	3	**Communal tensions** Review of latest episodes of communal tensions	*02*
	4.	**The tensions in J&K** Background, Political players Update on the current situation	*02*
	5.	**Review of any three Central Government projects and policies**	*02*
3	**International Affairs**		**10**
	1	**Security Council** Structure and role	*01*

	2.	Issues that currently engage the SC	*01*
	3	**Role of United Nations** ,General Assembly ,Other main organs of the UNO	*2*
	4.	Issues that currently engage the UNO	*2*
	5.	Four conflicts/ issues of international importance	*4*
4	**Maharashtra Issues**		**10**
	1.	Political parties reach and challenges, political leaders	*02*
	2.	An update on the current political dynamics of Maharashtra	*02*
	3.	News relating to the marginalized and displaced tribes	*02*
	4.	The latest news on floods and drought, unemployment, health issues, etc	*02*
	5.	Update two ongoing state projects	*02*
5	**Technology**		**10**
	1. Mobile Application for Journalists	Mobile apps help in content creation Examples of Mobile apps used by journalists worldwide	*02*
	2. Artificial Intelligence & Content Automation Tools	Introduction to AI and data science Introduction to Content Automation tools Examples of content automation tools in content creation	*02*
	3. Augmented Reality& Virtual Reality in Media	Introduction to Augmented Reality Introduction to Virtual Reality Examples of Augmented Reality games and apps Examples of Virtual Reality news websites worldwide	*02*
	4. Digital Gaming Industry	Introduction to Digital Gaming Industry	*02*
	5. Digital gaming in India	Overview of Indian digital gaming	*02*

Total Lectures	**48**

It is recommended that 15 minutes of every lecture is devoted to reading/discussing the major news stories of the day.	
Internal exercise:	**20 Marks**
The objective of internal exercise is to help the learners cultivate an interest in news and developments across fields.	

Sr no	Project/Assignment	Reason/Justification
01	Quiz on current affairs	This is an interesting way of engaging learners with news and personalities making news.
02	Group Discussion on burning issues	Bouncing of ideas and opinions is an effective way of enhancing understanding on a subject
03	Group presentations on any one current issue	This also gives the learners an opportunity to address the issues that come up in a team work and the ability to work through these. It also challenges their ability to collect relevant information and package effectively,

SYLLABUS DESIGNED BY

- **Renu Nauriyal**– CONVENER
- **Shridhar Naik**- MEMBER
- **Rajat Bandopadhyay** - MEMBER

Reference Books/Journals/Manuals

1. Manorma Yearbook published by Malayala Manorma
2. Competition Success Review
3. Competition Master
4. Yogana published by Publication Division, Ministry of Information and Broadcasting
5. The Virtual Reality Primer- Casey Casey Larijani
6. The Secret of Viral Content Creation- Priyanka Agarwal
7.https://www.lucidpress.com/blog/top-30-social-media-automation-tools
8. Understanding Augmented Reality: Concepts and Applications- Alan B Craig

9. https://www.forbes.com/sites/suparnadutt/2018/03/09/how-online-gaming-in-india-is-growing-fast-into-a-billion-dolla

10. 70 years in Indian politics and policy https://www.livemint.com/Politics/.../70-years-in-Indian-politics-and-policy.htr-market/#7e8eddbd55b6

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**I**
COURSE:	**HISTORY OF MEDIA**
COURSE CODE	**BAMMHM 106**
PAPER	**6 CORE III**
TOTAL MARKS	**100 (75 : 25)**
NUMBER OF LECTURES	**48**

COURSE OUTCOME

1. Learner will be able to understand Media history through key events in the cultural history
2. To enable the learner to understand the major developments in media history.
3. To understand the history and role of professionals in shaping communications.
4. To understand the values that shaped and continues to influence Indian mass media.
5. Learner will develop the ability to think and analyze about media.
6. To sharpen the reading, writing, speaking and listening skills that will help the students to understand the development of Media

MODULE	TOPIC	DETAILS	LECTURES
	INTRODUCTION		
I	**EVOLUTION OF PRESS IN INDIA**	a. Newspaper – the rise of the voice of India during British rule b. India's Freedom Struggle and Role of Media c. Independence and rise of Newspapers, Newspapers – a social aspect for freedom struggle, PRESS ACTS of India d. Press during the Emergency Period	**10**
	LANGUAGE PRESS		
II	**HISTORY OF INDIAN LANGUAGE PRESS IN INDIA**	a. Rise of Hindi Language Newspapers (detailed report on vernacular press in India referring to newspapers) b. Regional Press and its popularity of Indian regional languages in various regions c. Vernacular Press Act1876	**10**

	DOCUMENTARIES & FILMS		
III	**HISTORY OF DOCUMENTARIES AND FILMS**	a. Genesis of documentaries and short films, (screening of few documentaries is essential- like *Hindustan Hamara, Zalzala, The Vanishing Tribe*) Role of Documentarians - P V Pathy, D G Tendulkar ,H S Hirlekar, Paul Zils and FaliBillimoria Anandpatwardhan, b. Evolution of film making in India -brief history, Photography to moving films c. Origin of Hindi cinema d. Origin of Short films to what it is today, role of you tube and WhatsApp e. Great masters of world cinema	**10**
	BROADCASTING		
IV	**HISTORY OF RADIO AND TELEVISION IN INDIA**	a. Radio & Television as Mass Media b. Radio and Television Broadcasting c. The beginning of Radio and Television Shows ● A New Era in Broadcasting in India ● Satellite Television & Privatization in Broadcasting ● Advertising in India d. Internet Protocol Television	**10**
	MEDIA ICONS		
V	**ROLE OF MEDIA ICONS IN THE HISTORY OF INDIAN MEDIA**	1. Raja Rammohan Roy 2. Bal GangadharTilak 3. M.K.Gandhi 4. B.R. Ambedkar 5. KP Kesava Menon 6. K.C MammenMapillai 7. Maulana Abdul Kalam Azad	**08**

SYLLABUS DESIGNED BY

1. PROF. RANI D'SOUZA(CONVENOR)
2. DR. YATINDRA INGLE
3. MR. MITHUN PILLAI

INTERNAL EVALUATION METHODOLOGY
(any two to be selected- one individual and one group evaluation) 20 Marks

1. PROJECTS/ ASSIGNMENTS
2. ORAL & PRACTICAL PRESENTATIONS
3. GROUP INTERACTIONS
4. DEBATES & DISCUSSIONS
5. QUIZ

(Screening of Short Films and Documentaries are to done in the classroom with history being discussed)

REFERENCE BOOKS/JOURNALS/MANUALS
1. MASS COMMUNICATION IN INDIA PAPERBACK – BY KEVAL J. KUMAR 2. JOURNALISM IN INDIA: HISTORY, GROWTH, DEVELOPMENT BY K. C. SHARMA 3. MEDIA'S SHIFTING TERRAIN: FIVE YEARS THAT TRANSFORMED THE WAY INDIA COMMUNICATES BY PAMELA PHILIPOSE 4. INDIAN NEWS MEDIA: FROM OBSERVER TO PARTICIPANT BY USHA M. RODRIGUES & MAYA RANGANATHAN 5. DOCUMENTARY FILMS AND INDIAN AWAKEN BY JAGMOHAN, PUBLICATIONS DIVISIONS MINISTRY OF BROADCASTING AND INFORMATION, GOVERNMENT OF INDIA 6. HISTORY OF INDIAN CINEMA PAPERBACK – 1 JAN 2012 BY RENU SARAN 7. HISTORY OF BROADCASTING IN INDIA BY DR. P. THANGAMANI 8. INDIA ON TELEVISION BY NALIN MEHTA(HARPER COLLINS PUBLISHERS) 9. PRESS IN INDIA: NEW HISTORY HARDCOVER – 1 AUG 1995 BY G.S.C. RAGUAVAN 10. COMMUNICATION IN HISTORY: STONE AGE SYMBOLS TO SOCIAL MEDIA BY DAVID CROWLEY (AUTHOR), PETER URQUHART (AUTHOR), PAUL HEYER (AUTHOR)

SEMESTER II

Semester II	
Course code	**Course Name**
BAMMEC-201	Effective communication –II
BAMMFC-202	Foundation course –II
BAMMCW-203	Content Writing
BAMMID-204	Introduction to Advertising
BAMMIJ-205	Introduction to Journalism
BAMMMGC-206	Media, Gender & Culture

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**II**
COURSE:	**EFFECTIVE COMMUNICATION SKILLS -II**
COURSE CODE	**BAMMEC 201**
PAPER	**1**

TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**
	SEMESTER II
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMEC-201	Effective Communication Skills-II

Learning Outcome: 1. To make the students aware of use of language in media and organization. 2. To equip or enhance students with structural and analytical reading, writing and thinking skills. **3.** To introduce key concepts of communications.			**Total Lectures : 48 hrs.**
Module	**Topics**	**Details**	
1	**Writing**		
	1.Report writing	Report Writing (English, Hindi or Marathi) General report and News report writing - Basics and Format (Headline, Sub-headline, various type of report	
	2. Organizational writing	Organizational writing : (English, Hindi or Marathi) Internal communication , E- mails - Email E-mail Etiquette; Overcoming Problems in E-mail Communication, Stake holder communication Circulars- Guidelines for writing a circular- Languages and writing style of a circular- Format of a circular; Notices- Purpose- Format- Important points to remember while writing a notice, Letters of complaint, claim and adjustment, Consumer grievance letters, Letters under the Right to Information Act, Press Release, Letter to the Editor.	
	4. Writing for Publicity materials	Writing for Publicity materials (English, Hindi or Marathi) Headline, sub- headline, Body copy, Slogan, Jingle, Radio spot	
2	**Editing**		
	Editing	Editing: (English, Hindi and Marathi) Principles of editing (Punctuation, Substitution of words, Restructuring of sentences, Re-organizing sentence sequence in a paragraph, Use of link words,	
		Principles of Coherence and Cohesion), writing synopsis, abstracts, précis writing, news paper editing and magazine editing.	

3	**Paraphrasing and Summarizing**		
	1. Paraphrasing	Meaning , how to use paraphrase in communication, Paraphrase in plagiarism , Translation	
	2. Summarization	Summarizing content , the points and sub- points and the logical connection between the points	
4	**Interpretation of technical data**		
	Interpret technical data	Read graphs, maps, charts, Write content based on the data provided	
Total Lectures			**48**

Internal evaluation methodology **25 Marks**

Sr no	Project/Assignment
1	Clipping files on various current topics.
2	Publish letters to editors in news media.
3	Reporting of college events.

Bibliography:

- Business Communication - Rhoda A. Doctor and Aspi H. Doctor
- Communication Skills in English – Aspi Doctor
- Teaching Thinking - Edward De Bono De Bono's
- Thinking Course – Edward De Bono Serious Creativity –
- Edward De Bono The Mind Map Book – Buzan Tony
- Becoming a Translator: An Introduction to the Theory and Practice of Translation - by Douglas Robinson
- A Textbook of Translation - by Peter Newmark, Newmark

Syllabus Designed by:

- Gajendra Deoda (Convenor)
- Smita Jain
- Deepak Kumar Tiwari (Subject expert).

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**II**

COURSE:	**FOUNDATION COURSE**
COURSE CODE	**BAMMFC 202**
PAPER	**2**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**
	SEMESTER II
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMFC-202	FOUNDATION COURSE

	Course Outcome: 1. To introduce students to the overview of the Indian Society. 1. To help them understand the constitution of India. 2. To acquaint them with the socio-political problems of India.		
	Note : Revised FC (Foundation Course) Syllabus sanctioned vide Agenda Item No. 4.49 of AC. 6.6.2012 for the B.A. Sem-1 / B.Sc. Sem-1 of University of Mumbai. The BMM BoS is unanimously decided to follow the same syllabus to BA in Multimedia and Mass Communication (BAMMC) Semester -II as it is.		
Module	**Topics**	**Details**	**Lectures**
1	**Globalisation and Indian Society**	Understanding the concepts of liberalization, privatization and globalization; Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.	07
2	**Human Rights**	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights; Human Rights constituents with special reference to Fundamental Rights stated in the Constitution.	10
3	**Ecology**	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation-causes and impact on human life; Sustainable development- concept and components; poverty and	10

		environment.	
4	**Understanding Stress and Conflict**	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict.	10
5	**Managing Stress and Conflict in Contemporary Society**	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation; Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society.	08
6	**Contemporary Societal Challenges**	a. Increasing urbanization, problems of housing, health and sanitation; b. Changing lifestyles and impact on culture in a globalised world. c. Farmers' suicides and agrarian distress. d. Debate regarding Genetically Modified Crops. e. Development projects and Human Rights violations. f. Increasing crime/suicides among youth.	15
	Note: 15 lectures will be allotted for project guidance Unit Number 6 will not be assessed for the Semester End Exam.		

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**II**
COURSE:	**CONTENT WRITING**
COURSE CODE	**BAMMCW 203**
PAPER	**3**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**
	SEMESTER II
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**

BAMMCW-203	CONTENT WRITING

Crisp writing is the challenge.

Learning Outcome: **Lectures: 48**

1. To provide students with tools that would help them communicate effectively.
2. Understanding crisp writing as part of Mass Communication
3. The ability to draw the essence of situations and develop clarity of thought.

Syllabus			
Module	**Topics**	**Details**	**Lectures**
1	**Foundation**		**8**
	1.Grammar Refresher	With special emphasis on use of punctuations, prepositions, capital letters and lower case	*02*
	2.Vocabulary building	Meaning, usage of words , acronyms	*02*
	3.Common errors	Homophones and common errors in English usage.	*02*
	4. Essentials of good writing	With emphasis on writing with clarity, logic and structure	*01*
	5. Phrases and idioms	Creative usage of phrases and idioms.	*01*
2	**Editing Skills**		**10**
	1. Redundant words	Identifying redundant words and phrases and eliminating these.	*01*
	2.Editing sentences	Editing redundant words/ phases and replacing wrong words/punctuation/grammatical error	*02*
	3.Editing captions	Editing redundant words/ phases and replacing wrong words/punctuation/grammatical error	*02*
	4.Editing headlines	Editing redundant words/ phases and replacing wrong words/punctuation/grammatical error	*02*
	5.Editing copy	Structuring a story, Creating a flow, editing redundant words/ phases and replacing wrong words/punctuation/grammatical error	*03*
3	**Writing Tips and Techniques**		**10**

	1.Writing tickers/ scrolls	For television news	*01*
	2.Writing social media post	Twitter and for other social networks	*01*
	3.Writing briefs/snippets	News briefs, Lifestyle and entertainment snippets	*03*
	4.Caption writing	Picture stories etc	*02*
	5.Writing headlines	News headlines and feature headlines	*03*
4	**PRESENTATION TOOLS AND TECHNIQUES**		**10**
	1. Power Point Presentation	Use of Power Point tools Power Point to Pdf Power Point to self animated presentation Auto timing of Power Point presentation	*02*
	2. Info graphic	Colour selection Use of clip art Use of Power Point smart tools Minimalist animation for maximum impact	*02*
	3. Three minute presentation	Content for single slide Uses of phrases Effective word selection Effective presentation	*02*
	4. Google Advance search	How to select relevant information Locating authentic information How to gather information for domestic and international websites	*02*
	5. Plagiarism	How to do a plagiarism check Paraphrasing Citation and referencing style	*02*
5	**Writing for the Web**		**10**
	1. Content is King	Importance of content	*01*
	2. Less is more	Writing for print media/ social media like Twitter, etc	*02*
	3.Copy writing	Ad campaigns (creative, witty and attractive)	*03*
	4.Realtime content	Difference in writing for print vs digital	*02*
	5.Keywords	Designing keywords for Search Engine Optimization	*02*

Total Lectures	**48**

Internal exercise: 25 Marks

The objective of internal exercise is to help the learner develop the skills of writing briefly and effectively.

Sr no	Project/Assignment	Reason/Justification
1	**Writing Captions and Headlines**	Simple writing is difficult. This assignment will help the learners to grasp the most essential aspect of a story and present these as headlines and captions
2	**A three- minutes power point presentation**	This assignment challenges the learners to draw the essence of elaborate reports, research papers and present in three minutes
3	**Word Game/ Quiz**	This is an exciting way to get learners engaged in vocabulary building

Bibliography:

1. The Editor's Toolbox by Buck Ryan and Michael O' Donnell, Surjeet Publication
2. Writing for the Mass Media by James Glen Stovall
3. A Handbook of Rhetorical Devices by Robert A Harris

The Team:

1. Renu Nauriyal
2. Jitendra Nayak
3. Shreya Bhandary

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**II**
COURSE:	**INTRODUCTION TO ADVERTISING**
COURSE CODE	**BAMMID 204**
PAPER	**4**
TOTAL MARKS	**100 (75 : 25)**
NO OF LECTURES	**48**

	SEMESTER II
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMID-204	INTRODUCTION TO ADVERTISING

Learning Outcome: **Lectures: 48**

1. To provide the students with basic understanding of advertising, growth, importance and types.
2. To understand an effective advertisement campaigns, tools, models etc.
3. To comprehend the role of advertising , various departments, careers and creativity
4. To provide students with various advertising trends, and future.

Syllabus			
Module	**Topics**	**Details**	**Lectures**
1	**Introduction to Advertising**		**18**
	1. Introduction to advertising	Evolution , importance, Features , benefits , limitation , effects and 5M's of advertising	*02*
	2. Types of advertising	Consumer, Industrial, Retail, Classified, Corporate ,Public service, ,Generic, National, Global, International, Social (CSR) and Advocacy	*02*
	3. Ethics and Laws in Advertising	Puffery, Subliminal, Weasel claim, Surrogate, Shocking ads , Controversial , Comparative, Advertising code of ethics, Regulatory bodies, Laws and regulations	*04*
	4. Social, Cultural and Economic impact of Advertising	Women and advertising, Children and advertising, Senior citizen and advertising , Pop Culture and advertising	*04*
	5. Theories	Stimulus theory, AIDA, Hierarchy ,Means- End Theory	06
2	**Integrated marketing communication and tools**		**10**
	1. Integrated marketing communication	Emergence, Role, Tools, Communication process, The IMC Planning Process	*0*2
	2. Print Media and Out-of Home Media	Basic concepts, Types of Newspapers advertising , advantages and disadvantage of News paper advertising ,Magazines, Factors to consider for magazine advertising, Out-of-home Advertising, On- premise advertising , Transit advertising , Posters , Directory advertising	*02*

	3. Broadcast Media	Radio advertising Advantages and Disadvantages of Radio advertising **,** Television advertising **and its** Advantages and Disadvantages, Film advertising and Product placement - Advantages and Disadvantages	*02*
	4. Public Relation	Meaning of Public Relations, Types of public relations Difference between public relations and advertising, Difference between Publicity and Advertising, , Advantages and Disadvantages of Public Relations, Advantages and Disadvantages of Publicity	*02*
	5. Sales Promotion and Direct marketing	Growth and Types of Sales promotion, Advantages and Disadvantages Growth of Direct marketing and its tools Advantages and disadvantages	*02*
3	**Creativity in advertising**		**14**
	1. Introduction to Creativity	Importance of creative process, Creative strategy development Determining message theme, Big idea, positioning strategies, Types of appeals	*06*
	2. Role of different elements in ads	Logo, Jingle, Company signature, Slogan, tagline, illustration , Creating Radio commercial –Words, sounds , clarity , coherence etc.	*06*
	3. Elements of copy	Headline, Sub headline , Layout , Body copy , Types of copy and slogan , creating story board	*02*
4	**Types of advertising agency, department, careers and latest trends in advertising**		**06**
	1. Types of advertising agency	Full service, Creative boutique, Media buying agency, In- house agency, Specialized Agencies and others	*02*
	2. Various departments in an agency	Account handling, Production, Art, Copy, Media, Public relation, Human resources, Finance and others	*02*
	3. Latest trends	Rural advertising ,Ambush advertising, Internet advertising , email advertising Advertainment, advertorial, mobile advertising	*02*
Total Lectures			**48**

Internal evaluation methodology **25 Marks**

Sr no	Project/Assignment
1	Individual/ group project should be given to develop an advertising strategy on any product or service
2	Write a story board/ types of copy.
3	Big Idea – Group project

Bibliography:

1) 1. Advertising Principles and Practices (7th Edition) William D. Wells, John Burnett, Sandra Moriarty
2) Adland: Global History of advertising by mark Tungate
3) Copy paste : How advertising recycle ideas by Joe La Pompe
4) Indian Advertising: Laughter & Tears by Arun Chaudhuri
5) Adkatha The Story Of Indian Advertising by Halve Anand
6) Pandeymonium by Piyush Pandey
7) Introduction to Advertising – Amita Shankar
8) Contemporary Advertising – Loudon & Britta
9) Advertising – Pearson Education
10) www.afaqs.com
11) www.exchange4media.com
12) www.adweek.com

Syllabus Designed by:

- Shobha Venkatesh (Convenor)
- Dr. Hanif Lakdawala (Subject expert)
- Kiran R. Dalani (Subject expert)

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**II**
COURSE:	**INTRODUCTION TO JOURNALISM**
COURSE CODE	**BAMMIJ 205**
PAPER	**5**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**
	SEMESTER II
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMIJ-205	INTRODUCTION TO JOURNALISM

Course outcome:

To help media students to acquaint themselves with an influential medium of journalism that holds the key to opinion formation & to create awareness.

Syllabus			
Module	**Topics**	**Details**	**Lectures**
1		**History of Journalism in India**	
		Changing face of journalism from Guttenberg to new media	
		Journalism in India:	
		Earliest publications The rise of nationalist press ,Post 1947 The emergency 1975 ,Post Emergency Post liberalization of the economy boom in magazines niche journalism	
		How technology advancement has helped media	
		New media with special reference to rise the Citizen Journalism	
2		**News and is process**	
		Definition of News ,	
		The news process from the event to the reader	
		What makes a good story	
		Anatomy of a news story	
		Types of Beats- Crime, Environmental, Entertainment, Educational, Agricultural, Sports etc	
3		**Principles and format**	
		What makes a great journalist: Objectivity, Accuracy, Without fear or favour Balance Proximity Difference between a PR and a journalist Criteria for news worthiness Hard News / Soft News and blend of the two News Reports, Features Editorials	
4		**Career in journalism**	

		Reporter, Feature Writer, Mojo, Data journalist, Real time journalist, investigative journalist, rural journalist, In-depth journalist , lifestyle journalist	
5		**Covering an event (flip class)**	
		Background research	
		Finding a news angle	
		Capturing the right pictures for a photo feature Writing Headline, captions and lead	

Suggested readings

1. Writing and Reporting News by Carole Rich; Thomson Wadsworth
2. Journalism: Principles and Practice by Tony Harcup, Sage Publication, 2011 edition
3. Recommended reading Nalin Mehta on Indian TV
4. M V Kamath: 'Behind the by-line' journalist's Handbook, Professional Journalism.
5. Introduction to Journalism: Essential Technique Richard Rudin
6. Introduction to Journalism: Carole Fleming
7. Introduction to Journalism: James glen stowal

Syllabus Designed by:

1. Dr. Navita Kulkarni – Convener
2. Renu Nauriyal
3. Gajendra Deoda

PROGRAM	**BAMM**
YEAR	**FYBMM**
SEMESTER	**II**
COURSE:	**MEDIA GENDER & CULTURE**
COURSE CODE	**BAMMMGC 206**
PAPER	**6**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**
	SEMESTER II
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**

BAMMMGC-206	MEDIA GENDER & CULTURE

COURSE OUTCOME
● To discuss the significance of culture and the media industry. ● To understand the association between the media, gender and culture in the society. ● To stress on the changing perspectives of media, gender and culture in the globalised era.

MODULE	TOPICS	TOPICS	LECTURES
		INTRODUCTION TO CULTURAL STUDIES	
I	**EVOLUTION, NEED, CONCEPTS AND THEORIES**	Evolution, features of cultural studies, Need and significance of cultural studies and media **Concepts related to culture-** Acculturation, enculturation, ethnocentrism, cultural relativism, cultural shock and its relevance in media Theories: ● Stuart Hall : encoding and decoding, Circuit of culture ● John Fiske: culture and industry ● Feminism and Post feminism ● Techno culture and risk – Ulrich Beck	**(12)**
		CULTURE AND MEDIA	
II	**CONSTRUCTION, COMMODIFICATION, IMPACT AND RECENT TRNDS**	1. Construction of culture- social, economic, political, religion and technology 2. Culture, industry and media- commodification, memes, representation, articulation, popular culture, power, cyber culture 3. Media and its impact on the cultural aspect of the society. 4. Culture industry and communication - with reference, to film, TV, social media, advertisements etc., 5. Recent trends in Culture consumption: Changing values, Ideologies & its Relevance in the Contemporary society.	**(12)**

		GENDER AND MEDIA CULTURE	
III	**ROLE AND INFLUENCE OF MEDIA**	1. The influence of media on views of gender (theme, under representation, stereotypes, women and men, stereotype images, roles etc.) 2. Role of media in social construction of gender, Changing attitudes & behaviour for empowerment of women : Movements of change 3. Gender equality and media 4. Hegemonic masculinity in media 5. Gender issues in news media (TV, radio, newspapers & online news)	**(12)**
		GLOBALISATION AND MEDIA CULTURE	
IV	**GLOBAL, LOCAL, CONSUMER AND THE RECENT TRENDS**	1. Media imperialism 2. Globalisation and Local culture- Issues and Perspectives, threat to regional and local identities, Impact of global culture and its relevance in media and gender 3. Consumer culture and media in the era of globalisation. 4. **Digital Media culture**: Recent trends and challenges 5. **Media and Globalisation**: Global economic flows, global cultural flows, homogenization & fragmentation, glocalization, creolization, globalization & power.	**(12)**

SYLLABUS DESIGNED BY:-

1. PADMAJA ARVIND(CONVENOR)
2. RANI D'SOUZA
3. RUMINA RAI

INTERNAL EVALUATION METHODOLOGY

6. CONTINUOUS ASSIGNMENTS
7. ORAL & PRACTICAL PRESENTATIONS
8. GROUP/INDIVIDUAL PROJECTS
9. CLASS TEST
10. OPEN BOOK TEST
11. GROUP INTERACTIONS
12. QUIZ

REFERENCE

1. MEDIA AND CULTURAL STUDIES: MEENAKSHI GIGI DURHAM AND DOUGLAS M.KELLNER
2. CULTURAL STUDIES- THEORY AND PRACTICE – CHRIS BARKER
3. AN INTRODUCTION TO CULTURAL STUDIES- PROMOD K. NAYAR
4. CULTURE CHANGE IN INDIA- IDENITITY AND GLOBALISATION – YOGENDRA SINGH

5. INDIAN MEDIA IN A GLOBALISED WORLD- MAYA RANGANATHAN USHA M. RODGRIGUES
6. MEDIA GENDER AND POPULAR CULTURE IN INDIA- TRACKING CHANGE AND CONTINIUTY – SANJUKTHE- DASGUPTA

*****

AC :_October 3, 2019. **Item No. 4.8**

UNIVERSITY OF MUMBAI

Sr. No.	Heading	Particulars
1	Title of the Course	BA in Multimedia and Mass Communication (BAMMC)
2	Semesters	03 and 04
3	Level	P.G. / √**U.G.**/ Diploma / Certificate **(Strike out which is not applicable)**
4	Pattern	Yearly / Semester √ **CBCS (Strike out which is not applicable)**
5	Status	New / Revised √ **CBCS (Strike out which is not applicable)**
6	To be implemented from Academic Year	From Academic Year 2020-21**in Progressive manner**.

Date: **Signature :**

Name of BOS Chairperson√ / Dean : _Dr. Sunder Rajdeep_

CHOICE BASED CREDIT SYSTEM

BA in Multimedia and Mass Communication (BAMMC) (Choice based)

Semester –III, IV, V and VI revised Syllabus to be sanctioned and implemented from June 2020-21 in progressive manner.

PROGRAM OUTCOME

1. The program considers media industries and their relationship to culture and society, and the understanding of how communication works. The program emphasizes the development of critical thinking, professional writing skills and effective oral communication.
2. The Communication and Media Studies major prepares students for a wide variety of careers in business and industry, advertising, public relations and journalism, or advanced study
3. This program will equip the learners with professional skills essential for making career in Entertainment industry, Cinema, Television, OTT Platforms, social media platforms etc.
4. Students would demonstrate the ability to apply rhetorical principles in a variety of creative, cinematic, organizational, professional and journalistic venues.
5. Knowledge, skills, and values that prepare them for future careers in our interconnected society, whether in mass media or advanced study
6. Learners would develop a global awareness of political, social and corporate issues influenced by communication sensitivity and skills.
7. Learners will understand mass media as a system of interrelated forces, including historical foundations, technological advances, economic dynamics, regulatory constraints, and ethical concerns.
8. This programme will also give them an improved sense of self-confidence and self-efficacy and an awareness of their responsibilities as professionals in their field
9. Learners will be able to create and design emerging media products, including blogs, digital audio, digital video, social media, digital photography, and multimedia.
10. They will be better equipped to grasp the complex relationship between communication/media theories and a diverse set of individual, social, and professional practices.
11. Learners will understand the underlying philosophical assumptions of, and be able to apply, communication research methods to address a range of media texts and audiences, production and technological practices, and relevant social issues.
12. Learners will comprehend the foundations, process, and practices of writing for and about the media, and demonstrate proficiency in writing across platforms.
13. Learners will be able to conceptualize, design, and produce one or more works in media based on effective principles and practices of media aesthetics for a target audience.
14. Learners will acquire the knowledge and skills required to pursue a career in the specialization of their choice.

301-1

Program	**BAMMC**

	Semester III				
Title	**Credit**	**Paper**	**Name of the Course**		**Course Code**
	Learner should choose **any one** out of following elective courses				
AEEC	02	01	Electronic Media-I		BAMMC EM-3011
			Theatre and Mass Communication-I		BAMMC TMC-3012
			Radio Program Production-I		BAMMC RPP-3013
			Motion Graphics and Visual Effects –I		BAMMC MGV-3014
DSC	(4×3)= 12	02	Corporate Communication and Public Relations	DSC-C1	BAMMC CCPR-302
DSC		03	Media Studies	DSC-C2	BAMMC MS-303
DSC		04	Introduction to Photography	DSC-C3	BAMMC IP-304
DSE	04	05	Film Communication-I		BAMMC FCO-305
Practical	02	06	Computers and Multimedia-I		BAMMC CMM-306
	20				

SY BAMMC Semester III and IV Syllabus	
Year	**SY BAMMC**
Semester	**III**
Course:	**Electronic Media-01**
Paper	**Elective 01 (AEEC-1)**
Course Code	**BAMMC EM-3011**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Course Outcome

To make the students acquainted with working of the two powerful media; i.e. radio and television. The content is useful for both advertising and journalism students in order to further their careers in their respective fields.

COURSE CODE	**COURSE NAME**
BAMMC EM-3011	**ELECTRONIC MEDIA-01**

Syllabus

Sr. No.	**Modules**	**Details**	**Lectures**
1	**Introduction**		**10**
	A.	A Short History of Radio and TV in India and abroad	
	B.	Introduction to Prasar Bharti	
	C.	FM radio and community radio	
	D.	Convergence trends	

2	**Introduction to Sound for both TV and Radio**		**10**
	A. Introduction to sound	1. Types of Sound: Natural, Ambient, Recorded 2. The Studio Setup 3. Types of recording- Tape Recording, Digital Recording 4. Outdoor Recording 5. Types of Microphones	
	B. Introduction to Visuals	1. The Power and Influence of Visuals 2. The Video-camera: types of shots, camera positions, shot sequences, shot length 3. Lighting: The importance of lighting 4. Television setup: The TV studio 5. difference between Studio and on-location shoots	
	C. Electronic News Gathering (ENG)	1. Single camera 2. Two men crew	
	D. Electronic Field Production (EFP)	1. Single camera set up 2. Multi-camera set up 3. Live show production	
3	**Introduction to Formats (Fiction and non-fiction)**		**10**
	1. Introduction to Radio Formats	News - Documentary - Feature - Talk Show - Music shows - Radio Drama Radio interviews - Sports broadcasting	
	2. Introduction to Television formats	News - Documentary - Feature - Talk Shows - TV serials and soaps - Introduction to web series - Docudrama - Sports - Reality - Animation - Web series	
4	**Different Roles and contributions in the society**		**08**
	A. **Community Radio-role and importance**		
	B. **Contribution of All India Radio**		
	C. **The Satellite and Direct to Home challenge**		
5	**Introduction to Production process**		**10**

	1. Pre-Production	Script Storyboard Camera plot Lighting plot	
	2. Production	Camera angles Sequence Scene Shot Log keeping	
	3. Post-Production	Linear editing Non-linear editing Library shots Library sounds Dubbing	
	Total		**48**

Internal: Any two assignments compulsory

- A visit to a Radio or Television station
- Listening and recording news for TV and Radio
- Shooting an interview for a Television channel
- Recording a chat show for a radio channel

Reference Reading:

1. Basic Radio and Television: by S Sharma
2. The TV Studio Production Handbook : Lucy Brown
3. Mass Communication in India by Keval J. Kumar
4. Beyond Powerful Radio by Valerie Geller
5. Writing News for TV and Radio **:** Mervin Block
6. Essential Radio Journalism: How to produce and present radio news (Professional Media Practice) : Peter Stewart, by Paul Chantler
7. Andrew Boyd, 'Broadcast Journalism, Techniques of Radio and Television News ', Focal Press London.
8. Keval J Kumar, 'Mass Communication in India', Jaico Publishing House.
9. K.M Shrivasta, 'Radio and TV Journalism', Sterling Publishers Pvt. Ltd, New Delhi.
10. Usha Raman, ' Writing for the Media', Oxford University Press, New Delhi
11. Media Production: A Practical Guide to Radio and TV 1st Edition by Amanda Willett
12. Community radio in India : R Sreedher, Puja O Murada

BOS Syllabus Sub- Committee Members

1. Prof. Dr. Navita Kulkarni **(Convener)**
2. Prof. Neena Sharma (Subject Expert)
3. Ms. Priyanka Khanvilkar (Industry Expert)

301-2

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**III**
Course:	**Theatre and Mass Communication-I**
Paper	**ELECTIVE 02 (AEEC-2)**
Course Code	**BAMMC TMC-3012**
Total Marks	**100 (75 : 25)**

Number of Lectures	48

COURSE OUTCOME:

1. Individual and team understanding on theatrical Arts
2. Taking ownership of space, time, story-telling, characterization and kinesthetic
3. Shaping young students' minds through expression of their perception, creating awareness of their role and place in society, their responsibilities and possibilities

COURSE CODE	COURSE NAME and DETAILED SYLLABUS	
BAMMC TMC-3012	THEATRE AND MASS COMMUNICATION-I	
	Syllabus	
Module / **Topic**	**Details**	**Lectures**
	History	
I — **Dramatic literature and theatre history**:	**1. Study of the origin of theatre, history and growth** **2. Theatre as a medium of mass communication** **3. Theatre as a benefit to improving language skills** **4. Study of traditions and forms:** **(a) Indian:** Natya Shastra and Classical Indian Theatre Navarasa, Nayaka-NayikaBhed, VidushakaNatya – DrishyaKavya Trilogy –Natya – Nritta - Sangeet Study of some of the important Sanskrit playwrights i.e. Kalidasa, Bhasa, Shudraka, Kootiyattam and Folk (Jatra, Pandavani, Tamasha, Ram Lila,Yakshagana, Swang, Therukoothu, Bhawai, Dashavatar, etc) (b) Growth of Indian Regional and Modern (Experimental) Theatre (c) **Asian Theatre** (Japanese Noh, Spiritual and Trance of Bali and Korea, Chinese Kunqu Opera) (d) **Ancient Greek:** Aristotle's *Poetics* Comedy, Tragedy, Satyr Chorus (e) **European**: Commedia D'elle Arte and Renaissance. French Baroque theatre, Shakespeare, Brecht, Ibsen etc Naturalism – Emile Zola (f) American Musicals	**14**
Activity:	Presentations by students on different folk/traditional theatre forms from across the world through videos and images to study the salient features	
	Design	
2 — **Stage craft and theatre techniques**	• Theatre architecture and set design (Detailed study of Amphitheatre, Natyamandapam etc. Types of stages e.g.	**10**

		proscenium, arena, thrust, end etc.) • Costume design: study of elements of color, textures, shapes and lines • Lighting and special effects: light sources, use of modern light equipment, planning and designing light Make up	
	Activity:	Mask making, prop making experimenting with sound and live music and recorded music	
		PREPARATION	
3	**Preparing the mind, body and voice:**	**Mind:** • Recalling experiences, talking about daily observations, collecting news clips, stories, poems etc which may inspire theatre and enactment, increasing concentration, activities to enable ideation and improvisation **Body:** • Simple rhythmic steps to instill grace and agility, Mime etc **Voice**: • Narration of poems, understanding meter and tempo, weaving stories, using intonation and modulation	**10**
	Activity:	Mirror games	
		READING	
4	**Reading plays and analyzing the characteristics:**	**Western:** **Select any 2** 1. Romeo and Juliet / Hamlet – William Shakespeare 2. Long Day's Journey Into Night –Eugene O'Neil 3. Death of a Salesman – Arthur Miller 4. Oedipus Rex - Sophocles 5. Angels in America - Tony Kushner 6. The Glass Menagerie – Tennessee Williams 7. Look Back in Anger – John Osborne **Indian:** **Select any 2** 1. Yayati – Girish Karnad 2. Taj Mahal Ka Tender –Ajay Shukla 3. Ashad ka ek Din– Mohan Rakesh 4. *Shantata! Court Chalu Ahe* (1967; "Silence! The Court Is in Session") /*Sakharam Binder* (1971).Vijay Tendulkar	**14**
		Activity: Understand the salient features: Plot Theme Characterization Narrative Genre	

BOS Syllabus Sub- Committee Members

1. Prof. Rani D'Souza (Convener)
2. Prof. Shamali Gupta (Course Expert)
3. Mr. Abhijit Khade (Industry Expert)

Projects for Internal Evaluation **25 MARKS**

1. Individual: Enact a character (epic, historical, national or social leader through speech, poetry). Essential a mono act not more than 2 minutes
2. Group: improvise on a current affairs topic and create a street play. Enact it within the college campus or outside the college gate. Not more than 5 minutes per team. Team should essentially be small. 5-6 members.
3. Class: Watch a live performance of a play and write a review consisting of its special features.

301-3

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**III**
Course:	**Radio Programme Production-I**
Paper	**ELECTIVE 01 (AEEC-2)**
Course Code	**BAMMC RPP-3013**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC RPP 401	**RADIO PROGRAM PRODUCTION -I**

COURSE OUTCOME:
The course is intended to explore the art of audio production. The students are made familiar with the aesthetics of sound and its application in various radio programme formats. To provide them with the basic knowledge and understanding of radio business and production.

MODULE	**DETAILS**		**LECTURES**
1	**UNIT 1**		**10**
	1.	Introduction of Radio	
	2.	History of Radio: Growth and development. Radio as a Mass- Medium: Uses and characteristics of radio.	
	3.	Writing for the radio-.Who you are talking to? What do you want to say?	
	4.	Structure and Signposting	
	5.	The Script	
2	**The work of producer**		**08**
	1.	Ideas	
	2.	The Audience, Resource Planning , preparation of material	
	3.	The studio session	
	4.	Post- production	
	5.	Technician, Editor, Administrator and Manager	

3	**The Radio Studio**		**10**
	1.	Studio Layout	
	2.	The studio desk, mixer, control panel console or board.	
	3.	Digital Mixers	
	4.	Studio Software	
	5.	Digital Compression and Digital	
4	**News – Policy and Practice**		**10**
	1.	'Interesting'	
	2.	News Values-Accuracy, Realism, and Truth	
	3.	The Newsroom Operation	
	4.	The News Conference and Press Release	
	5.	News reading and Presentation- The Seven Ps, News reading, Pronunciation, Vocal Stressing, Errors and Emergencies	
5	**Interviewing**		**10**
	4.	Types of Interview	
	5.	What the Interviewee Should Know	
	6.	Preparation Before the Interview and The Pre-interview Discussion	
	7.	Devil's Advocate	
	8.	Question Technique-Multiple Questions and Leading Questions	

Syllabus Sub-committee
Prof. Gajendra Deoda (Convener) Mr. Ganesh Achwal (Industry Expert) Dr. Navita Kulkarni (Subject Expert)
References:
Chatarjee P.C. : The Adventures of Indian Broadcasting, Konark Luthra H.R. : Indian Broadcasting Publication Division. McLiesh Robert: Radio Production, Focal Press Saxena Ambrish: Radio in New Avtar-AMTO FM, Kanishka Publishers, New Delhi.

301-4

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**III**
Course:	**MOTION GRAPHICS and VISUAL EFFECTS**
Paper	**ELECTIVE 01 (AEEC-4)**
Course Code	**BAMMC MGV-3014**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

Brief:

The new generation is energetic and seeks energy in every experience. We see animation and visual effects in almost every television program including news and financial market channels. Sports channels are foremost in using various visual effects for updates as well as keeping energy intact. The future is around new experience of video viewing and the media learners will be part of future shape of media.

Course Outcome;

This course is designed to introduce the student to the art and science of visual effects for broadcast and digital filmmaking. Topics covered include the visual effects workflow, video technology, image processing, creating mattes, tracking, and compositing.

1. Understand the difference between a visual effect and a special effect.
2. Determine when to choose whether to create a visual effect or a special effect and determine when the two techniques can work together.
3. Understand basic image processing techniques.
4. Pull mattes using various image processing techniques including Chroma-keying
5. Track motion data using various techniques.
6. Describe and use the compositing process and identify major applications used in industry. Develop a visual effects pipeline for integration in the filmmaking process.

COURSE CODE	COURSE NAME and DETAILES SYLLABUS	
BAMMC MGV-3014	MOTION GRAPHICS and VISUAL EFFECTS	

Modules		Details	Lectures
01	Introduction to Adobe After Effects		10
	1. The interface	How to interact with interface and location of tools and panels. How to set up a project file and import media.	*02*
	2. Timeline	Understanding the timeline and its channels. Using channel settings to control media on timeline.	*02*
	3. Tools	Understanding tools and how they are used and applied.	*01*
	4. Panels	Understanding each individual panel and how they are used.	*01*
	5. Effects	Understanding the various effects, their usage and attributes. Introducing color correction. Understanding particle effects. Using sound Audio Effects.	*04*
02	Introduction to Adobe Premiere		08
	1. Files	Understanding files and formats. Importing files (video/audio/image).	*01*
	2. Timeline	Working on the time and layers.	*02*
	3. Editing	Tools required for editing the video. Working with audio layers separately.	*02*
	4. Key-frames and effects	Adding key-frames and using effects on layers.	*02*

	5. Rendering	Exporting files in various formats.	*01*
03	**Understanding VFX Elements**		**10**
	1. Layers	Understanding usage of layers.	*02*
	2. Masks	Understanding the importance of elements used to create masked effects.	*02*
	3. Render	Understanding render queue and setting up batch rendering while going through all render setups and outputs (formats) available.	*02*
	4. Composing	Working with media sequences. Understanding scene technique. One shot technique and cuts and transition techniques.	*02*
	5. Blend Modes	Working with various blend modes.	*02*
04	**Motion graphics and Colours**		**10**
	1. Kinematic Typography	Understanding usage of Kinematics in Typography.	*01*
	2. Content creation	Usage with simple characters to words or lines of content.	*02*
	3. Key framing	Importance of Key Frames. Understanding Tilting.	*02*
	4. Logo animation	Animating logos for visual impact and simulate still icons to communicate better.	*03*
	5. Colour	color Grading and color correction using after effects.	*02*
05	**Camera and Lights**		**10**
	1. Camera types	Types of camera and their usages.	*02*
	2. Shutter and aperture	Understanding shutter and aperture with lights.	*02*
	3. Lights	Types of lights and their usages.	*02*
	4. Effects of lights	Using camera and lights to simulate a 3D experience.	*02*
	5. Objects	Creating Objects and their usage with camera and lights.	*02*
Total			**48**

1. Mr. Arvind Parulekar: (Convener)
2. Mr. Neil Maheshwari: (Subject Expert)
3. Prof. Izaz Ansari (Subject Expert)
4. Mr. Ashish Gandhre: (Industry Expert)

Internal Exercise:

The objective of internal exercise is to help the learners identify opportunities in visual effects in the broadcast and film making industries.

Sr. No.	Project Assignment	Reason/Justification
01	Animated Logos and Kinematic Typography	Creating Indents for Television, Movies or Online Videos. This project creates understanding of animation and how kinematics works with the elements. Allows deeper understanding of communication with simple objects. (Logos and Text)

302

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**III**
Course:	**CORPORATE COMMUNICATION and PUBLIC RELATIONS**
Paper	**02 (DSC-C1) CORE V**
Course Code	**BAMMC CCPR-302**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

Course Outcome:

1. To provide the students with basic understanding of the concepts of corporate communication and public relations.
2. To introduce the various elements of corporate communication and consider their roles in managing media organizations.
3. To examine how various elements of corporate communication must be coordinated to communicate effectively in today's competitive world.
4. To develop critical understanding of the different practices associated with corporate communication with the latest trends and social media tools.

COUESE CODE	COURSE NAME	
BAMMC CCPR-302	CORPORATE COMMUNICATION and PUBLIC RELATIONS	
Syllabus		
Module	**Details**	**Lectures**
1	**Foundation of Corporate Communication**	**14**
	1. Introduction to Corporate Communication	Meaning , Need and Scope of Corporate Communication towards Indian Media Scenario — *02*
	2. Keys concept in Corporate Communication	*Corporate Identity:* Meaning and Features, *Corporate Image:* Meaning, Factors influencing Corporate Image, Corporate Image creation sustainability and restoration (Online and traditional) *Corporate Reputation and Management:* Meaning, Advantages of Good Corporate Reputation. — *06*
	3. Ethics and Law in Corporate Communication	Importance of Ethics in Corporate Communication, Professional Code of Ethics, Mass Media Laws: Defamation, Invasion of Privacy, Copyright Act, Cyber-crime and RTI. — *06*

2	**Understanding Public Relations**		**16**
	1.Introduction and Growth of Public Relations- Indian Scenario	Meaning, Definitions, Scope, Objective and Significance of Public Relation in Business. Tracing Growth of Public Relations, in India, Internal and External PR. Reasons for Emerging International Public Relations, Mergers/Collaborations/Joint Ventures between Indian and international public relations agencies, advantages and disadvantages of Public Relations.	*06*
	2.Role of Public Relations in various sectors	Healthcare, Entertainment, Banking and Finance, Real estate, Fashion and Lifestyle and Service.	*04*
	3.Theories and Tools of Public Relations	Grunting's (4 models),Pseudo-events, Publicity , Propaganda, Persuasion, Situational theory , Diffusion theory and various tools of Public Relations (Press conference, Press release , Media Dockets, Advertorials, Sponsorship.	*06*
3	**Corporate Communication and Public Relation's range of functions**		**10**
	1.Media Relations	Introduction, Importance of Media Relations, Sources of Media Information, Building Effective Media Relations, Principles of Good Media Relations , Media analysis and evaluation	*03*
	2.Employee Communication	Introduction, Sources of Employee Communications, Organizing Employee Communications, Benefits of Good Employee Communications, Steps in Implementing An Effective Employee Communications Programme, Role of Management in Employee Communications	*03*
	3.Crisis Communication	Introduction, Impact of Crisis, Role of Communication in Crisis, Guidelines for Handling Crisis, Trust Building, Case studies such as Nestle Maggie, Indigo, Cadbury Dairy Milk, Niira Radia, Tylenol etc	*04*
4	**Latest Trends, Tools and Technology Role of Social media in Corporate Communication and Public Relations**		**08**
	1.Emerging trends, tools and technology	Introduction, Today's Communication Technology, Importance of Technology to Corporate Communication, pros and cons of technology used in Corporate Communication.	*02*
	2.New Media Tools	Website, Online press release, Article marketing, Online newsletters, Blogs	*02*
	3.Role of Social Media	Role of Social media as Influential marketing, Identifying brand threats, influence journalist's stories, swiftly react to negative press, Viral marketing, engaging and interacting, storytelling, E- Public Relations and its importance.	*04*
Total Lectures			**48**

BOS Syllabus Sub- Committee Members		
1. Prof. Shobha Venkatesh (Convener) 2. Dr. Hanif Lakdawala (Course Expert) 3. Dr. Rinkesh Chheda (Course Expert) 4. Ms. Amrita Chohan (Industry Expert)		
Internal evaluation methodology		**25 Marks**
Sr no.	**Project/Assignment**	
1.	Presentation various topics learned	
2.	Writing Press release	
3.	Mock Press conference	
References:		
1. Public Relations Ethics, Philip Seib and Kathy Fitzpatrick 2. Public Relations- The realities of PR by Newsom, Turk, Kruckleberg 3. Principals of Public Relations-C.S Rayudu and K.R. Balan 4. Public Relations -Diwakar Sharma 5. Public Relations Practices- Center and Jackson 6. The Art of Public Relations by CEO of leading PR firms		

303

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**III**
Course:	**MEDIA STUDIES**
Paper	**03 (DSC-C2) CORE VI**
Course Code	**BAMMC MS-303**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

COURSE OUTCOME

1. **To provide an understanding of media theories**
2. **To understand the relationship of media with culture and society**
3. **To understand Media Studies in the context of trends in Global Media**

COURSE CODE	**COURSE NAME**
BAMMC MS-303	**MEDIA STUDIES**

Syllabus

Module	Topics	Details	Lectures
		Introduction	
1	**Eras, relevance, connection to culture, Literature**	• Era of Mass Society and culture – till 1965 • Normative theories-Social Responsibility Theory • Development media theory	**10**

		Media Theories	
2	**Propaganda and propaganda theory-**	• Origin and meaning of Propaganda • Hypodermic Needle/Magic bullet • Harold Lasswell	**14**
	Scientific perspectives to limited perspectives	• Paul Lazarsfeld-Two step flow • Carl Hovland and Attitude Change theory	
		Cultural Perspectives	
3	**Various schools**	• Toronto school (McLuhan) • Schools- Birmingham(Stuart Hall) • Frankfurt- Theodor Adorno and Max Horkheimer • Raymond Williams- Technological Determinism • Harold Innis- Bias of Communication	**12**
	Media and Identity	Feminism /Racism/ethnicity etc Caste/class/tribal/queer representations (India examples)	
		Media Effects	
4	**Theories on media Effects**	• Media effects and behavior • Media effect theories and the argument against media effect theories • Agenda Setting Theory • Cultivation Theory • Politics and Media studies-media bias, media decency, media consolidation.	**06**
		New Media and The Age Of Internet	
5	**Meaning making Perspectives**	• New media • Henry Jenkins-Participatory culture • Internet as Public sphere-Habermas to Twitter • McLuhan 's concept of Global village in the age of Netflix • Uses and Gratification in the age of Internet	**06**

BOS Syllabus Committee Members

1. Prof. Rani D'souza (Convener)
2. Prof. Neena Sharma
3. Prof. Bincy Koshy
4. Prof. Mithun Pillai

Internal Evaluation Methodology **25 MARKS**

1. Continuous assignments
2. Oral and practical presentations
3. Group/individual projects
4. Open book test
5. Group interactions
6. Quiz

References:

1. Mass communication theory- Dennis quail
2. Mass communication theory: foundations, ferment and future-Stanley j BaranandDennis k Davis
3. Introduction to mass communication: media literacy and culture updated edition 8th edition
4. Introduction to mass communication – Stanley J. Baran
5. Media and cultural studies-Meenakshi Gigi Durham and Douglas M Kellner
6. Social media: a critical introduction- Christian Fuchs

304

Program	**BAMMC**
Year	**SY BAMMC**
Semester	**III**
Course:	**Introduction To Photography**
Paper	**04 (DSC-C3) CORE VII**
Course Code	**BAMMC IP-304**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Brief:

The world cannot be imagined without images. Image is inseparable part of media. "Picture speaks thousand words." The course is designed to explore "how to make picture speak thousand words.

Learning Outcome: **Lectures: 48**

1. To introduce to media learner the ability of image into effective communication.
2. To help the learner understand that media photography is a language of visual communication and is far beyond just point and shoot fun moments.
3. To practice how picture speaks thousand words by enlightening the learner on how.
4. To develop the base of visualisation among learners in using pictures in practical projects.
5. To help learner work on given theme or the subject into making a relevant picture or photo feature.

COURSE CODE	**COURSE NAME**
BAMMC IP-304	**INTRODUCTION TO PHOTOGRAPHY**

Syllabus

Module		**Details**	**Lectures**
1	**Camera: The Story teller**		**12**
	1. The Body: The faithful middleman	The heart of the system How camera sees differently than human eyes. Limitations and Wonders of camera. Formats of camera: Small Full frame, Half frame (APS-C), Medium, Large (camera movements) Experiencing frame Types of camera: DSLR; View; Rangefinder; Mirror-less	*02*

	2. Aperture: The iris of the camera	Diaphragm Controls amount of light entering lens Factor in Exposure calculation Active factor of Depth of field and Bokeh (creative) F'-numbers and aperture scale. Application of Depth of Field in advertising and Journalism.	*03*
	3. Shutter: The Click magic	Blind between Lens and Image sensor Controls duration of light Major factor in Exposure calculation Main player in controlling action Motion blur, Motion freeze and Long exposure effects Application of motion blur/freeze in Advertising and journalism. Synchronization with Flash, Creative Slow sync	*05*
	4. Image sensor: The retina that sees	The image maker or recorder Film v/s digital Film: Photochemistry Digital: Photo-electronics Types of Sensor: CCD and CMOS ISO: Photosensitivity (Sensor/Film Speed)	*01*
	5. Viewfinder: The interactive monitor	The control room cum monitor Displays camera settings Aperture, Shutter and ISO Metering modes, Focusing modes, Exposure modes, Frame count, File format etc	*01*
2	**Lens: Imaging device**		**08**
	6. The eye of camera: Learning to see	Main player in image formation, Focusing the object (sharpening the image) Speed of the Lens (light intake ability) Numbers and Markings on the Lens AF, ED, IF, IS, SW, ASP etc	*02*
	7. Focal length: Which lens is suitable	The factor to consider for Type of Photography and choosing lens for the purpose. Main distinguishing factor Fixed V/s Variable focal length	*01*
	8. Image size: See close	The magnification ratio of a lens Longer focal length = Bigger image size	*01*
	9. Coverage angle: Crop out unwanted	Prime concern in Composition How much of a scene a lens takes in from a viewpoint Safe focusing distance, Distortion: Barrel/ Pin-cuision	*01*
	10. Types of lenses: The right one for the task at hand	Prime Lens v/s Zoom lens Prime = Fixed focal length Zoom = Variable focal length Normal, Wide angle and Telephoto Special purpose lenses: Macro, Fish eye, Tilt-shift	*03*

3	**Light: Parameters of Light- The essential raw material**		**16**
	6. Intensity and Exposure: Perfect tone	How much light: consideration for exposure Exposure triangle (A,S,ISO) The model of exposure	*03*
	7. Direction and Lighting: Lighting for Cinema, Television and Advertising	From where: direction begets shadow Shadow = Depth Lighting = Shading Three point lighting Key: Main Fill: Contrast level (lighting ratio) Kicker: Separation or background light Types of lighting: Portrait, Effect, Ambient and Mood or drama	*06*
	8. Quality and Ambience: Why there are umbrellas and reflectors	How soft or how hard: Effective size of light source Small: Hard, Contrast, Sharp Medium: Mid soft, moderate contrast, soft shadow Large: Extra soft, low contrast, shadowless Modifiers: Umbrella, Soft-box, Reflector, Diffuser, Grid, Gobos	*02*
	9. Colour and Mood: What tells Cozy or Cool	Colour of light concept: Main distinguishing factor Kelvin: Colour temperature *Pure light>True colours* White balance: Neutralizing Preset white balance and AWB Colour and Mood (warm/cool)	*02*
	10. Measure The Director in you is the King	Light meter: Main input of exposure Incident v/s Reflective (advantage / disadvantage) In built meter and Metering modes: Average, Center weighted, Spot, Matrix, Focus priority Exposure Modes: M, A, S, P, and Smart program modes Errors in inbuilt metering>Exposure compensation	*03*
4	**Composition: Art of Seeing> Way of portraying a subject**		**06**
	6. Frame and Aspect ratio	Dimensions of sensor and proportion Aspect ratio: 2:3/ 4:5/ 16:9 (HD)	*01*
	7. Visual indicators	Line, Shape, Size, Tone, Colour, Texture, Space and Center of interest; Subject= Aesthetic Assembly of objects	*01*
	8. Rules of composition	Rule of thirds/ Balance/ Leading lines/ Frame within frame, Enhancing depth/ Unusual viewpoint/ Shadow/ Pattern breaking…	*02*
	9. Breaking the rules	Cropping, Panorama, Flattening	*01*

	10. Viewpoint and Perspective: What Pros do	1, 2 and 3 point perspective: Vanishing points and viewpoint Normal: The way we see Enhanced: Exaggerated depth Compressed: Feeling of distance taken away Forced: Unrealism Aligned: Back projection and green screen application	*03*
5	**Digital Imaging: Electronic format**		**06**
	9. Image sensor	Format, 135mm/ APS-C, Medium format, Large format	*01*
	10. Megapixel	Pixel and its values, Total number of pixels, File size	*01*
	11. Resolution	Pixel Per Inch: Quality of Image, Magnification ratio	*01*
	12. Image magnification	Viewing distance, Image size and Pixilation How large an image can be for given megapixel	*02*
	13. File Formats	RAW, JPEG, TIFF (Bit and Compression) advantages and limitations of Raw format	*01*
Total Lectures			**48**

BOS Syllabus Committee Members

1. Prof. Arvind Parulekar: (**Convener)**
2. Prof. Izaz Ansari (Subject Expert)
3. Mr. Atul Bagayatkar (Industry Expert)

Suggested Methods

Sr. no.	Project/Assignment	Reason/Justification
01 Print Media	Scrap book with collection of Photographs cropped from newspaper and Magazine (40+20)	The pictures cropped are captured by professionals. This gives ready examples of what is the decisive moment and they can have to inspect the picture to understand composition, lighting and subject handling. Analysis of each picture for the learned topics in scrap book. **Points:** Depth of field, Motion blur/freeze, Lighting, Quality of light, Composition, Colour temp, Mood/Drama
02 Electronic Media	Screen shots captured of a movie (36)	Movie is a 2-3 hrs ongoing continuous event. Capturing real key frames is as if photographing in a small 2-3 hrs event, This should help them to look for the right story telling frame, anticipate and stay alert as if required on actual photographic assignment.
03 Field work	Shooting, i.e. actual working on given topics or themes.	This is the field application of the learnt technique to get presentable pictures. The creation part of appreciation and imitation rom above two projects.

Reference Books:

Collins Books series: Pentax Inc.

1. Taking successful pictures,
2. Making most of colour,
3. Expanding SLR system,
4. Lighting techniques

Minolta Photographer's handbook

- Indoor Photography, •

Outdoor photography:

Life Book series:

- Colour,
- Camera,
- Light
- Portrait

Photography course:

- Volume 1: Understanding Camera
- Volume 2: Secrets behind successful pictures
- Volume 3: Practicing Photography
- Volume 4: Handling Professional assignments

Me and My Camera

- Portrait photography
- Glamour photography
- Do it in Dark (Darkroom Techniques)
- Pro-technique (Pro-photo)
- Night Photography
- Beauty and Glamour
- Product Photography

305

Program	**BAMMC**
Year	**SY BAMMC**
Semester	**III**
Course:	**Film Communication-I**
Paper	**06 DRG**
Course Code	**BAMMC FCO-305**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Brief:

The media cannot be experienced without cinema. Movies are inseparable from social life today. Contribution of films are in all fields of mass communication whether Journalism, Public Relations, Advertising or pure entertainment. Cinema has larger impact on masses as well as all classes. The course is designed to understand cinema rather than only seeing it.

Course Outcome:	**Lectures: 48**
1. To inculcate liking and understanding of good cinema. 2. To make students aware with a brief history of movies; the major cinema movements. 3. Understanding the power of visuals and sound and the ability to make use of them in effective communication. 4. Insight into film techniques and aesthetics.	

COURSE CODE	COURSE NAME		
BAMMC FCO-305	FILM COMMUNICATION-I		
Syllabus			
Module		**Details**	**Lectures**
	Art of Story telling		
1.	**History:** Still pictures to moving images.	**1.1** History of Cinema. **1.2** Birth of Visual Art. **1.3** Understanding the Language of Cinema. **1.4** Transition from Documentary to Feature Film	*04*
2.	**Understanding aspects of film appreciation.**	**2.1** Grammar, Technology and Art. Director - the captain Writer – the back bone. **2.2** Aspects of Film-1: Visual Aspects and Editing Mise-en-Scene (Art, Costume, Camera placement) Cinematography Creating Meaning through editing **2.3** Aspects of Film-1: Film Sound Three components of Film Sound The relationship between Sound and Image	*08*
3.	**The Early Cinema:** 1895 to 1950	3.1 Early Years (1895-1919) World and India. The Silent Era (1920-1931) 3.2 Early Sound Era (1930-1939) 3.3 The developmental stage (1940-1950)	*8*
4.	**Major film movements and its impact.**	4.1 The major cinema movements and their film makers 4.2 Hollywood Cinema-Brief history of Hollywood, Star system, academy Awards, global audience of Hollywood cinema 4.3 Italian neo-realism- Origin and impact on world cinema, work of Roberto Rossellini and Vittorio de sica 4.4 Japanese cinema- Work of Yasujiro ozu, Akira Kurosawa, Hayao Miyazaki etc. 4.5 Irani cinema- Contribution of Abbas Kiarostami, Majid Majidi etc.	*12*
5.	**Mainstream Indian Cinema and parallel Indian cinema**	5.1 Art v/s Commercial 5.2 Indian Meaningful cinema(Commercial) • The Angry Young Man • The Indian Diaspora and Bollywood • Contemporary Bollywood Cinema • Globalisation and Indian Cinema, The multiplex Era 5.3Golden era of Indian Cinema – Important work of Bimal Roy, Guru Datt, Raj Kapoor and V. Shantaram 5.4 Indian New Wave cinema – Mrinal Sen, Mani Kaul, Girish Kasarvalli, MS Sathu 5.5 Parallel cinema: Contribution of Shyam Benegal, Govind Nihlani, Gulzar, Mani Kaul,	*16*

		Said Mirza etc.	
Total Lectures			**48**

BOS Syllabus Committee Members

1. Prof. Gajendra Deoda (Convener)
2. Prof. Chetan Mathur (Subject Expert)
3. Mr. Abhijit Deshpande (Industry Expert)

Internal exercise:

The objective of internal exercise is to help the students identify good cinema and how to write film review including all points of view. Also develop their vision to higher aesthetic level.

Suggested Methods		
Sr. no	**Project/Assignment**	**Reason/Justification**
1.Print Media	Write reviews of film seen by them during lectures/film festivals	To inculcate understanding of cinema and writing skills needed for film review
2.Electronic Media	Making documentary on any of the prominent film personalities/ genre/film theories	To make them understand the depth of cinema and its different aspects

Suggested Screenings:

- Documentaries on World and Indian Cinema (100 years of Cinema).
- Films of Dada Saheb Phalke
- Citizen Kane,
- The Battle over Citizen Kane
- Bicycle Thief
- Roshomon
- Do Bigha Zamin/Bandini
- Sahab, Bibi aur Ghulam/Pyaasa,
- Awara/Shri 420
- Lajwanti/Ek ke Baad Ek

306

Program	**BAMMC**
Year	**SY BAMMC**
Semester	**III**
Course:	**COMPUTERS MULTIMEDIA -01**
Paper	**06 DRG**
Course Code	**BAMMC CMM-306**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Brief: Digital workflow:

Since the introduction of computers in media every process of image editing and film editing is computerized. Various softwares –beginners to professional- are developed and today software knowledge equals literacy in media. Image, Audio and Video in digital format are easy to share and store as well as saved to multiple places. The knowledge of software has become extremely essential to survive and grow in media today.

Course Outcome:

1. To help learners make media industry ready. This will help learners to be aware of the minimum requirement of the software when stepping out in the industry.
2. To introduce the media softwares to make the learners understand what goes behind the scene and help them choose their stream.
3. To prepare learners skilled enough for independency during project papers in TY sem VI.
4. To help learners work on small scale projects during the academic period.

COURSE CODE	COURSE NAME and DETAILED SYLLABUS
BAMMC CMM-306	COMPUTERS MULTIMEDIA -01

Syllabus

Modules		Details	Lectures
1	**Photoshop: Pixel based Image editing Software**		**12**
	1. Introduction to Photoshop	Image editing theory Bitmaps v/s Vectors When to use Photoshop and when to use drawing tools	*02*
	2. Photoshop Workspace	The tools, Toolbox controls Property bar, Options bar, Floating palates	*03*
	3. Working with images	Image mode, Image size, canvas size Image resolution, size and resampling What is perfect resolution? Cropping to size and resolution Resizing v/s resampling	*05*
	4. Image Editing	Levels, Curves, Contrast adjustment, Colour adjustment Photo filters	*01*
	5. Working with Text	Text layer, Character palate, Paragraph palate, Text resizing, Text colour, Text attributes Working on simple project/ one page design	*01*
2	**CorelDraw: Vector based Drawing software**		**06**
	1. Introduction to CorelDraw	Corel Draw Interface, Tool Box, Importing files in CorelDraw, Different file formats	*01*

	2. Using text	Artistic and paragraph text, Formatting Text, Embedding Objects into text, Wrapping Text around Object, Linking Text to Objects Text C2C:	*01*
	3. Exploring tools	Basic shapes: Cut, Erase, Combine, Shaping tool: Nodes, Handles, Corners Convert to Curves: Reshaping, Creating figures, Logos	*01*
	4. Applying effects	Power of Blends, Distortion and contour Effects, Envelopes, Lens effects, Transparency, Creating Depth Effects and Power Clips	*02*
	5. Exporting in CorelDraw	Exporting, Types of export, Exporting for other software	*01*
3	**Quark Xpress/ InDesign: Layout Software**		**08**
	1. Introduction to Quark Xpress	List the menus, List the tools, Benefits of using Quark, Application of Quark	*02*
	2. Text Edits in Quark	Format of text, Purpose of text selection, Aligning text in different design formats, Text alignment with embedded images	*02*
	3. Using palettes	Using palettes for different types of publications made in quark, Magazine in quark, Newspaper in quark,	*01*
	4. Colour correction in quark	Embedding images in proper formats, Colour correction on the images, Adjusting according to the color tone of the publication,	*02*
	5. Exporting files	Types of files, Exporting for different publications/templates, Newspaper, magazine, etc.	*01*
4	**Premiere Pro: Audio-visual: Video editing software**		**10**
	1. Introduction to editing	Editing importance, Great editing examples, Editing for different formats (film/ad/news/etc.)	*02*
	2. Introduction to premiere	How premiere helps in editing, Understanding the toolbar, Importing files, Experimenting with video and audio layers, Basics of editing (cut/layers/different windows/etc.)	*02*

	3. Understanding file formats	Understanding different file formats (AVI/MPEG/MOV/H264, etc.), Importing raw footage for edits, Performing video checks while editing	*02*
	4. Using colour grading	What is color grading, Examples of color grading, Using filters and presents in color mixing, Applying presents on layers for editing	*02*
	5. Exporting and rendering	Exporting in different formats, Choosing right formats for exposing, Managing quality while exporting, Rendering and maintain file format, Improving quality and time to render techniques	*02*
5	**Sound Forge/Sound Booth: Sound Editing Software**		**12**
	1. Introduction to Digital Audio	Sound basics, Audio band pitch volume Understanding Digital audio Sampling, bit rate	*02*
	2. Concept of Dolby Digital	Mono, Stereo, Quadrophonic Surround sound, 5.1 Channel, Subwoofer Difference in Dolby Digital and DTS, More about DTS Three way sound speaker	*02*
	3. Sound Recording	Recording Equipment Microphone and Types of microphones Preamps, Power amps, Sound card Input from audio sources, Extract audio from CD Different audio saving formats Wave, WMA, CDA, MP3 Digital Computer software	*03*
	4. Working with Sound	Workspace, Play bar, timeline, Transport tool bar Working with audio file Basic editing, cut/copy/paste, Paste special Using Markers, Regions and Commands Sound processing techniques Channel converter, Bit depth converter	*03*
	5. Advanced Sound Processing	Delay, Echo, Reverb, Chorus Mixing sounds Noise gating. Expansion, Changing pitch and Time duration Sound track output Create your audio CD and mark chapters	*02*
	Total		**48**

BOS Syllabus Committee Members

1. Prof. Arvind Parulekar: **Convener**
2. Prof. Izaz Ansari: (Subject Expert)
3. Mr. Ashish Gandhre: (Industry Expert)

Internal exercise:

The objective of internal exercise is to help them identify image and video editing, and apply it to projects. This will ensure the knowledge of the students are up to the industry standards. Also helping them develop their vision to higher aesthetic level.

Sr. no.	Project/Assignment	Reason/Justification
01 Print	Preparing a magazine or a series of posters of different size (type of a campaign promotion) using either quark of PS or Corel	Taking example of magazines or daily newspapers, students can come up with a sample. This will help them be industry ready with a fair hands-on-experience.
02 Electronic	Making a short clip with the use of premiere and 3D Maya	Making a short video clip with the fusion of 3D Maya (some 3D element) and premiere to edit out a short clip (short film/ad/news reel, etc.)

References:

- Photoshop Bible McLeland Willey Publication
- Corel Draw Practical Learning: BPB Publication
- Quark Express-9 : Prepress Know-How Noble Desktop Teachers
- Desktop Publishing with Quark 10 Kindle version
- Digital Music and Sound Forge Debasis Sen BPB Publications

	SEM III	SEM IV	Justification
01	Photoshop Basic	Photoshop Advanced	Associated with Intro to Photography
02	CorelDraw	Adobe Illustrator	Both the software preferred in industry
03	Quark Express	Adobe InDesign	Both the software preferred in industry
04	Premiere Pro Basic	Premiere Pro Advance	Associated with Film Communication
05	Sound Forge/Booth	Dreamweaver	SF Associated with Radio and TV production and DW with Digital media production

1. The learner is learning Photography in Semester-III as well as Project papers in Semester - VI. Photoshop training shall make learner self-sufficient as well as employable in industry.
2. The learner is learning Film Communication in Semester -III. The knowledge of video editing shall help student to create short films and participate in competitions. Also learner can create his portfolio.
3. Dreamweaver is web designing software. Training in this can help learner to run his website and upload his work in photography and videography.
4. The learner is learning Radio and Television Production in Semester -IV. The audio is inevitable part and effective sound is the sole of audio and audio-video production. The training in sound processing shall help learner to use professional sound in his projects of Radio and Television as well as Film Communication.

_401-1

Program	**BAMMC**
Year	**SY BAMMC**
Semester	**IV**
Course:	**Electronic Media-II**
Paper	**Elective01 (AEEC-1)**
Course Code	**BAMMC EM-4011**
Total Marks	**100 (75:25)**

Number of Lectures	48

Course Outcome:

To make the students acquainted with working of the two powerful media; i.e. radio and television. The content is useful for both advertising and journalism students in order to further their careers in their respective fields.

COURSE CODE	COURSE NAME
BAMMC EM-4011	ELECTRONIC MEDIA-II

Syllabus

Modules		Details	Lectures
1	**Evolution and growth of Radio and Television:**		**08**
	A. Evolution and growth of Radio:	• Satellite Radio – The Evolution and Growth • AIR and Community Radio- Developmental and Educational Role • Internet Radio and Private FM Channels broadcast on Internet.	
	B. Evolution and growth of Television	• Evolution and growth of Private and Satellite channels: • Growth of Private International, National and Regional TV Networks and fierce. • Competition for ratings. • Satellite television broadcast- Television channels for niche audiences —entertainment, news, sports, science, health and life style. HDTV telecast • Proliferation of DTH services:	
2	**Regional channels:**		**10**
	A. Rise of regional channels and Importance of Regional Channels in India and Globally		
	B. Trends in regional radio and Television channels.		
3	**News and other nonfictional formats.**		**10**
	1. **TRP**	Breaking news on television and the TRP race:	
	2. Panel discussions:	How panel discussions can make the public opinion	
	3. Interviews:	Radio and Television Interview techniques	
	4. Anchoring:	Qualities of a good anchor Voice modulation	
	5. Radio Jockey:	Understanding your audience first, Voice modulation, Clear Diction, Accurate Pronunciation	

4	**Writing for Broadcast Media-(Radio and Television)**		**10**
	11. Preparation of Audio and Video briefs:	Idea generation, Scripting, Story board	
	12. Scripting:	Scripting for: Interviews/Documentary/Feature/Drama/ Skits on Radio and TV.	
	13. Ethics:	Ethics including Censorship in presentation of News. Code of conduct Fact checking	
5	**Current and Emerging Trends in Electronic media**		**10**
	5. '24/7 news broadcast:	Features, Audience effectiveness, advertisements and Dumbing down of News	
	6. Convergence and Multi-media:	1. Use of Facebook and Twitter handles by Radio and TV channels 2. Internet TV/ Radio 3. Mobile TV/Radio	
	7. Emerging Trends:	Mobile Technology, Social Media and Web: eg. • Hotstar • Voot • Sony Live	
	8. Digital storytelling /Features :	• Story idea • Development and Presentation • Web series	
	Total		**48**

Internals	**Marks 25**
Presenting, shooting and editing of news bulletin. Scripting and shooting for any fictional programme. Making a docudrama Writing and recording of radio talk show	
BOS Syllabus Committee Members	
1. Dr. Navita Kulkarni (Convener) 2. Prof. Neena Sharma (Subject Expert) 3. Prof. Gajendra Deoda (Subject Expert)	

401-2

Program	**BAMMC**
Year	**SYBMMC**
Semester	**IV**
Course:	**Theatre and Mass Communication-II**
Paper	**ELECTIVE**
Course Code	**BAMMC TMC-4012**

Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

COURSE OUTCOME :

1. Direction and the works, developing an eye for details
2. Deeper understanding of theatre and how it has evolved to create human connections
3. Understanding the role theatre plays as a medium of mass communication in development of society

COURSE CODE	**COURSE NAME**
BAMMC TMC-4012	**THEATRE AND MASS COMMUNICATION-II**

Syllabus

Module	Topic	Details	Lectures
		Indian Theatre Icons	
I	**Play Writing:**	1. Role of a playwright in theatre 2. Structure: Plot, Act, Scene, Character Setting 3. Basic types of playwriting, Script format 4. Role of IPTA and National School of Drama in the flourishing of theatre in India 5. Theatre and its contribution to cinema and television in India	10
	Contribution of Indian Dramatists who revolutionized Indian Theatre:		
		• Vijay Tendulkar • Girish Karnad • Bijon Bhattacharya • Prithviraj Kapoor • Utpal Dutt • Shambhu Mitra • Mahesh Dattani • Badal Sarkar • Ebrahim Alkazi • Satyadev Dubey • B.V. Karanth • Ratan Thiyam • Mohan Rakesh	
		Role Of Theatre	
II	**Theatre: Role As A Medium Of Mass Communication**	1. In India theatre emphasizes on the social problems and themes such as agriculture, literacy campaign, social and national harmony, human trafficking, child labor, gender discrimination, religious tolerance, women empowerment, prevention of HIV-AIDS, family planning, pulse polio, nutrition, environment pollution 2. Theatre for education and entertainment: Command or instructive function	**10**

		3. Theatre for development communication and social change: Persuasive function 4. Theatre for development (T4D): Building peace in Sierra Leone , Wise Up in Botswana (awareness of HIV/AIDS) – UNICEF 5. Development function: MacBride Commission report 'Many Voices One World' 6. Use of folk theatre, puppet theatre and mime for the above purpose to reach out to the rural masses.	
	Activity:	Get newspaper clips dealing with socio-political issues and prepare scripts for short skit.	
		Director And Producer	
III	**Direction and Production:**	1. What is direction, Qualities of a good director, Major responsibilities of a director, Principles of direction, Difference between creative director and interpretative director 2. Considerations for selection of a production, 3 producing formats, 5 departments of technical production 3. Who is a producer and what is his job 4. Types of rehearsals, Determining the number of performances, Theatre Angel 5. 10 top running Broadway shows	**10**
		Management And Marketing	
4	**Theatre management, marketing and event organization**:	1. Business aspects of theatre, a career in arts administration and management. 2. Budgetary planning, Costs Strategy 3. Performing Arts System and audience relations, Marketing and Communication strategies, Bookings and ticketing, Reviews and previews – press and publicity 4. Institutional relations and protocol, Infrastructure management 5. Supplier and provider management	**10**
		Scripting, designing and promotions	
	Theatre As self-expression:	1. Devising the message 2. Writing the script and finalising it 3. Designing the set 4. Rehearsals, Staging the performance, Curtains 5. Marketing and promotions	**08**
BOS Syllabus Committee Members			
1. Prof. Rani D'Souza (Convener) 2. Prof. Shamali Gupta (Subject expert) 3. Mr. Abhijit Khade (Industry expert)			

Internal evaluation through projects:
The class puts up a grand one act play

401-3

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**IV**
Course:	**Radio Program Production-II**
Paper	**ELECTIVE**
Course Code	**BAMMC RPP-4013**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**
COURSE OUTCOME:	
To give learner basic knowledge of radio/audio production theory, techniques and aesthetics via practical experience in the writing and production of several program formats. To make familiar them with the art of audio recording, editing, mixing, and aural storytelling techniques.	

COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**	
BAMMC RPP 310	**RADIO PRODUCTION-II**	
Syllabus		

MODULE		**DETAILS**	**LECTURES**
1	**The Discussion**		**10**
	1.	Format	
	2.	Selection of participants	
	3.	Preparation	
	4.	Speaker Control, Subject Control and Technical Control	
	5.	Ending the Programme	
2	**Commentary**		**08**
	1.	Preparation work with the Base Studio	
	2.	Different Sports	
	3.	Communicating Mood and Coordinating the images	
	4.	Content and style	
	5.	News Action and Sports Action	
3	**Using the internet and social media**		**10**
	1.	An online presence	
	2.	Internet radio	
	3.	Radio Podcasts	
	4.	Internet Research	
	5.	Making the best use of Social Media	
4	**Phone-Ins**		**10**
	1.	Technical Facilities, Programme Classification	
	2.	The Open Line And Choosing The Calls	
	3.	The Role Of The Host And The Host Style	
	4.	Reference Material, Use Of ‘Delay’	

	5.	Linking Programmes Together, Personal Counseling The Presenter As Listener	
5	**Making Commercials**		**10**
	1.	Copy Policy	
	2.	The Target Audience	
	3.	The Product Or Service 'Premise'	
	4.	Voicing And Treatment	
	5.	Music And Effects	
	Total		**48**

Syllabus Sub-Committee:

Prof. Gajendra Deoda (Convener)
Mr. Jaidevee Pujari Swami (Industry expert)
Dr. Navita Kulkarni (Subject expert)

References:

1. Lost Sound: The Forgotten Art of Radio Storytelling by Jeff Porter.
2. On the Air: The Encyclopaedia of Old-Time Radio by John Dunning.
3. The radio station by Michael C. Keith.
4. Radio Theory Handbook: Beginner to Advance by Ronald Bertrand
5. Out on the Wire: The Storytelling Secrets of the New Masters of Radio

401-4

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**IV**
Course:	**Motion Graphics and Visual Effects-II**
Paper	**ELECTIVE**
Course Code	**BAMMC MGV-4014**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**	
BAMMC MGV-4014	**MOTION GRAPHICS and VISUAL EFFECTS-II**	
	Syllabus	
Modules	**Details**	**Lectures**
01	**Compositing**	**08**
1. Pass Compositing	Multi Pass Compositing.	*01*
2. Pre Compositions	Creating a composition with original composition (Nesting)	*01*
3. Tracking-I	Application and usage of Tracking Elements. Understanding Match Moving.	*02*
4. Tracking-II	Object and Camera Tracking.	*01*
5. Layer and Node composition	Layer-based compositing. Node-based compositing.	*03*
02	**Rotoscopy**	**10**

	1. Rotoscopy	Understanding rotoscoping and its application and usage. Rig Removal and its importance.	*02*
	2. Matting	Understanding Alpha and Luma mattes. Use of Garbage mattes.	*03*
	3. Footage Clean-up	Removing faults/wires in live action footage.	*01*
	4. VFX and Colour Grading	Creating mattes for visual effects. Colour grading for specific objects/frames	*03*
	5. Exporting files	Understanding computability for rendering. Exporting in various file formats.	*01*
03	**Blender: Working with 3D**		**10**
	1. Introduction to 3D	Making and Rendering Your First Scenes.	*02*
	2. Tools	Basic Principle: Data blocks. Introduction to Edit Mode.	*02*
	3. 3D Objects	Separating and Joining Objects.	*02*
	4. Curves	Object Modifiers. Converting to Mesh from Curve.	*02*
	5. Textures	Materials, Textures, and How They Get onto Surfaces.	*02*
04	**Scripting and Workflow**		**10**
	1. Script Editor	Accessing Script Editor and its usage.	*02*
	2. Overlaying	Use and Importance of Overlaying.	*01*
	3. Expressions	Importance of Expressions. Understanding different expressions used and how they function.	*02*
	4. Workflows	The importance of workflows for a VFX Project.	*03*
	5. Industry application	How workflows are used in industry.	*02*
05	**Chroma Keying**		**10**
	1. Keying	What is Chroma Keying?	*02*
	2. Green and Blue screens	What is Blue/Green Screen Imaging? Why Blue/Green color be used.	*01*
	3. Chroma Screen	Application of Chroma (Green and Blue screen effect).	*02*
	4. Application	Using Chroma to work on simple shoots. Wire removals and cleaning up footage.	*03*
	5. Exporting to Premiere	Using visual effects into Premiere Pro timeline videos.	*02*
Total Lectures			**48**

Syllabus Sub-Committee

1. Prof. Arvind Parulekar: (Convener)
2. Prof. Izaz Ansari: (Subject Expert)
3. Mr. Ashish Gandhre (Industry Expert)

Internal Exercise:

The objective of internal exercise is to help them identify job opportunities in visual effects in the broadcast and film-making industries.

Sr. No.	Project/Assignment	Reason/Justification
01	Montage	Creating a Television News Broadcast with all its elements. This project helps with working with multiples elements and layers simultaneously. Shows the importance of audio elements and uses various techniques and effects.
02	Show Reel	Creating a project with all the tools, techniques and methods learnt in **Multimedia 1**. This project can be used as portfolio for aspiring VFX artists.

Note:

The course Motion Graphics and VFX is associated with Film Communication as well as Television Production of Radio and TV. Also, it is associated with Web designing and shall help learner create eye catching after effects in his own website.

402

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**IV**
Course:	**Writing and Editing for Media**
Paper	**CORE VIII DSC D1**
Course Code	**BAMMC WEM-402**
Total Marks	**100 (75 : 25)**
Number of Lectures	**48**

COURSE OUTCOME

1. Provide the ability to understand writing styles that fit various media platforms.
2. It would help the learner acquire information gathering skills and techniques.
3. On completion of this course, students will be able to understand similarities and differences in writing for all forms of media including internet and digital.
4. The learner will gather knowledge of different news and copy formats along with appropriate style-sheets and layout.
5. The learner will imbibe the importance of writing clearly, precisely and accurately for different types of audiences
6. Provide acquire basic proficiency in proof-reading and editing.

COURSE CODE		COURSE NAME	
BAMMC WEM-402		WRITING and EDITING FOR MEDIA	
Syllabus			
Modules	**Topics**	**Details**	**Lectures**
		PRINT MEDIA	
I	**WRITING FOR PRINT MEDIA**	1. What makes news? (determinants of news) 2. Art and basic tools of writing 3. Steps and elements of writing-editorial, features and review 4. Writing for Newspapers and Magazines 5. Writing a News story/feature stories/Article/Editorials(differences) 6. Leads, nut shelling and story structure 7. Writing style and the stylebook 8. Public Relations and corporate writing-various forms 9. Writing for Advertisements	**12**
		RADIO AND TELEVISION	
II	**WRITING FOR BROADCAST MEDIA**	1. Radio and Television: Challenges, strengths and weaknesses 2. Writing for Television and Radio programs 3. Script writing formats 4. Writing for interviews, live news and daily news 5. Radio jockeying / online radio and new trends Storyboarding for Television commercials	**10**
		DIGITAL MEDIA	
III	**DIGITAL MEDIA: A sunrise opportunity**	1. Difference between newspaper writing and writing for the Web, headline writing, deck heads, subheads, lists and hyperlinked content 2. How to produce well-written webpages Written content for the web, digital spaces and digitally distributed media. 3. Development of web-specific style guides, convergence of text and video on digital. 4. Emerging fields of personal publishing, including blogging and micro blogging (or publishing on LinkedIn). 5. Dealing with breaking news and fake news in real time. 6. Writing for Advertisements through Email and SMS 7. Writing Blogs	**14**

		EDITING	
IV	**EVALUATION OF CONTENT**	1. Checking spelling and grammar. Check news/magazine copies for headlines (types, appeal), sub heads, Use of graphics and illustrations for construction and information flow in Newspapers. 2. Rewriting leads 3. Achieving fitment with spacing requirements at any newspaper, magazine or webpage. 4. Checking Advertising agency copies, checking headline/sub headline (types, appeal) and maintaining sequence and flow in body copy. 5. Online editing: editing requirements; content, layout, clarity, style, conciseness, online headlining -website design	**12**

BOS Syllabus Committee members

1. Prof. Rani D'souza (Convener)
2. Mr. Adith Charlie (Industry Expert)
3. Ms. Shreya Bhandary (Industry Expert**)**

Internal Evaluation Methodology **25 MARKS**

1. Written assignments for print media
2. Digital /online written assignment
3. Writing blogs
4. Open book tests
5. Oral and practical presentations
6. Projects

1. James glen stovall, writing for the mass media, sixth edition, published by Dorling kindersley (India)
2. Artwick, Clauddete G., Reporting And Producing For Digital Media, Surjeet Publications, 1st Indian Reprint, 2005
3. The associated press stylebook. . Associated press (current edition)
4. Chicago guide to fact–checking (Chicago Guides To Writing, Editing And Publishing)By Brooke Borel
5. Fundamentals Of Writing: How To Write Articles, Media Releases, Case Studies, Blog Posts And Social Media Content By Paul Lima | 10 April 2013
6. Itule, B. D. and Anderson, D. A. (1989). News Writing and Reporting For Today's Media. Ny:Mcgraw-Hill
7. An introduction to writing for Electronic Media-Scriptwriting Essentials Across The Genres Authors: Robert B. Musburger
8. The basics of media writing-a strategic approach by Scott A. Kuehn - Clarion University Of Pennsylvania, Usa And Andrew Lingwall- Sage Publications
9. Writing for journalists (media skills) by Wynford Hicks
10. Feature writing for Journalists (Media Skills) by Sharon Wheeler
11. Writing for News Media: The Storyteller's Craft by Ian Pickering | 27 November 2017

12. An introduction to writing for electronic media: scriptwriting essentials across the genres by Musburger, PhD, Robert B.

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Program	**BAMMC**
Year	**SY BAMMC**
Semester	**IV**
Course:	**Media Laws and Ethics**
Paper	**(DSC D2) CORE IX**
Course Code	**BAMMC MLE-403**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Brief: In law a man is guilty when he violates the rights of others. In ethics he is guilty if he only thinks of doing so. - Immanuel Kant

Course Outcome:

1. To provide the learners with an understanding of laws those impact the media.
2. To sensitize them towards social and ethical responsibility of media.

COURSE CODE	**COURSE NAME**
BAMMC MLE-403	**MEDIA LAWS and ETHICS**

Syllabus

Module	**Details**	**Lectures**
1	**Constitution and Media**	**09**
	1. Core values of the Constitution — Refreshing Preamble, unique features of the Indian Constitution	01
	3. Freedom of Expression — Article 19 (1) (a), Article 19(2)	02
	4. Judicial Infrastructure — Hierarchy of the courts Independency of the judiciary Legal terminologies	2
	5. Social responsibility of the media — Social Responsibility Theory Emerging Issues in Social Responsibility Theory in today's era	2
	5. Social Media — Threat of Fake News and facts verification Social media decorum	2
2	**Regulatory bodies**	**10**
	1. Press Council of India — 2. Brief history: Statutory status 3. Structure 4. Powers and limitations	02

	6. TRAI	Role of Telecom Regulatory Authority of India	02
	5. IBF	1. Indian Broadcasting Foundation 2. Broadcasting Content Complain Council, 3. Broadcasting Audience Research Council	02
	4. ASCI	1. Advertising Standard Council of India 2. Mission 3. Structure 4. Consumer Complaint Council	02
	5. NBA	1. News Broadcasters Association : 2. Structure 3. Mission 4. Role	02
3	**Media Laws**		**10**
	1. Copyright and IPR	What is copyright, Intellectual Property Rights Exceptions Major Amendments Recent Case studies	02
	2. Defamation	1. Definition. 2. Civil, Criminal 3. Exceptions 4. Recent case studies	02
	3. IT Act	1. Information Technology Act 2000 2. Amendment 2008 3. Section 66A 4. Section 67 5. Case Studies	02
	4. Contempt	1. Contempt of Court 2. Contempt of Parliament	02
	5. More acts	1. Drugs and Magic Remedies (Objectionable Advertisements) Act, 2. Emblems and Names (Prevention of Improper Use) Act	02
4	**Media Laws**		**10**
	1. Right to Privacy	2. Evolution 3. Right to Privacy a Fundamental Right	02
	3. Morality and Obscenity	1. Indecent Representation of Women's Act 2. 19.2, IPC 292 , 293 3. Change in perception with time	02
	4. Unfair Practices	Unfair Trade Practices and the Competition Act 2002	02
	5. OSA	1. Official Secrets Act 2. Controversies 3. Case Studies	02
	4. RTI	1. Right To Information Act 2005 2. Brief History 3. Importance and current status	02

5	Media Ethics and Social Responsibility		09
	1. **Why Ethics**	What is ethics? And why do we need ethics?	01
	2. **Ethical responsibility of journalist**	1. Code of conduct for journalist 2. Conflict of interest 3. Misrepresentation 4. Shock Value	02
	3. **Fake News**	1. Post -truth and challenges of fighting fake news 2. Techniques of fact verification	02
	3. **Ethical responsibility of advertisers**	4. Violation of ethical norms by advertisers 5. Case Studies	02
	6. **Stereotyping**	Stereotyping of minorities, women, senior citizens, regions, LGBT	02
Total Lectures			**48**

Syllabus Sub-Committee	
1. Prof. Renu Nauriyal (Convener) 2. Prof. Mithun M Pillai (Subject Expert) 3. Prof. Bhushan M Shinde (Subject Expert)	
Internal exercise:	**25 Marks**
The objective of internal exercise is generate interest and awareness about new issues relating to media laws and media responsibility	

Sr. no.	Project/Assignment	Reason/Justification
1. Field work	Group presentation based on field visit eg. visit to court	Exposure to the real world of law and challenges of team work
2.Group discussion	On current issues relating to media law	This would demand clarity of perception and expression
3.Test	Based on the syllabus	To test the knowledge about the topics covered.

References:

1. Basu, D.D. (2005). Press Laws, Prentice Hall.
2. Iyer, V. (2000), Mass Media Laws and Regulations in India, AMIC Publication.
3. Thakurta, P.G. (2009).Media Ethics, Oxford University Press.
4. Duggal, P. (2002). Cyber law in India, Saakshar Law Publications
5. P. B. Sawant and P.K. Bandhopadhyaya- Advertising Laws and Ethics – Universal Law Publishing Co
6. Media Laws: By Dr S R Myneni, Asian Law

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Program	**BAMMC**
Year	**SY BAMMC**
Semester	**IV**
Course:	**MASS MEDIA RESEARCH**
Paper	**(DSC-D3) CORE X**
Course Code	**BAMMC MMR-404**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Course outcome

- To introduce students to debates in Research approaches and equip them with tools to carry on research
- To understand the scope and techniques of media research, their utility and limitations

COURSE CODE	**COURSE NAME**
BAMMC MMR-404	**MASS MEDIA RESEARCH**

Syllabus

Module	Topic	Details	Lectures
		Research In Media	
I	**Introduction to mass media research**	• Relevance, Scope of Mass Media Research and • Role of research in the media • Steps involved in the Research Process • Qualitative and Quantitative Research • Discovery of research problem, identifying dependent and independent variables, developing hypothesis	**12**
		Design	
II	**Research designs**	• Concept, types and uses • Research Designs: a) Exploratory b) Descriptive and c) Causal.	**04**
		Data Collection	
III	**Data – collection methodology**	a. Primary Data – Collection Methods I. Depth interviews II. Focus group III. Surveys IV. Observations V. Experimentations b. Secondary Data Collection Methods c. Literature review d. **Designing Questionnaire and measurement techniques** a. Types and basics of questionnaire b. Projective techniques c. Attitude measurement scales e. Sampling process f. Data Tabulation and Research report format	**18**

		Analysis	
IV	**Content analysis**	a. Definition and uses b. Quantitative and Qualitative approach c. Steps in content analysis d. Devising means of a quantification system e. Limitations of content analysis	**05**
		Application Of Research	
V	**Application of research in mass media**	a. Readership and Circulation survey b. TRP c. RRP d. Audience Research e. Exit Polls f. Advertising Consumer Research	**05**
		The Semiotics	
VI	The **Semiotics** of the **Mass Media**.	a. What is semiotics in media? b. Why is semiotics important? c. What are codes in semiotics? d. Semiotics and media	**04**
Total Lectures			**48**

BOS Syllabus Committee Members

1. Dr. Navita Kulkarni (Convener)
2. Dr. Hanif Lakdawala (Course Expert)
3. Prof. Rani D'Souza (Course Expert)

Internal Assessment: Methodology **25 MARKS**

Reference Books:

1. Research Methodology; Kothari: Wiley Eastern Ltd.
2. A Handbook Of Social Science Research: Dixon, Bouma, Atkinson OUP
3. Analysing Media Message: Reffe, Daniel; Lacy, Stephen And Fico, Frederick (1998); Lawrence Erlbaum associates.
4. Media Research Methods: Gunter, Brrie; (2000); Sage
5. Mass Media Research: Wimmer And Dominick
6. Milestones In Mass Communication: Research De Fleur

405

Program	**BAMMC**
Year	**SYBAMMC**
Semester	**IV**
Course:	**Film Communication II**
Paper	**(DSC-D4) DRG**
Course Code	**BAMMC FCO-405**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Brief:

The media cannot be experienced without cinema. Movies are inseparable from social life today. Contribution of films are in all fields of mass communication whether Journalism, Public Relations, Advertising or pure entertainment. Cinema has larger impact on masses as well as all classes. The course is designed to understand cinema rather than only seeing it. To give media better film makers.

Course Outcome:	**Lectures: 48**

1. Awareness of cinema of different regions.
2. Understand the contribution of cinema in society.
3. How to make technically and grammatically good films.
4. From making to marketing of films.
5. Economic aspects of film.
6. Careers in films.

COURSE CODE	**COURSE NAME**
BAMMC FCO-405	**FILM COMMUNICATION II**

Syllabus

Module	**Details**	**Lectures**
Understanding Cinema		
1. Regional Cinema	Regional Films and Film makers – Marathi (V. Shantaram), Bengali (Satyajit Ray/Ritwik Ghatak), Malayalam/Tamil/ Telegu/ Kannad, (Film makers – K. Balachandar, K. Vishwanath, Adoor Gopakrishnan) etc.	*12*
2. Hindi Cinema	2.1 Popular Hindi Commercial Films(Bollywood) 2.2 Past to Present 2.3 Economic contribution of cinema. 2.4 Convergence of Art and Commercial. 2.5 Genre in present (Romcom, Thriller, Biographic, Action, Musical etc.)	*12*
3. Cinema now	Contemporary Era Celluloid to Digital (1990-1999) Digital Explosion (2000 onwards) Media Convergence and Film Viewing Culture	*08*
4. Film Making	***Film Production to Film Exhibition*** 4.1 Aspects of Production Systems: Financial, Administrative and Creative. 4.2 Stages of Film Making -1: Pre-Production 4.3 Stages of Film Making -2: Actual Production 4.4 Stages of Film Making -2: Post-Production 4.5 Film and Censorship. 4.6 ROI Systems in Film Industry Distribution Promotion Marketing Branding Internet	*08*

	5. Film Culture	5.1 Introduction to Film Institute, Film Bodies and Trade Associations such as FTII, NFAI, Films Division, DFF, IFFI, CBFC, IFTDA, SGI, WICA, etc. 5.2. Film Festivals: What is Film Festival? Major Film Festivals in India and Abroad 5.3 Film Awards: Nature and Types of Film Awards Major Film Awards in India and Abroad	*08*
Total Lecture			**48**

BOS Syllabus Sub-Committee Members	
1. Prof. Gajendra Deoda (Convener) 2. Prof. Chetan Mathur (Subject Expert) **3.** Prof. Abhijit Deshpande (Industry Expert)	
Internal Exercise:	**25 Marks**
To make students put in practical use the outcome of Film Communication.	

Suggested Methods		
Sr. no.	**Project/Assignment**	**Reason/Justification**
Electronic Media	Group project of Short film making	To understand the understanding of cinema grasped by the students.

Suggested Screenings:
Documentaries on Famous Film makers – K. Balachander. K. Vishwanath, Adoor etc. Pinjra Apur Sansar/Megha Dhake Tara Sholay/Amar Akbar Anthony Hum Aapke Hai Kaun / Dilwale Dulhaniya Le Jayenge Bajirao Mastani/Manikarnika/Bahubali URI Film

406

Program	**BAMMC**
Year	**SY BAMMC**
Semester	**IV**
Course:	**Computer Multimedia II**
Paper	**(Practical) DRG**
Course Code	**BAMMC CMM-406**
Total Marks	**100 (75:25)**
Number of Lectures	**48**

Brief: Digital workflow:

Since the introduction of computers in media every process of image editing and film editing is computerized. Various soft wares –beginners to professional- are developed and today software knowledge equals literacy in media. Image, Audio and Video in digital format are easy to share and store as well as saved to multiple places. The knowledge of software has become extremely essential to survive and grow in media today.

Course Outcome:

1. To help learner be media industry ready. This will help learners to be aware of the minimum requirement of the software when stepping in the industry.
2. To introduce the media soft wares to make the learner understand what goes behind the scene and help them choose their stream.
3. To prepare learner skilled enough for independency during project papers in TY sem.VI.
4. To help learners work on small scale projects during the academic period.

COURSE CODE	**COURSE NAME**	
BAMMC CMM-406	**Computer Multimedia II**	
Syllabus		
Modules	**Details**	**Lectures**
1	**Photoshop: Advanced Image Editing**	**12**
	1. Working with multiple images	**Mixing** Selection marquee, Lasso, Magnetic lasso, feather Slice tool, Erase tool Pen tool and image tracing Clone tool, Stamp tool	*02*
	2. Image Effects	**Editing** Burning, Dodging Smudge, Sharpen, Blur Eyedropper, Choosing colour Swatches, Colour pick Filters	*03*
	3. Working with Layers	**Layer basics** Changing background, Gradient Moving linking aligning layers Applying Transformations Masking layers Masts and extractions Layer effects, Adjustment layers	*05*
	4. Wonders of Blend Modes	Blend modes Advanced blending options Layer blends	*01*
	5. Fully Editable Text	Text as art, Glyphs, Creative text Type mask tool, Image in text Text to path and Direct selection Path selection (black arrow) Creating Professional design using all the tools	*01*

2	**Adobe Illustrator: Vector based Drawing software**		**07**
	1. Introduction to Adobe Illustrator	Illustrator Interface, Tool Box, Panels and Bars Importing files in illustrator, Different file formats	*02*
	2. Using text	Artistic and paragraph text, Formatting Text, Embedding Objects into text, Wrapping Text around Object, Linking Text to Objects	*02*
	3. Creating Simple designs	Text based logo replication, Shape based logo replica, Creating new symbols, Fill colour, Outline colour, Weight and opacity	
	4. Applying effects	Power of Blends, Distortion and contour Effects, Envelopes, Lens effects, Transparency, Creating Depth Effects and Power Clips	*02*
	5. Exporting in Illustrator	Exporting, Types of export, Exporting for other soft wares	*01*
3	**InDesign: Layout Software**		**08**
	1. Introduction to Adobe In Design	List the menus, List the tools, Palates Benefits of using In Design, Application of In Design	*02*
	2. Text Edits in InDesign	Format of text, Character and Paragraph Bars Purpose of text selection, Aligning text in different design formats, Text alignment with embedded images	*02*
	3. Using palettes	Using palettes for different types of publications made in InDesign, Magazine in InDesign, Paragraph styles Newspaper in InDesign, Paragraphs type palate, Text wrap palate	*01*
	4. Colour correction in InDesign	Embedding images in proper formats, Colour correction on the images, Adjusting according to the color tone of the publication	*02*
	5. Exporting files	Types of files, Exporting for different publications/templates, Newspaper, magazine, etc.	*01*
4	**Premiere Pro: Audio-visual: Advanced application**		**10**
	1. Introduction to editing	Editing importance, Great editing examples, Editing for different formats (film/ad/news/etc.)	*02*

	2. Exploring Premiere Pro	How premiere helps in editing, Understanding the toolbar, Importing files, Experimenting with video and audio layers, Basics of editing (cut/layers/different windows/etc.)	*02*
	3. Right application of various file formats	Understanding different file formats (AVI/MPEG/MOV/H264, etc.) Importing raw footage for edits, Performing video checks while editing Using inbuilt transitions,	*02*
	4. Using colour grading	What is color grading, Examples of color grading, Using filters and presents in color mixing, Applying presents on layers for editing	*02*
	5. Exporting and rendering	Exporting in different formats, Choosing right formats for exposing, Managing quality while exporting, Rendering and maintain file format, Improving quality and time to render techniques	*02*
5	**Adobe Dreamweaver: Web designing software**		**11**
	1. Introduction to Dreamweaver	Workspace overview Document toolbar, Document window, Panel groups, Files pane, Property inspector, Tag selector Defining website in Dreamweaver	*02*
	2. Working with DW	Creating Dreamweaver template Page layout in DW CSS layouts: advantages and disadvantages Creating HTML pages, Insert content and form Creating Forms in DW	*02*
	3. Linking pages	Using DW to accomplish basic web page development, Page properties Title, Background image, BG colour, Text colour, Links	*03*
	4. Using Tables	Cell padding, cell spacing, Border Table basics: Colour BG in cell, Invisible tables, Changing span, Making image into clickable link	*02*
	5. Typo in DW	Changing Font typefaces, size, style, colours Text to hyperlink	*02*
	Total		**48**

BOS Syllabus Committee Members

1. Prof. Arvind Parulekar (Convener)
2. Pro. Izaz Ansari (Subject Expert)
3. Mr. Ashish Gandhre (Industry Expert)

Internal exercise:

The objective of internal exercise is to help them identify image and video editing, and apply it to projects. This will ensure the knowledge of the students is up to the industry standards. Also helping them develop their vision to higher aesthetic level.

Sr. no.	Project/Assignment	Reason/Justification
01 Print	Preparing a magazine or a series of posters of different size (type of a campaign promotion) using either InDesign of PS or Illustrator	Taking example of magazines or daily newspapers, students can come up with a sample. This will help them be industry ready with a fair hands-on-experience.
02 Electronic	Making a short clip with the use of premiere	Making a short video clip with premiere to edit out a short clip (short film/ad/news reel, etc.) Embedding video with Dreamweaver

Bibliography:

- Photoshop Bible, McLeland ,Willey Publication
- Adobe Illustrator Classroom in a book: Adobe House
- InDesign: Classroom in a book Kelly Kordes and Tina DeJarld Adobe
- Adobe Premiere Pro: Practical Video Editing
- Dreamweaver: Web designing made easy: Todd Palamar

	SEM III	SEM IV	Justification
01	Photoshop Basic	Photoshop Advanced	Associated with Intro to Photography
02	CorelDraw	Adobe Illustrator	Both the soft wares preferred in industry
03	Quark Express	Adobe InDesign	Both the soft wares preferred in industry
04	Premiere Pro Basic	Premiere Pro Ad	Associated with Film Communication
05	Sound Forge/Booth	Dreamweaver	SF Associated with Radio and TV production and DW with Digital media production

Note: Please refer the reasons for this multimedia course in continuing soft wares like Photoshop and Premiere Pro from Sem-II to Sem-IV. The Course outcome shall be met during this course.

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AC : _October 3, 2019. Item No. 4.9

UNIVERSITY OF MUMBAI

Sr. No.	Heading	Particulars
1	Title of the Course	BA in Multimedia and Mass Communication (BAMMC)
2	Semesters	05 and 06
3	Level	P.G. / √**U.G.**/ Diploma / Certificate **(Strike out which is not applicable)**
4	Pattern	Yearly / Semester √ **CBCS (Strike out which is not applicable)**
5	Status	New / Revised √ **CBCS (Strike out which is not applicable)**
6	To be implemented from Academic Year	From Academic Year 2021-22**in Progressive manner**.

Date: **Signature :**

Name of BOS Chairperson√ / Dean : __Dr. Sunder Rajdeep

TYBAMMC Semester - V

Semester V- Journalism		
Course Code	**Credits**	**Course Name**
COMPULSORY-CORE	**04X2=08**	**DRG (Discipline Related Generic)**
BAMMC DRG-501	**04**	**1. Reporting**
BAMMC DRG-502	**04**	**2. Investigative Journalism**
ELECTIVES	**03X04=12**	**DSE 1 B (Discipline Specific Electives) (Elect Any Four Courses From Below)**
BAMMC EJFW 1B501		1. Features and Writing For Social Justice
BAMMC EJWS 1B502		2. Writing and Editing Skills
BAMMC EJGM 1B503		3. Global Media and Conflict Resolution
BAMMC EJBF 1B504		4. Business and Financial Journalism
BAMMC EJMJ 1B505		5. Mobile Journalism and New Media
BAMMC EJNM 1B506		6. News Media Management
BAMMC EJJP 1B507		7. Journalism and Public Opinion
BAMMC EJML 1B508		8. Media Laws and Ethics
TOTAL	**20**	

COMPULSORY- CORE- DRG(DISCIPLINE RELATED GENERIC)		
BAMMC DRG-501	04	1. REPORTING
BAMMC DRG-502	04	2. INVESTIGATIVE JOURNALISM

COMPULSORY –CORE 01	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**REPORTING**
COURSE CODE	**BAMMC DRG-501**
PAPER	**DRG (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC DRG-501	**REPORTING**

COURSE OUTCOME

1. To enable students to become Reporters which is supposed to be a prerequisite while entering into the field of Journalism.
2. To make them understand basic ethos of the news and news-gathering.
3. To prepare them to write or present the copy in the format of news.
4. To develop nose for news.
5. To train them to acquire the skills of news-gathering with traditional as well as

modern tools.

6. To inculcate the skills for investigative journalism.
7. To make them understand the basic structure/ essential knowledge for various beats.
8. To make them responsible reporters and the face of media.

Module		Details	Lectures
1			
	Concept Of News	Definition Of News, types of news, elements of news, collection of facts. News-writing How to write a news story, Basic Principles of Reporting ABC of Reporting Accuracy, Balance/Brevity and Clarity. Objectivity as the basic principle. Is it possible to adhere to the principle? Other basic principles such Verification, Attribution of Sources, Speed. Do these principles clash with each other?	10
	2. News Gathering	A) How do reporters gather news? Press Conference, Public Meetings, Press Release, Interviews, Rallies, Official Programs. Incident/On the spot coverage. B) Sources Primary and Secondary Citizen journalism Role of anonymous sources. New-age technological sources-RTI, Recorders, Camera, Spy Camera and Spy tools, Social Media, Being undercover.	10
	3. **Beats System in Reporting**	What is beat system, why it is necessary, how does it help, What are requirements of various beats. The basic beats such as Crime, Civic Affairs/Local Administration Law and Courts, Politics, State Administration, Transport (Road, Rail, Waterways and Aviation), Infrastructure, Education Health, Entertainment and Defense. New upcoming beats : Community, Women and Child welfare, Technology, Science and Environment, Youth and Career, Consumer.	10
	4. Coverage of Disasters	Do's and Don'ts. Role of Reporters. Mitigation, nuisance value, constructive role, Risks involved, Special training, if any, Precautions and responsibilities. Imminent Dangers or threats in Reporting. Study these with special in-depth reference to Pulwama attack Gadchiroli Naxal attack Return of Abhinandan Varthaman The references of Kerala flood, Orissa thunderstorm, Bihar, Assam flood may also be studied.	08

	5.Case studies	Ethical Issues in reporting/ Credibility of Reporters. Follow-up Story Yellow Journalism and its comparison with other forms. Rafale scam Agusta westland case PNB scam (Nirav modi) National Herald Panama case Bofors scam Watergate scam The Case studies are to be studied in the light of coverage done by reporters. The tools and techniques learnt in earlier sections from 1 to 11 should be applied in studying these.	10
	Internal Assignments		
	Suggestions :	There should be uniformity in the yardsticks for internal assessment of Reporting and emphasis should be on the field work/assignments rather than just objective questions. The coverage of the original news-stories, even in mock environment, be given priority. The knowledge of basic beats can be tested through the application.	

REFERENCES:

1. Aggarwal. VirBala, Essentials of practical journalism. (2006) Concept publishing Company, New Delhi.
2. Brunus, Lynette Sheridan, Understanding Journalism, (2002) Vistaar Publications. New Delhi.
3. Lawrence, Alders Lorenz and JhonVivan, News Reporting and Writing (2006) Pearson Education, New Delhi.
4. Pant N.C. and Jitenderkumar, Dimensions of Modern Journalism. (1995) Kanishka Publishers, New Delhi. 5. Verma. M.K, News.

BOS SYLLABUS SUB-COMMITTEE MEMBERS

Prof. Gajendra Deoda (Convener)
Prof. Santosh Gore (Industry Expert)
Prof. Amruta Bane (Subject Expert)

COMPULSORY 02	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**INVESTIGATIVE JOURNALISM**
COURSE CODE	**BAMMC DRG-502**
PAPER	**DRG (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V			
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**		
BAMMC DRG-502	**INVESTIGATIVE JOURNALISM**		
COURSE OUTCOME			
1. Understand the role of investigative reporting in modern journalism 2. To learn to conduct investigative research in an ethical manner. 3. To create and write excellent investigative stories for media. 4. To acquire advanced investigative journalistic skills 5. Learner will acquire the ability to understand and analyse the key areas of investigative journalism even with limited resources.			
MODULE	**TOPICS**	**DETAILS**	**LECTURES**
	CAREERS and OPPORTUNITIES IN INVESTIGATIVE JOURNALISM		
I	**INTRODUCTION TO INVESTIGATIVE JOURNALISM**	• Who is an Investigative Reporter, Role of an Investigative Reporter • Qualities and essentials for becoming an investigative journalist, career and opportunities • Centre for Investigative Journalism (CIJ) • Ethical/unethical use of sting operations	10
		DATA COLLECTION	
II	**SOURCES**	• Records and the Confidentiality of Source • Issues of contempt, defamation • Right to Privacy and Official Secrets Act • What is evidence? • Case Study: Panama Papers and Watergate Scandal	10
		DESIGNING THE STORY	
III	**FINDING and WRITING YOUR STORY**	• Observation • Planning techniques • Cultivating sources • Developing the project	10

		DATA PROTECTION and SECURITY	
IV	**SECURITY OF SOURCES and DATA**	• Protection of sources • Safety of journalists • Criticism of Investigative Journalism	08
		FINAL STORY	
V	**GENERATION OF THE STORY**	• Research methods • Insight knowledge • Asking the right questions • Libel and fact checking • Writing and rewriting the report	10
	TOTAL LECTURES		**48**

BOS SYLLABUS SUB-COMMITTEE MEMBERS

4. Prof. Rani D'souza **(Convener)**
5. Mr. Adith Charlie **(Industry expert)**
6. Prof. Renu Nauriyal **(Course expert)**
7. Ms. Shreya Bhandary **(Industry expert)**

INTERNAL EVALUATION METHODOLOGY **25 MARKS**

7. MANDATORY SCREENING OF THE FOLLOWING DOCUMENTARIES/FILMS/MOVIES

A. All The President's Men (Based On The Watergate Scandal, One of The Most Viewed Movies
B. Icarus (Documentary On The Russian Olympics Doping Scandal, Won The Oscar In 2018
C. Spotlight/The Post (Journalism In An Era Without Internet And Mobile Phones, When Journalists Took Years Working On An Investigation)

8. Project Guided By Faculties
9. Any One Small Local Case To Be Taken And Investigated And Submitted In The Form Of Compilation Of All The Methodology
10. Continuous Weekly Evaluation Of The Investigations Being Carried Out On The Case Study Selected By The Learner.
11. Group Discussions

REFERENCE BOOKS/JOURNALS/MANUALS

1. A Manual For Investigative Journalism
Edited By Syed Nazakat And The Kas Media Programme

ELECTIVE 01

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**Features and Writing For Social Justice**
COURSE CODE	**BAMMC EJFW 1B501**
PAPER	**1 DSE 1B (ELECTIVE)**

TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V		
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**	
BAMMC EJFW 1B501	**FEATURES AND WRITING FOR SOCIAL JUSTICE**	
COURSE OUTCOME:		
1. To provide students with technique of narration and story telling 2. To share the art of developing a story idea **3.** To acquaint and sensitize them through assignments to the issues of deprivation around us and using writing as a tool for social justice		
MODULE	**DETAILS**	**LECTURES**
1	**About features**	10
6.	What makes feature writing different	*01*
7.	Deconstructing a feature	*02*
8.	News Feature	*02*
9.	Human Interest Stories, Profiles	*02*
10.	Developmental stories, opinion pieces, in-depth features as tools of social justice	*01*
2	**How to pen a feature**	08
11.	Finding fresh ideas, developing a story idea	
12.	On and off field research	
13.	Building observation and listening skills	
14.	Structuring the story	
15.	Use of anecdotes, Illustrations, Interviewing	
3	**Becoming the voice of the urban poor (Mumbai): letters to editors, blogs**	10
11.	Prone to disasters : floods etc	*02*
12.	Poor health specially mental health	*02*
13.	Lack of facilities and obstacles to education	*02*
14.	Night schools	*02*
15.	Unemployment and exploitation	*02*
4	**Mumbai based features/ letter to the editor/ post/opinion piece on**	10
14.	Plight of Rag pickers	*02*
15.	Construction workers	*02*
16.	The homeless	*02*
17.	Slum rehabilitation projects	*02*
18.	Condition of Mumbai Jails/ Courts	*02*
5	**Mumbai based features/ letter to the editor/ post/opinion piece on**	10
14.	City issues of hygiene and pollution	*02*
15.	Water crisis	*02*
16.	Crime and safety	*02*
17.	Corruption issues faced by the common man	*02*
18.	Challenges faced by senior citizens and the physically/ mentally challenged	*02*
Total Lectures		**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. Prof. Renu Nauriyal **(Convener)**
2. Prof. Kanika Kachru
3. Dr. Mahesh Patil
4. Prof. Deepak Tiwari

INTERNAL EVALUATION METHODLOGY	**25 MARKS**
Sr. no.	Project/Assignment
01	Letters to the Editor
02 Electronic Media	Flip class presentation
03 Field work	Feature based in Mumbai or vicinity on any one of the issues of social justice

REFERENCES:

1. Feature Writing: Meera Raghvendra Rao, 2012
2. Communication and Development: The Challenges of Twenty First Century- V.S. Gupte, 2000.
3. *On Writing Well* (30th anniversary edition), William Zinsser, Harper Paperbacks, 2006.
4. Poverty and deprivation among the Katkari by Rohit Mutatkar, Economic and Political Weekly Vol. 52, Issue no. 13.01 April, 2017
5. Legal status and deprivation in urban slums over two decades by Laura B Nolan, David E Bloom and Subbaramaniyam. Economic and Political Weekly Vol. 53, Issue No 15, 14 April, 2018.
6. Delhi's Slum Dwellers, deprivation, Preferences and Political Engagement among Urban poor by Abhijit Banerjee, Rohini Pande and Michael Walton, International Growth Centre, October 2012.

19. The Free Voice on Democracy, Culture and Nation by Ravish Kumar.
20. Everyone Loves a Good Drought by P. Sainath.
21. Looking Away by Harsh Mandar.

ELECTIVE 02

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**WRITING and EDITING SKILLS**
COURSE CODE	**BAMMC EJWS 1B502**
PAPER	**2 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJWS 1B502	**WRITING and EDITING SKILLS**

COURSE OUTCOME:

1. To provide learners with tools and techniques of editing and writing.
2. To acquaint learners with the art of narration and storytelling strictly within the contours of journalistic principles.

Module		Details	Lectures
1	**Tools and Techniques of Editing**		**10**
	1. Brevity	Brevity: the soul of communication Eliminating redundancy in communication	02
	2.Functional Grammar	Refreshing Grammar, Common Errors	02
	3. Word power	Working with words	04
	4. Punctuations	For media usage	01
	5. Style book	Use of numbers, abbreviations, names and terms	01
2	**Crisp writing**		**08**
	1. News Sense	Finding the right story angle	02
	2. Saying it in bold	Writing headlines, captions, leads and intros	01
	3.Podcast	Writing for the ear	01
	4. Net cast	Writing for visuals	01
	5. Web writing	Story Compiling Difference between writing for print and real time writing	03
3	**Resume writing : Telling your story**		**10**
		Assimilating facts and details	02
		Building a narrative	02
		Making it pictorial	02
		Layout and page design	02
		Being a credible voice	02
4	**Feature Writing**		**10**
	1.Features stories	Human Interest Stories	02
	2. Reviews	Books, Films, App	02
	3. Columns	Analytical, Interactive, Agony Aunt	02
	4.Editorials	Importance, Voice of the publication, Format	02
	5.Obituaries	Writing obituaries Need for factual verification and tone. Can obituaries be critical?	02
5	**Interviews**		**10**
		Types of subjects	02
		Preparing for interviews	02
		Preparing a questionnaire	
		Protocol and Ethical Issues	02

		Writing the interview copy	02
Total Lectures			**48**

BOS SYLLABUS SUB-COMMITTEE MEMBERS
1. Prof. Renu Nauriyal (**Convener**) **2.** Prof. Shreya Bhandary

Internal Assessment **25 MARKS**

The objective of internal exercise is to help the learners grasp the most essential and interesting elements of a story and create an impactful narrative. The assignment will also challenge the creativity of the learner.

Sr. no.	Project/Assignment	Reason/Justification
01	Prepare a creative resume for print and also an audio-visual version	This would be a treasured element for the learners portfolio
02	Flip Class assignment	This will be a confidence building exercise and give the learner the opportunity to hone his presentation skills

Reference:

1. The Editor's Toolbox by Buck Ryan and Michael O' Donnell, Surjeet Publication
2. Writing for the Mass Media by James Glen Stovall
3. Amy Einsohn, The Copyeditor's Handbook, 3rd ed. (University of California Press, 2011)
4. The Chicago Manual of Style.

ELECTIVE 03

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**GLOBAL MEDIA and CONFLICT RESOLUTION**
COURSE CODE	**BAMMC EJGM 1B503**
PAPER	**3 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJGM 1B503	**GLOBAL MEDIA and CONFLICT RESOLUTION**

COURSE OUTCOME:

1. To help students understand the difference in the role and structure of the media across the globe.
2. To develop an understanding of the hold of media conglomerates and the issues of cultural differences

3 To help students appreciate the potential of media in resolving conflicts.

MODULE		DETAILS	LECTURES
1	**Evolution of Global Media**		**10**
		North – South Divide, Imbalance in Global flows	*01*
		NWICO, MacBride Commission, Failure of NANAP	*03*
		Global Media Conglomerates, parachute journalism and embedded journalism	*03*
		Post Truth and avalanche of fake news	*02*
		Information Disorder	*01*
2	**Media profiles, issues and analysis**		**10**
		Contemporary Role of Global News Agencies	*02*
		Media in Europe	*02*
		Media in USA and Australia	*03*
		Media in Russia	*01*
		Media in Africa : talking drums; community radio	*02*
3	**Media profiles ,issues and analysis**		**12**
		Media in China	*02*
		Media in Japan	*02*
		Media in North Korea	*02*
		Media in Singapore	*01*
		Media in the Middle East and Role of Aljazeera	*03*

		Media in Malaysia	*02*
4	**Conflict Resolution**		**10**
		Changing nature of conflict	*02*
		Media driver of peace or driver of conflict	*01*
		The shifting media landscape, Challenges for independent media	*02*
		The role media can play in conflict resolution and peace promotion	*01*
		Case study: The Kashmir Conflict and LTTE conflict in Sri Lanka	*04*
5	**Media Information Literacy**		**06**
		Five Laws of MIL	*01*
		MIL and youth radicalization in cyberspace	*01*
		Preventing violent extremism	*01*
		MIL to tackle social polarization of Europe	*02*
		Encryption / Cryptography media communication	*01*
		landscape	
Total Lectures			**48**

Internal exercise:

The objective of internal exercise is to help the learner study the media landscape in a country/ region, the apparent and subtle controls, bias and stereotypes as well as the issues related to cyberspace.

Sr. no.	Project/Assignment	Reason/Justification
01	Flip class assignment: Presentation on a media of a country/ region	This will sharpen the research and presentation ability of the learner
02	Discussion on any current media issue	This will expose them to different perspectives and the ability to listen to others
03	Essay/ test	Test of knowledge, critical thinking ability

BOS SYLLABUS COMMITTEE MEMBERS

1. Prof. Renu Nauriyal (Convener)
2. Prof. Shridhar Naik (Subject Expert)
3. Prof. Neena Sharma(Subject Expert)
4. Prof. Jitendra Nayak(Subject Expert)

INTERNAL EVALUATION **25 MARKS**

BIBLIOGRAPHY:

1. Understanding Global Media by Terry Flew, Red Globe Press
2. Media and Conflict Resolution: A Framework for Analysis by EytanGilboa Deutsche Welle – 3. Global Media Forum (2009) Conflict Prevention in the Multimedia Age
3. How to Understand and Confront Hate Speech Pankowski, Rafal (2007)
4. How media can be an instrument of peace in conflict-prone settings, drawn from Media in Conflict Prevention authored by Michelle Betz.1 Additional inputs to this paper by Katy Williams.
5. The Media Were American: U.S. Media in Decline. Jeremy Tunstall (2008} Oxford Press

22. Conflict-sensitive reporting: state of the art; a course for journalists and journalism educators (2009)17 UNESCO publication
23. Triumph Of The Image: The Media's War in The Persian Gulf, A Global Perspective (Critical studies in communication and in the cultural industries) by Hamid Moulana.
24. An indispensable intervention for countering radicalization and violent extremism, Jagtar Singh
25. The Kashmir Problem and Its Resolution, Wajahat Habibullah, United States Institute of Peace
26. .Social Media and Conflict Prevention By Sheldon Himelfarb, United States Institute of Peace. 2012.
27. How social media is changing the way we see conflict By Kym Beeston. 2014.
28. A New Era of Global Protest Begins By Rajesh Makwana. Transcend Media
29. Tweets of Contention: How Social Media is Changing Political Conflict By Thomas Zeitzoff. Political Violence.

ELECTIVE 04

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**BUSINESS and FINANCIAL JOURNALISM**
COURSE CODE	**BAMMC EJBF 1B504**
PAPER	**4 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJBF 1B504	**BUSINESS and FINANCIAL JOURNALISM**

COURSE OUTCOME

1. The overall objective of this course is to provide students with the background, knowledge and skills necessary to be business and financial journalists.
2. To create awareness about the importance of business and financial news and its role in coverage, reporting and editing

3. Acquire the skills to write different kinds of Business and Financial leads.
4. Acquire the skill to convert Business news releases into Business and financial reports
5. To improve skills in reporting and writing basic and complex business and financial stories in different beats
6. Provide a basic understanding of the world of business and finance by localising financial and economic data effectively.

MODULES	TOPICS	DETAILS	LECTURES
	BUSINESS AND FINANCIAL JOURNALIST		
I	**INTRODUCTION**	• Who is a Business Journalist? • Skills for Business Journalism • Role of a Business Journalist • Careers and opportunities in Business and Financial Journalism • Analysis of Major Business and Financial media in India	**04**
	REPORTING OF MAJOR INDIAN SCAMS		
II	**FINANCIAL JOURNALISM AND MAJOR INDIAN SCAMS**	• Satyam corporate fraud • Cement scandal • 2G scam / Neera Radia Tapes • Ketan Parekh scam • The Coalgate scam • Adarsh Housing Society scam • ICICI Bank - Chanda Kochar • Kingfisher – Vijaya Mallaya • Nirav Modi Scam • Rafale deal	**10**
	BEATS		
III	**BEATS AND AUDIENCES IN BUSINESS AND FINANCIAL JOURNALISM IN INDIA**	**1. Banking Sector in India** • Functions of commercial banks • Use of modern technology such as core banking its advantage, and its advantages, social benefits and use in banking in financial inclusion • Government schemes related to banking • Topics such as foreign exchange reserves; functioning of the World Bank, BRICS BANK and Asian Development Bank. • Business and Financial terminologies used in Media **2. Union Budget** • Components of the Union Budget	**18**

		• Why is India running a budget deficit and a fiscal deficit?, Populism and budget • Media presentation of Budget	
		3. Aviation • FDI policy for aviation in India • Why Indian carriers are making losses • Regulatory structure for civil aviation • Can any airline start international flights? • Media Coverage	
		4. Technology • Growth of India's IT service exports • Why India's engineers are sought-after? • Are India's engineers qualified? • The government's STPI framework for boosting tech innovation • Media coverage of technology	
		5. Startups • VC funding: a big driver of the startup ecosystem • India's unicorns: Startups valued at over $1 billion • Working in a corporate v/s working in a startup • Rise of tech and startup journalism • Startup India plan	
	FINANCIAL MARKETS and INSTITUTIONS		
IV	**1. STOCK EXCHANGE**	• Bombay Stock Exchange, National Stock Exchange • SENSEX, NIFTY and impact of their volatility. • Retail Market – the Indian Scenario	**10**
	2. UNDERSTANDING THE EQUITY MARKET	• Stocks, bonds and mutual funds, how they are bought and sold, how prices are determined • How to read stock tables for business journalism. • Currency Regulation • De-monetization • Commodities	

	3. ROLE , OBJECTIVES AND FUNCTIONS	**1.** Reserve Bank Of India **2.** SEBI - Securities And Exchange Board Of India **3.** Niti Aayog	
	GLOBALISATION		
V	**GLOBAL TRADE and FINANCE**	**1.** Globalization and its impact on international trade **2.** How currency markets operate **3.** Global supply chains and its impact on competitiveness of local industries **4.** The 2008 financial crisis	**06**
	Total Number of lectures		**48**

1. PROF. RANI D'SOUZA**(CONVENER)**
2. MR. ADITH CHARLIE **(INDUSTRY EXPERT)**
3. MR. RAJESH KURUP **(INDUSTRY EXPERT)**

INTERNAL EVALUATION METHODOLOGY

1. ASSIGNMENTS
2. SCREENING OF GOVERNMENT OF INDIA BUDGET LIVE ON TELEVISION OR INTERNET
3. VISITS TO BSE/NSE
4. WRITING ON ANY ONE BEAT ON A REGULAR BASIS
5. ORAL and PRACTICAL PRESENTATIONS
6. GROUP INTERACTIONS
7. DISCUSSIONS AND DEBATES

REFERENCES/WEBSITES/JOURNALS FOR BUSINESS and FINANCIAL JOURNALISM

1. Introduction to Business and Economic Journalism, Pandeli Pani(In Co-Authorship with Ulrike Fischer-Butmaloiu)
2. From Lehman To Demonetization: A Decade Of Disruptions, Reforms And Misadventures' By Tamal Bandyopadhyay
3. `Bandhan: The Making Of A Bank' By Tamal Bandyopadhyay
4. `Sahara: The Untold Story' By Tamal Bandyopadhyay
5. Indian Economy – RudraDutt And Sundhram
6. Indian Financial System – M.Y. Khan
7. Financial Journalism: Money Matters By Marie Kinsey
8. Introduction To Business And Economic Journalism By Pandeli Pani(In Co-Authorship With Ulrike Fischer-Butmaloiu)
9. Business Journalism: A Critical Political Economy Approach By Ibrahim Seaga Shaw
10. Newspaper Business Management – Frank Thayer
11. Business Journalism: How To Report On Business And Economics By Keith Hayes
12. List of Websites :
    a) Www.Bloomberg.Com
    b) Www.Reuters.Com
    c) business-standard.com
    d) financialexpress.com
    e) thehindubusinessline.com
    f) thequint.com
    g) outlookindia.com

h) asianage.com
i) mydigitalfc.com

ELECTIVE 05	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	MOBILE JOURNALISM and NEW MEDIA
COURSE CODE	BAMMC EJMJ 1B505
PAPER	**5 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJMJ 1B505	MOBILE JOURNALISM and NEW MEDIA

Course Outcome

- This course was arranged as a preparation program for Media Students, having an enthusiasm for finding out about the nuts and bolts of versatile news-casting. You needn't bother with any past involvement with the ideas, apparatuses or assets of portable news coverage.

Towards the end of the course, you will leave away with information about:

- Global adoption of mobile and its versatility has influenced and changed journalism in New Age Media. M-Learning, in the Era of New Media is the most effective method to get ready for the eventual fate of the media and life in a portable first world.
- Step by step instructions to report and connect with crowds utilizing cell phones.
- Step by step instructions to utilize the accepted procedures for ease of use and item plan when constructing your portable encounters in Journalism.
- The most effective method to settle on educated choices about structure portable news items crosswise over stages. The most effective method to get ready for the eventual fate of wearable's different patterns that may change the course of portable media and news-casting.

MODULE	TOPIC	LECTURES
I	**THE STATE OF MOBILE**	08
	1. How mobile has influenced modern journalism 2. Mobile centric reporting and editing 3. Mobile as a 'Newsroom'. 4. Branding of News using social media 5. Mobile News catering to Niche beats 6. Evolution of M-Learning (Mobile Learning) amongst the Youth with the Mobile Applications	

II	**Mobile Journalism**	12
	1. News Workflow and Mobile Journalism a. How to identify the seven basic steps of mobile reporting. b. How to create and share branded mobile journalism content. c. How to use two simple mobile apps to make an audio or video documentary, or a narrated photo-essay. d. How to select accessories that enhance the camera or audio quality of IOS smart phones and tablets. **2.** Introduction to Mobile Applications (News generation and Uploading process : techniques of generating audiences) **3.** Blog set-up **4.** Mobile writing and creation of News Trends (Hash tags, tagging, linking accounts etc	
III	**DESIGNING FOR THE MOBILE EXPERIENCE**	10
	A. Designing 1. How good design is intuitive, making something immediately usable. 2. About the importance of satisfying expectations of tactile interaction and content: tap, flick, pinch, drag, etc. 3. How mobile design differs from established desktop design. (Options and choices for your content). 4. About best practices for process: How design, development and content best work together. 5. About Mobile Analytics: What is your audience using? **B.** Social Newsgathering and Listening : creation of story ideas, News Sources and Content **C.** Social Media Collaboration with M-Learning and Viewer creation (Crowd sourcing) **D.** Going Viral : being the Scavenger and Mobile Journalist **E.** M-learning: learning the Art of News Audit	

IV	**MOBILE NEWS PRODUCT DEVELOPMENT**	10
	1. Different mobile development approaches and their benefits as well as weaknesses 2. Responsive vs. mobile apps vs. mobile-optimized Sites 3. How to go about planning and building mobile products (Different frameworks and services to move swiftly, other considerations such as staffing, timelines, etc.) a. The Digital Skeleton : understanding placing, timing and generation of News story b. Fake News c. Social Media Policies and Ethics d. Verification and Authenticity of information	
V	**FUTURE OF MOBILE JOURNALISM and M-LEARNING :**	10
	1. About the evolution of wearable 2. About the rise of Google Glass 3. About Glass Journalism 4. About augmented reality storytelling and journalism a. Emerging Forms of News management : 360 degree videos, wearable, accessories etc b. Emerging Managing Change in Newsroom culture and Evolving Business Models for M-Learning c. Studying Social Media Analytics d. M-learning the future of Newsrooms	

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. Prof. Gajendra Deoda(Convener)
2. Mr. Abhijeet Kamble (Industry Expert)
3. Dr. Yatindra Ingle(Subject Expert)

Sr. no.	Project/Assignment	Reason/Justification
01	Assignment/ Presentation	This will sharpen the research and presentation ability of the learner
02	Discussion on any current media issue	This will expose them to different perspectives and the ability to listen to others
03	Creation of Mobile News	5 one minute news stories or 5 minutes news bulletin

REFERENCES :

1. A Text Book of Internet and Web Page Design, Srivastav Rajkumar.
2. Web Masters Hand Book, Galgotia
3. Computer Graphic Software Construction, John R Rankin
4. The Internet Book, Comer Douhlas E .
5. The Information Society: An Introduction, Arm and Mattelart. 2003 by Sage Publications Ltd
6. Designing Interactive Websites, Mohleo James L and Thompson Learning

7. MOJO: The Mobile Journalism Handbook: How to Make Broadcast Videos with an iPhone or iPad by Ivo Burum, Stephen Quinn
8. *The Mobile Journalism Handbook Routledge text books.*
9. A Field Guide for Mobile Journalism Volume 1: Producing photographic stories with smart phones and tablets
10. Closer to the story? Accessibility and mobile journalism by PanuKarhunen

ELECTIVE 06

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**NEWS MEDIA MANAGEMENT**
COURSE CODE	**BAMMC EJNM 1B506**
PAPER	**6 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJNM 1B506	**NEWS MEDIA MANAGEMENT**

Course Outcomes:

1. To make students aware about the responsibilities, structure and functioning of responsibilities of an organization.
2. Students will be able to analyze individual media businesses and understand the Economic drivers of the media economy.
3. Students will have developed hands-on experience as content marketers using journalistic and digital techniques.
4. Students will have gained a perspective on the evolution of media in the last 25 years and on key current trends.

SR.NO.		MODULES	LECTURE
1.	**Introduction**		10
	Making News:	Truth, Ideology and News work	
	Legacy Media	Broadcast Media Overview and Print Publishing Overview	
	A Comparative Analysis with Electronic Media:	Contemporary Elements, Dimensions and Image of Print Media:	
	News media as business enterprise	• Proprietary concerns • Types of ownership	
2.	**Organizational Structure**		14
		• Hierarchy • Decision making • Inter-relationship between departments	

	Human Resource development	Specialized training for skilled workers	
	Financial Management		
	Cost and Profitability	• Costing classification and allocation • Nature of cost • Factors affecting cost • Fixed and variable costs	
	Challenges of Globalization and Liberalisation	a) Foreign Direct Investment b) Cross Media Ownership c) Commercialization of Media	
	Understanding Company Law	Press and Registration of Books Act • Relevant aspects of Company Law	
3.	**Resource and supply chain, and marketing techniques.**		12
	Resource and supply chain	• Newsprint • Technology • Production process	
	Managing Resources	• Advertising revenue building and maintenance • Circulation revenue • Ways to cut cost and boost revenue	
	Marketing techniques	• Brand building • Public Relations i. Newspaper's relation to its community ii. Understanding the target audience iii. Building goodwill iv. Promoting the newspaper's / site's services v. Sales promotional activities • Role of research and readership surveys • Sales forecasting and planning • Advertising the newspaper / website I channel • Becoming a digital media brand	
4.	**Disruptive Technology and Media Business Models:**		6
		1) The role of advertising 2) From Web 1.0 to 2.0 3) Yahoo, Craigslist, Google, Facebook, Twitter, Whats App, Pinterest	
5.	**Case studies**		6
		Case studies – Eenadu and Network 18 Expansion of Sky Network [Star Network in India] Relevance of TAM Ratings in News Channels along with IRS Studies	

	TOTAL LECTURES		48

BOS SYLLABUS COMMITTEE MEMBERS

1. DR. NAVITA KULKARNI- (**CONVENER)**
2. DR. PRIYADARSHINI PODDAR(SUBJECT EXPERT)
3. PROF GAJENDRA DEODA(SUBJECT EXPERT)

INTERNAL EVALUATIONS

Sr. no.	Project/Assignment	Reason/Justification
01	Assignment/ Presentation	This will sharpen the research and presentation ability of the learner
02	Discussion on any current media issue	This will expose them to different perspectives and the ability to listen to others
03	Creation of Mobile News	5 one minute news stories or 5 minutes news bulletin

REFERENCES:

1) Ben Badgikian: Media Monopoly
2) India's Communication Revolution from Bullock Carts to Cyber Carts, (Arvind Singhal, Everett M Rogers)
3) Advertising and Integrated Marketing Communications, (Kruti Shah)
4) Digital Branding: A Complete Step-by-Step Guide to Strategy, Tactics and Measurement (Daniel Rowles)
5) Disruptive Innovation: Strategies for Enterprise Growth (Jayanta Bhattacharya)
6) Understanding Company Law, (Alstair Hudson)
7) Newspaper organization and Management (Rucket and Williams)
8) The paper tigers by Nicholas Coleridge
9) News Media Management: Mr P.K Ravindranath
10)Print Media Communication and Management by Aruna Zachariah
11)News Culture by Stuart Allan

ELECTIVE 07

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**JOURNALISM and PUBLIC OPINION**
COURSE CODE	**BAMMC EJJP 1B507**
PAPER	**7 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJJP 1B507	**JOURNALISM and PUBLIC OPINION**

COURSE OUTCOME

1. To understand the role of media in influencing and impacting Public opinion.
2. To analyse the formation of Public opinion through digital and social media.
3. To analyse the impact of the media on public opinion on socio-economic issues.
4. To make students aware of theoretical framework of research on media and society.

MODULE	TOPICS	DETAILS	LECTURES
		PUBLIC OPINION AND THEORIES	
I	**UNDERSTANDING PUBLIC OPINION AND THEORIES OF MEDIA.**	1. **Defining Public Opinion.** Its functions in society. Means of gauging Public Opinion – opinion polls, exit polls, surveys, social media, Role of Media in influencing Public Opinion. **2. Media theories-** Walter Lippman - Modern Media and Technocracy Juergen Habermas- The idea of Public Sphere Paul Lazarsfeld – Research, Two Step Flow of Information Noam Chomsky – Manufacturing Consent, Propaganda Model Agenda Setting Vs Uses and Gratifications	**[4]** **[6]**
		POLITICAL OPINION AND POLICY MAKING	
II	**MEDIA'S ROLE IN INFLUENCING POLITICAL OPINION AND POLICY MAKING.**	1. Coverage of Political Parties, Personalities and General Elections by national and international media; media biases. Use of Media for election campaigns-The Donald Trump Elections, BJP campaign in India. **2.** Media Coverage of Indian Government's Economic, Defence and Foreign Policy.	**[6]** **[4]**
		WARS AND CONFLICTS	
III	**MEDIA'S COVERAGE OF WARS AND CONFLICTS.**	1. Vietnam War, Gulf Wars, Kargil Conflict, Surgical Strikes on Pakistan. 2. War on terror-International conflicts in Syria, Israel, Afghanistan and Europe.	**[6]** **[4]**
		SOCIO-ECONOMIC ISSUES	
IV	**MEDIA'S COVERAGE OF SOCIAL AND ECONOMIC ISSUES.**	A. Portrayal of Women in Media. B. Representation of LGBTQ community in media. C. Representation of Dalits, Tribals and Economically weaker sections of Society.	**[4]** **(2)** **[4]**

		IMPACT OF NEW MEDIA	
V	**EVOLUTION OF DIGITAL, SOCIAL AND NEW MEDIA AND ITS IMPACT ON PUBLIC OPINION.**	**1.** Digital media and its impact on Political culture. **2.** Use of Whats app, twitter and Face book to promote fake news **3.** Social media and its impact on culture.	**(3)** **(2)** **(3)**
	TOTAL LECTURES		**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. Prof. Rani D'souza (Convener)
2. Mr. Raju Korti (Industry Expert)
3. Prof. Mithun Pillai(Course Expert)

INTERNAL EVALUATION METHODOLOGY **25 MARKS**

1. CONTINUOUS ASSIGNMENTS
2. DIGITAL /ONLINE WRITTEN ASSIGNMENT
3. ORAL and PRACTICAL PRESENTATIONS
4. DISCUSSIONS/DEBATES
5. NEWS BASED PRESENTATIONS
6. PROJECTS

REFERENCES/JOURNALS/WEBSITES

1. Ahmed Rashid: The Taliban.
2. Chambers Deborah, Fleming Carole (2004), 'Women and Journalism', Psychology Press.
3. Rush Ramona, Oukrop Carole, Creedon Pamola (2013), 'Seeking equity for women in Journalism and Mass Communication education: A 30 year Update', Taylor and Francis.
4. Sardesai Rajdeep: "2014: The Election that Changed India" .
5. Walter Lippmann : "Public Opinion" by Herman Edward S. and Chomsky Noam "Manufacturing Consent: The Political Economy of the Mass Media" by
6. Lalles John: Nature and Opinion of Public Opinion.
7. Tiwari Arpit Rakesh: Study of the Print News Coverage of Narendra Modi @014 Lok Sabha Elctiond. – acadademia.edu.
8. Coverage of 2014 Lok Sabha Polls by News Channels – Analysis by Centre for Media Studies.
9. Coleman Benjamin: Conflict, Terrorism an Media in Asia.
10. Ranganathan Maya; Rodrigues Usha: (2010) Indian media in a Globalised World, Sag Publications.
11. en.qantara.de/content/the-arab-spring-and-the-media-distorted-images
12. Alexanrova Ekaterina – Using Media Effectively; Barack Obama's Election Campaign Academia.edu
13. EhabGalal and RiemSpielhans – Covering the Arab Spring: Middle East in the Media. Academia .edu
14. Babla Maya – Arab Spring Media Monitor Report: One year of Coverage. UDC Centre of Public Diplomacy.
15. Rutledge Dr. Pamela – How Barack Obama Won the Social Media Battle in 2012 Presidential Election : mprcenter.org/blog
16. Jamali Reza, Online Arab Spring: Social Media and Fundamental Change, Chandos Publishing House.

17. Sharma Ram Nath, Sharma Yogendra, Sharma Rajendra; (2000), Kargil war: A Saga of Patriotism, Shubhi publications.
18. Swami Praveen(1999): The Kargil War New Delhi: LeftWord Books
19. Humphries Drew (Ed), (2009), Women, Violence and Media: readings from feminist Criminology, UPNE.
20. Berns Nancy, Framing the Victim: Domestic Violence, Media, and Social Problems, transaction Publishers.
21. Bareh Hamlet, (2001), Encyclopaedia of North-East India: Assam, Mitthal Publications.
22. Freedman Des, Thussu Daya; (2011), Media and Terrorism: Global Perspectives, Sage Publications.
23. Schneider Nadja-Christina , Titzmann Fritzi-Marie (2014), Studying Youth,
24. Media and Gender in Post-Liberalisation India, Frank and Timmy Gmbh Publication (Pg 19- 45)
25. The social media era of political culture: the case study iceland posted by Oliver Bjornsson.
26. https://bainesreport.org/2017/11/the-social-media-era-of-political-culture-the-case-study-of-iceland/
27. How Social Media Affects Politics https://sysomos.com/2016/10/05/social-media-affects-politics/
28. How Digital Media are Influencing Politics and Political Discourses in Kenya Johanna RIESS http://frenchjournalformediaresearch.com/index.php?id=581
29. www.opendemocracy.net/openindia/paranjoy-bordoloi/mass-media-in-north-east-india-trends-of-conflict-reporting
30. Using New Media effectively: An Analysis of Barack Obama's Election Campaign Aimed at Young Americans by Ekaterina Alexandrova. (This is a thesis submitted by the student).
31. Karvin Andy: Distant Witness: Social Media, the Arab Spring and a Journalism Revolution.

ELECTIVE 08

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**MEDIA LAWS and ETHICS**
COURSE CODE	BAMMC EJML 1B508
PAPER	**8 DSE 1B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V			
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**		
BAMMC EJML 1B508	**MEDIA LAWS and ETHICS**		
COURSE OUTCOME:			
1. To help students understand the laws that impact the media 2. To develop an understanding of the ethical responsibilities of the media 3. To help students appreciate the challenges of fake news and misinformation in a new changing ecosystem of news and information.			
MODULE		**DETAILS**	**LECTURES**
1	**Laws relating to media freedom: provisions, status and case studies**		**08**
	6.	Article 19 (1) (a) of Indian Constitution	***01***
	7.	Article 19.2	***01***
	8.	Defamation –sections 499,500	***02***
	9.	Contempt of Courts Act 1971	***02***
	10.	Public Order – sections 153 AandB,295A,505	***02***
2	**Provisions in the Act, challenges in its implementation, case studies**		**12**
	1.	**Sedition (IPC124A), Obscenity (IPC292,293)**	***03***
	2.	**Contempt of Parliament**	***02***
	3.	**Official Secrets Act**	***03***
	4.	**Whistleblowers Protection Act**	***02***
	5.	**Press and Registration of Books Act**	***02***
3	**Provisions in the Act, challenges in its implementation, case studies**		**10**
	1.	Right to Information Act	***03***
	2.	Information Technology Act	***06***
	3.	Right to Privacy and its violation by media	***02***
	4.	Indian Evidence Act and its relevance for the media	***02***
	5.	The Copyright Act, the application of copyright, fair us, the incentive theory of copyright, damages and penalties	***03***
4	**Media Ethics**		**08**
	1.	Why ethics is important? Social responsibility of media	***01***
	2.	Core principles of journalism: Accuracy, Independence, Fairness, Confidentiality, Humanity, Accountability, Transparency	***01***
	3.	Confidentiality and Public Interest ,Conflict of interest,	***02***
	4.	Ethics and sting operation	***02***
	5.	Emergence of Alternative News Portals (e g: Alt News)	***02***
5	**Self –Regulation and Fake news**		**10**
	1.	Different forms of Regulation: State Regulation, Self-Regulation, Co-Regulation	***02***
	2.	Press Ombudsman: Readers' Editor- its significance. Regulatory practices in Developed Democratic Countries	***02***
	3.	Role of journalist to combat digital fuelling of disinformation, misinformation and mal information,	***02***
	4.	Is transparency the new objectivity? Sieving propaganda from new.	***02***
	5.	Sourcing and Verifying News; Ethical journalism the weapon to combat information disorder.	***02***

Total Lectures	48
BOS SYLLABUS COMMITTEE MEMBERS	
1. PROF. RENU NAURIYAL (**CONVENER)** 2. PROF. BHUSHAN M SHINDE 3. PROF. MITHUN M PILLAI	

Internal exercise: **25 Marks**

The objective of internal exercise is to help the learner apply the learning from the lectures and view critically, media related issues from a legal and ethical perspective.

Sr. no.	Project/Assignment	Reason/Justification
01	**Prepare a feature / research paper**	**This would challenge the writing, narrative and analytical skills of the learners**
02	**Group/ individual presentation**	**This exercise would build the confidence and presentation skills of the learners**
03	**Test**	**This would test the subject knowledge of the learner.**

References :

1. Introduction to the Constitution of India by Durga Das Basu
2. Law of the Press by Durga Das Basu
3. Press Laws and Ethics of Journalism by P.K. Ravindranath
4. Journalism in India by Rangaswami Parthasarthy.
5. Textbook on the Indian Penal Code Krishna Deo Gaur
6. The law of Intellectual Property Rights edited by Shiv Sahai Singh
7. The Journalist's Handbook by M V Kamath
8. Media and Ethics by S.K.Aggarwal
9. Introduction to Media Laws and Ethics by Juhi P Pathak
10. Edelman TRUST BAROMETER - Global Results. https://www.edelman.com/global-results/
11. Viner, K. A mission for journalism in a time of crisis; The Guardian. https://www.theguardian.com/news/2017/ Nov/16/a-mission-for-journalism-in-a-time-of-crisisBall, J. (2017).
12. Post-Truth: How Bullshit Conquered the World. London: by James Ball, Biteback Publishing.

1. www.indiankanoon.org
2. www.prasarbharathi.gov.in.
3. www.lawzonline.com
4. www.presscouncil.nic.in
5. www.thehoot.org

SEMESTER VI-JOURNALISM		
COURSE CODE	**CREDITS**	**COURSE NAME**
COMPULSORY-CORE	**04X2=08**	**DRG(DISCIPLINE RELATED GENERIC)**
BAMMC DRG-601	**04**	**1. DIGITAL MEDIA**
BAMMC DRG-602	**04**	**2. NEWSPAPER and MAGAZINE DESIGN (PROJECT)**
ELECTIVES-	**03X04= 12**	**DSE 2 B (DISCIPLINE SPECIFIC ELECTIVES) (LEARNER SHOULD ELECT ANY FOUR OF THE COURSES)**
BAMMC EJCI 2B601		**1. CONTEMPORARY ISSUES**
BAMMC EJLJ2B602		**2. LIFESTYLE JOURNALISM**
BAMMC EJPT2B603		**3. PHOTO and TRAVEL JOURNALISM**
BAMMC EJMJ 2B6504		**4. MAGAZINE JOURNALISM**
BAMMC EJSJ 2B605		**5. SPORTS JOURNALISM**
BAMMC EJCR 2B606		**6. CRIME REPORTING**
BAMMC EJFNF 2B607		**7. FAKE NEWS and FACT CHECKING**
BAMMC EJTJ 2B608		**8. TELEVISION JOURNALISM**
	20	

COMPULSORY-CORE 01	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**DIGITAL MEDIA**
COURSE CODE	**BAMMC DRG-601**
PAPER	**DRG 1 (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI			
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**		
BAMMC DRG-601	**DIGITAL MEDIA**		
Course Outcome:			
• Understand digital marketing platform • Understand the key goals and stages of digital campaigns • Understand the of use key digital marketing tools • Learn to develop digital marketing plans			
Module	**Topic**	Details	Lectures
Module I	Introduction to Digital Marketing	a. Understanding Digital Media b. Advantages of Digital Media c. Principles of Digital Media Marketing d. Key Concepts in Digital media e. Traditional Vs Digital Media	4
Module II	Search Engine Optimization	a. How search Engine works b. Introduction to SEO	8

	(SEO):	c. On Page Optimization d. Off Page Optimization e. SEO Audit, Tools and Measurement f. SEO Resources, Careers in SEO	
Module III	Search Engine marketing (SEM)	a. What is SEM? b. Why SEM c. What is Google Adwords? Why Google Adwords d. Google network e. Adwords terminologies f. Campaign types g. Creation of Google Display NETWORK (GDN) h. Display Ads format i. Conversion tracking j. GDN Campaign creation (DEMO) k. Remarketing l. What are Google shopping Ads	8
Module IV	Social Media Marketing (SMM)	a. Introduction to Social Media b. Facebook Marketing c. Instagram Marketing d. LinkedIn Marketing e. Twitter Marketing f. SMM Tools g. Creating a successful social media strategy	08
Module V	Email marketing	1. key terms and concepts 2. Customer acquisition strategies 3. Best Practices : CRABS 4. Tools to enhance lead nurturing 5. Enhance better reach	3
Module VI	Web Analytics	a. Introduction to analytics b. Social CRM and analysis c. Google analytics d. Digital Analytics e. Content performance analytics f. Visitor analysis g. Social media analytics	6
Module VII	Affiliate Marketing and Programmatic Marketing	a. Affiliate Marketing b. Definition, Purpose, Resources required, Top Players in Affiliate Marketing, Segregation of Affiliate marketing c. Programmatic Marketing d. Evolution and growth of programmatic Marketing e. Real Time bidding, f. Types of Programmatic Advertising, Advantages and Challenges, Myths of Programmatic Marketing	3
Module VIII	Content writing	a. Intro to content writing b. Core Principles of Content writing c. Why blogs matter d. Principles of writing blogs e. How to write content for twitter and Mobile	6
Module IX	Cyber laws	a. Information Technology Act b. Copyright Act	2

		c. Cyber Ethics d. Digital Security	
TOTAL LECTURES			48
BOS SYLLABUS SUB-COMMITTEE MEMBERS			
1. Dr Hanif Lakdawala **(Convener)** **2.** Mr Pradeep Sasidharan **(Subject Expert)**			
Reference Books			
1. Digital marketing By Seema Gupta **2.** Digital Marketing By Puneet Singh Bhatia			

COMPULSORY –CORE-02	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**NEWSPAPER and MAGAZINE DESIGN**
COURSE CODE	**BAMMC DRG-602**
PAPER	**DRG 2 (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC DRG-602	**NEWSPAPER and MAGAZINE DESIGN**

Brief: Design-A Reading Experience

The paper is around Publication Layout and Design. Publication especially is a periodical and certain aspects repeat over and oven within a publication as well as over the issue after issue. This is why the publication follows certain stylebook to keep consistency thereby identity established. The publication design is handled differently than the advertising design and is majorly discipline based software workout. Software such as Quark Express or Adobe InDesign are in practice across industry. Adobe In Design is evolved as highly professional version of Adobe PageMaker which ruled the industry since Desk Top Publishing (DTP) popularized as versatile solution.

Course Outcome:

- The learner is required to understand the process of print media production since the content collection to the final print ready layout.
- This includes news weightage as well as article relevancy and the visual treatment to the text block. The appearance of the various text blocks matters in layout.
- Learner should be able to reconstruct headlines suitable for the space keeping the core meaning and intensity intact.
- Learners are expected to develop software skills to be employable in industry.
- Learners shall develop the aesthetic vision and understand the discipline behind a layout.

Module	Subtopics	Expansion	Lectures
01	**Design and Layout basics**		**10**
	• Elements of design	Point, Line, Shape, Size, Tone, Colour, Texture, Space	*02*
	• Principles of Design	Proportion, Contrast, Harmony, Balance, Harmony, Unity	*02*
	• Rules of Layout	Alignment, Proximity, Emphasis, Syntax, Visual path	*02*
	• Grid and Page set up	Page size, Space division, Creating template, Margins,	*02*
	• Master Pages	Creating master pages, Margins, Page numbering, Columns, Footer space, Folio	*02*
02	**Editing and Terminology**		**08**
	• Page division	National Page, City/Local, World, Economy, Sports, Entertainment, Editorial (OpEd)	*01*
	• Rewriting / recomposing headlines, Creating decks,	Considering length of Head, Using synonyms, Abbreviations, Popular terms, Units and Counts	*02*
	• Terminology	Head, Deck, Body, Boost, Callout, Slug, Caption, Jumpline, Byline, Credits, Banner, Skyline, Strapline, Teasers	*02*
	• Type of Content	Anchor story, Lead, Tomb stoning, , Short stories, Feature, Editorial, Reviews, Interviews, Feedback,	*02*
	• Errors	Widow, Orphan, Dog leg, Burries story	*01*
03	**Typography and Visual aids**		**06**
	• Type classification	Serif, Sans serif, Decorative, Trendy, Distress, Handwriting	*01*
	• Measurements	Size, Weight, Posture, Kerning, Tracking, Leading, Expand, Condense	*01*
	• Visual indicators	Indentation, Dropcap, Inset, Alignment, Hyphenation	*01*
	• Text path	Curvelinear, Baseline, Shift, Warp text, Text in shapes	*01*
	• Text to Box	Picture in text, Texture in text, Text effects, Shadow, outline,	*02*
04	**Working on Project Quark or InDesign**		**12**
	• Workspace	Grouping required panels and assigning default, Menu bar, Property bar, Options bar, Measurement bar, Transform controls, Panel docking,	*02*
	• Toolbox	Text, Picture, Shape, Table, Transparency, Line,	*02*
	• Panels	Style sheet/Para styles, Colour/ Swatch, Page layout, Align, Wrap text,	*03*
	• Picture treatment	Choosing right picture, Tracing outline, Fading, Transparency, Extending canvas, Gradient, Reshaping picture, Placement	*03*

	• Creating Typo	Type templates i.e. Style sheets	*02*
05	**Planning and Production of Magazine**		**12**
	• Content Plan/ varied content: Cover story, Interview, Feature, Sp report, Tips,	Content collection, Sorting and scrutiny, Picture collection, Dividing in parts, Extracting pull outs, quotes, Assigning pages to stories, Assigning pages to Ads	*03*
	• Flat plan	Block diagram of the content, Judgment of facing page relevancy, Testing for contradiction	*02*
	• Rough Layout	Rough idea of layout, Conceptualization, Judging weightage of pictures and text	*03*
	• Logic of Cover design	Title size, Cover lines, Release date, Close up based, Action based, Celebrity, Demo, Art, Animation, Gimmick, Cover story	*02*
	• Pagination and Print ready	Sequencing for printing, Form, Cut marks, Alley	*02*
Total Lectures			**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. Mr. Arvind Parulekar (Convener)
2. Prof. Rani D'Souza
3. Prof. Sandesh Patil

Instructions:

1. Content need not be original and can be sourced from Google or News sites.
2. Content should not be dummy or greeking not allowed. (Lorel Ipsum discouraged)
3. Rewriting of headline may be needed to fit the width and will be part of evaluation. (use editing techniques)
4. Pictures must be relevant and appropriate placement as well as proportional to news length necessary.
5. Pictures should not be in any case distorted. (broken aspect ratio deducts marks)
6. Use of illustrations recommended wherever necessary.
7. Picture placement and unity with the text in text frames is evaluative aspect.
8. Right content on right pages and in apt places has weightage in evaluation.
9. New original Masthead and design is evaluation aspect. (Discourage students from copying existing)
10. Enough issue details (day, date, pages, site etc.) on appropriate place count as layout element.
11. The script need not be Devanagari for Marathi medium learners and they can use English content. (Devanagari font problem is considered, However viva will be in Marathi or Hindi.
12. Viva voce will be conducted only against evaluation of the completed project.
13. Printout of the project may be in black and white in case of financial constraints, but then the original soft copy as well as pdf must be produced before the examiner.

Internal assessment:

Internal assessment is carried out based on following submissions to the internal faculty, but must be produced before external examiner.

i. Front page replica of broadsheet: This helps student to explore most of the tools to take his work close to the actual broadsheet page.
ii. Typography chart: Classification of typefaces into serif, sans serif, decorative and trendy. This helps them to understand the visual difference and readability of different fonts.

iii. Content plan for the magazine: The planning desk exercise to be carried out carefully before starting the magazine. Understanding parts of magazine and flow of the articles. Sections as well as front book, back book and main book concept.
iv. Flat plan: For judging facing page connectivity or discrepancy.
v. Pagination: A separate soft file with page sequence suitable for printing.

External Project:

1. **Broadsheet design and layout**: Broadsheet of 6 pages in Adobe InDesign OR Quark Express.
    a. Supportive software can be Adobe Photoshop for Image editing, Corel Draw or Illustrator for Masthead or Logo making and Illustrations wherever needed.
    b. Basic Layout must be either in Adobe InDesign or quark Express, one of the layout software.
    c. Learner may use Quark Express for Broadsheet and InDesign for Magazine and display his skills in both. (This will not fetch extra rewards.)
2. **Magazine Design and Layout:** Magazine of minimum 32 pages or in multiple of 4 pages thereof can be done.
    a. Content plan and Typo chart must be produced at the time of viva voce in print form.
    b. Broadsheet and Magazine shall be produced in print form as well as soft copy and examiner in his every right may ask for soft copy to be inspected on respective software.

References :

- Visual Journalism: Rajesh Pandey, Adhyan Publication.
- Newspaper Layout and Design: Daryl Moen,Surjeet Publication.
- The Magazine Handbook: NcKay J. Routledge.
- Editorial Art and Design: Randy StanoMiyami Herald.
- Art and Production: N. N. Sarkar.
- Digital Editorial Experience: Sue Apfelbaum.

ELECTIVE 01

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**CONTEMPORARY ISSUES**
COURSE CODE	**BAMMC EJCI 2B601**
PAPER	**DSE 1 (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJCI 2B601	**CONTEMPORARY ISSUES**

COURSE OUTCOME

- To stress the importance of social economic political aspects of the society as a media professional.
- To understand the role of media as a strategy to create awareness on various issues and mobilise to bring social progress.

MODULE	TOPICS	DETAILS	LECTURES
		SOCIAL MOVEMENTS	
I	**SOCIAL MOVEMENTS AND PROGRESS FOR SOCIETY**	• Define Social Movements, Elements, Types and Stages of Social Movements. • Social Movements with reference to Tribal, Women, Farmers, Untouchability, Cultural, Environmental (with special reference to "Swatch Bharat Abhiyaan") • Developmental issues- displacement and rehabilitation.	**(12)**
		GROWTH AND DEVELOPMENT	
II	**ECONOMIC GROWTH AND DEVELOPMENT**	• Economic issues in India. • Industry and Economic Growth – Factors, challenges, industrial robots and employment, • Agriculture and economic development- Factors, challenges and measures. • New age skills – Make in India, trends and challenges. • Entrepreneurship and its relevance. • Tourism-trends and challenges • Regional aspects- Role of MIDC in economic development of Maharashtra, Special Economic Zone, Food Security Act'2013	**(14)**
		POLITICS	
III	**POLITICS AND SOCIETY**	• Crime and Politics • Role of whistle blower • Corruption- causes and remedial measures • Role of political parties and its impact on political system. • Changing trends in politics- Functions, features, agendas, majority vs coalition government. • Terrorism – causes, consequences, remedial measures.	**(12)**
		SOCIAL WELFARE SCHEMES	
IV	**SOCIAL WELFARE SCHEMES BY THE GOVERNMENT OF INDIA**	• With reference to women and child (any five) • Commerce and Industry (start-up India hub, scheme for IPR-creative India and innovative India.	**(10)**

		• Smart Cities, skill to save life, save a life initiative, national strategic plan and mission (2017-2024) "SAMPARK". • Rural (any three Schemes)	

BOS SYLLABUS COMMITTEE MEMBERS

1. DR. PADMAJA ARVIND (CONVENER)
2. PROF. RANI D'SOUZA(Subject Expert)
3. PROF. RUMINA RAI(Subject Expert)

INTERNAL EVALUATION METHODOLOGY

1. Continuous Assignments
2. Oral And Practical Presentations
3. Group/Individual Projects
4. Open Book Test
5. Group Interactions
6. Quiz

REFERENCES

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5. Berns Nancy, Framing the Victim: Domestic Violence, Media, and Social Problems, Transaction Publishers.
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8. Media and Gender in Post-Liberalisation India, Frank and Timmy Gmbh Publication (Pg 19-45)
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16. R P Kataria and Salah Uddin (2013) Commentary on Human Rights Orient Publishing Company.
17. J.Shivanand, Human Rights:Concepts and Issues,
18. Ram Ahuja , (2012),Indian social Problems, Rawat Publications.
19. Ghanashyam Shah, (2011) Social Movements in India, Sage Publications.
20. A.R Desai, Rural Sociology.

21. Marilyn A .Brown and Benjamin K.Sovacool,Climate Change and Global Energy Security:Technology and Policy Options, Oxford Publications.
22. Bill McKibben, The End of Nature.
23. David Spratt and Philip Sutton,Climate Code Red:The Case for Emergency Action.
24. Jeffrey D.Sachs, The Age of Sustainable Development.

MAGAZINES AND JOURNALS

1. Down to Earth: Science and Environment Fortnightly
2. Economic and Political Weekly
3. YoJana

ELECTIVE 02

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**LIFESTYLE JOURNALISM**
COURSE CODE	**BAMMC EJLJ 2B602**
PAPER	**DRG 2 (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJLJ 2B602	**LIFESTYLE JOURNALISM**

COURSE OUTCOME

1. **Acquire a conceptual overview of lifestyle journalism and its function in the media industry.**
2. **Acquire an ability to report on lifestyle journalism stories or events in a clear, concise, factual and meaningful way.**
3. **It is a combination of practical skills and conceptual understanding of how this form of journalism is increasingly relevant for the 21stcentury. This course will help the learner acquire an ability to understand audiences and markets in which the lifestyle journalists provide information.**
4. **It will teach students how to do lifestyle journalism with integrity, exploring the broader lifestyle field while focusing on a variety of sub-fields such as travel, music, movies, arts and food, along with students' special interests**

MODULE	TOPIC	DETAILS	LECTURES
		LIFESTYLE JOURNALISM	
I	**INTRODUCTION TO LIFESTYLE WRITING**	• Lifestyle writer has very niche audience. Who are we writing for? • Lifestyle Journalist should know the publication house audience • Lifestyle News, critique/review/ evaluate on stories from magazines • Lifestyle Journalist : balance between Elite and Mass Lifestyle Culture (newspapers) • Source of Lifestyle stories	**10**
		WRITING STYLE	
II	**WORDS, PICTURE, STORY AND EDITING**	• What is good Lifestyle writing? • Use of Pictures and Graphics, finding and focusing your story • Crafting and structure – the beginning, middle, and end • Reporting and Interviewing. Feature leads, Lifestyle Columns • Rewriting and self-editing	**10**
		TYPES OF LIFESTYLE WRITING	
III	**TYPES OF LIFESTYLE WRITING**	1. Review : Art show, Movie, Theatre Performance, Book 2. Travel : Various types of Travel writings 3. Food : Street, Restaurant food, Food festival, Restaurant review 4. Health and Fitness : Gym, Yoga, various new forms of workout 5. Other forms fashion, Garden, Home and General Tips and guidelines	**10**
		FASHION INFLUENCERS	
IV	**ROLE and IMPORTANCE OF FASHION INFLUENCERS IN LIFESTYLE JOURNALISM**	1. Fashion, Gender and Social Identity 2. The impact of fashion bloggers and magazines on the society 3. E-fashion markets defining the trends amongst the youth 4. Cinemas in the past and in today's world have influenced the society in terms of fashion and Lifestyle **5.** Role of Music's Fashion in the society	**08**
		SOCIAL MEDIA	
V	**LIFESTYLE AND ROLE OF SOCIAL MEDIA :**	• The power of marketing in the contemporary fashion world • Labelling and branding: The power of representation • Shakespearian theatre and the aesthetic image: how	**10**

		Shakespearian productions reflect contemporary fashion trends • The influence of celebrities on fashion: an exploration of celebrity-endorsed fashion lines • Fashion Lifestyles and Hashtags • Lifestyle advertising , Collaborations and Co-Marketing of Brands, Fashion and Social Media Campaigns	
1. Prof. Rani D'souza(Convener) 2. Dr.Yatindra Ingle 3. Prof. Aparajita Deshpande (Industry Expert)			

REFERENCES

1. **Lifestyle Journalism (Journalism Studies) 1st Edition by Folker Hanusch (Editor) Feature Writing**
2. **Lifestyle Journalism, Media, Consumption and Experience, 1st Edition Edited by Lucia Vodanovic**
3. **Lifestyle Journalism byJean Ann Colbert In: Encyclopedia of Journalism**
4. **Feature Writing –Susan Pape and Sue Featherstone (A practical introduction)**
5. **http://www.thelifestylejournalist.in/**
6. **https://www.reuters.com/news/lifestyle.**

ELECTIVE 03

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**PHOTO AND TRAVEL JOURNALISM**
COURSE CODE	**BAMMC EJPT 2B603**
PAPER	**DSE 3 (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME and DETAIL SYLLABUS**
BAMMC EJPT 2B603	**PHOTO AND TRAVEL JOURNALISM**

COURSE OUTCOME

1. The objective of this course is to develop the ability of the learner to bring life into the story through characters and descriptions of places using photographs.
2. The learner will be able to spread knowledge about different destinations through writings
3. To understand the diverse audiences that are interested in travel and lifestyle-related content.
4. To understand the use of camera and images to drive interest in stories.

MODULE	TOPIC	DETAILS	LECTURES
		BEGINNING OF THE STORY	
I	**INTRODUCTION TO TRAVEL WRITING**	• Writing about destinations: How do we capture the particular spirit of a place? Who are we writing for? We should know our publication house audience • Compelling beginnings and endings: Where do we start? How do we end? Ethical issues while covering travel journalism: How to cover and what should be avoided. Factoring in cultural diversity • Building a theme and narrative structure: What makes a travel narrative feel whole? • Drawing characters from real life: How can we reproduce memorable encounters? Travel journalists don't just report, they become a source of information for many other stories. • Submitting writings for publications: How do we catch the interest of an editor?	**10**
		CREATION OF THE STORY	
II	**WORDS, PICTURES AND STORY TELLING**	• What is good travel writing? Salient examples. • Finding and focusing your story, crafting and structure – the beginning, middle, the end and transitions. • Bring your story to life – characters and descriptions • Show don't tell – exercises in enlivening your writing • Elements of style – use of first person, developing your voice, rewriting and self-editing • The qualities of a good travel writer - use of vivid language, voice, tone, readings from published travel writers. • The dos and don'ts from professionals	**10**
		WHERE TO WRITE THE STORY	
III	**TYPES OF TRAVEL WRITING**	1. Freelance Travel writing 2. Travel blogging 3. Books 4. General Tips and guidelines 5. Travel writing for guidebooks and apps	**08**

	CAMERA –EYEPIECE OF A TRAVEL JOURNALIST		
IV	**PHOTO JOURNALISM**	• Introduction to Photo Journalism • Basic Concepts of photography and photo editing • Fields of Photojournalism • Digital Photography, Camera Topology and Operations • Analysis of Photo Journalist's work, Photo Journalism Ethics, Case Studies in Photo Journalism	**12**
		NICHE MARKET, INTERNET AND PRINT	
V	**MARKETING YOUR STORY**	• **Online Travel Journalism** • networking, niche markets, travel trends, market research • communicating with editors of different media , preparing the manuscript for submission	**06**

SYLLABUS DESIGNED BY

1. PROF. RANI D'SOUZA (CONVENER)
2. MR. ADITH CHARLIE (INDUSTRY EXPERT)
3. DR.YATINDRA INGLE
4. PROF. APARAJITA DESHPANDE (INDUSTRY EXPERT)

REFERENCES

1. How To Be A Travel Writer (Lonely Planet) By Don George
2. The Writer's Handbook Guide To Travel Writing By Barry Turner (Editor)
3. The Travel Writer's Handbook: How To Write And Sell Your Own Travel Experiences 6th Edition By Jacqueline Harmon Butler, Louise Purwinzobel.
4. Travel Writing: See The World. Sell The Story. 2nd Edition By L. Peat O'neil

-ELECTIVE 04

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**MAGAZINE JOURNALISM**
COURSE CODE	**BAMMC EJMJ 2B604**
PAPER	**DSE (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**
SEMESTER VI	

COURSE CODE	COURSE NAME and DETAIL SYLLABUS
BAMMC EJMJ2B601	MAGAZINE JOURNALISM

COURSE OUTCOME:

This course introduces the students to the nuances of magazine journalism, feature writing and Reviews.

MODULE	TOPIC	DETAILS	LECTURES
Module I	History of magazine journalism	• A brief history of magazine journalism, global scenario and current trends in magazine journalism in India; Magazine boom in India and the glorious years of the news magazine magazine journalism versus newspaper journalism, Survival of Magazines in digital era – issues , challenges , prospects	10
Module II	Definition and Genres of Magazines	• Definition and genres of magazines - news, special interest, general, lifestyle, glamour, gossip, special audience magazines, public relations , Automobile , Career guidance , Technology , Sports , Health , Women , Children , Diwali issues , travel ,environment , education , B2B magazines magazines, literary magazines, Sunday magazines and journals; online magazines- e-zines, • webzines, web-edition magazines; a review of leading general interest magazines in English , • Hindi and Marathi. Magazine formats.	10
Module III	Organizational structure	Organizational structure of a magazine – editorial, advertising, circulation, promotion and business departments; reporting and editing operations in a magazine; magazine journalism terminology	05
Module IV	Cover Story	Cover and cover story – functions of the cover- cover design formats – cover blaze - coverlines; contents page; cover story selection criteria: length, strength, importance, promotability and illustratibility	10
Module V	Types of Articles	Magazine articles- features, film reviews, book reviews, profiles, columns, cartoons, regulars and fillers , interviews	05
Module VI	Magazine Design	–format, layout, typography, colour, photos, illustrations, info graphics and Blurbs.	08

Suggested assignments
Visit a publication house to understand the content designing and printing of a magazine
Design a magazine using N design or coral draw
Cover a story for the magazine
Internship in a magazine publication

REFERENCES

- Tim HolmesandLiz Nice

- Jack Ian., (1996) Granta: The Magazine of New Writing. London, England: Granta Publishers
- Tim Holmes, Magazine Journalism. SAGE Publications Ltd., 2010
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- 2014
- SubhomoyBhattacharjee, India's Coal Story. PBI PAN INDIA, 2017
- Mark Tatge, New York Times Reader: Business and the Economy. 2010

BOS SYLLABUS SUB-COMMITTEE
Dr. Navita Kulkarni –(Convener)
Dr. Mahesh Patil
Mr. Sachin Parab

05

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**V**
COURSE:	**SPORTS JOURNALISM**
COURSE CODE	**BAMMC EJSJ 2B 605**
PAPER	**5 DSE 2B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**
BAMMC EJSJ 2B 605	**Sports Journalism**

COURSE OUTCOME:
1. To provide learners with tools and techniques of sports writing and analysis.
2. To acquaint learners with importance of different sports tournaments from commercial point of view.
3. To educate learners about careers in sports journalism.

Module		**Details**	**Lectures**
1	**Unit I**		**10**
	1.	Definition Of Sports News and Characteristics of Sports Journalist	
	2.	Sports Journalism: Trends and Theories.	
	3.	Analysis of Sports News for Doordarshan and Radio. Writing for magazines and cyber media.	
	4.	Heading of Sports News: Theories and Importance, Various Types of Sports Headings.	

	5.	Print media tradition, Digital Age, Printing and Proof Reading, Various Aspects of Writing for Sports Journalism.	
2	**Unit II**		**10**
	1.	Affairs related to various sports and events. National and international games.	
	2.	Information related to various Authorities, academies and structure of various sports departments.	
	3.	Changes in rules and new amendments for the different games. New records, achievements, awards and statistics of games.	
	4.	Law related to sports and important decisions, ruling and guidelines in sports.	
	5.	The writing of sports stories, in short form and long form The gathering of sports information, at games, practice, through social media, and interviews, attending matches on the ground	
3	**Unit III**		**10**
	1.	Various events of sports and their fields or areas. Stadiums, Indoor and outdoor games.	
	2.	Management of event, planning, organizing, conducting and documentation of events.	
	3.	Preparing handouts, broachers, jingles, reports, punch lines and slogans for society to communicate the importance of sports.	
	4.	Publication material, tools of propaganda, various modes of Communication. Event coverage planning and management.	
	5.	The role race, gender and culture play in sports coverage and in newsrooms The relationship between hard-news and opinion-based presentations in sports journalism, in print and in other media	
4	**Report on National and International Sports News**		10
	1.	How to use your research, refining it for use in the best medium suited for the particular story you are telling	
	2.	Regional sports- Kho-kho, Kabaddi, etc.	
	3.	National sports- National games, Tournaments, etc.	
	4.	International sports- FIFA World cup, Cricket, Commonwealth games, Olympic games, Asian games, Wimbledon, etc.	
	5.	New version of sports- IPL, Pro Kabaddi, HIL, PBL, etc.	
5	**Career Outlook**		08
	1.	Journalist Photographer/videographer/podcast/photography	
	2.	Writer in digital/print/TV/radio and social media	
	3.	Editor across multi-platforms Producer across multi-platforms	
	4.	Host Remote journalist Areas of Employment	
	5.	Magazines TV Radio Online Multi-platform outlets	

Definition of sports reporting; Language of sports journalism; Sports news and sports feature; Sports columns; Interviewing techniques; Sports photography; Examples of great sports writers; Ethical issues

Phil Andrews, Sports Journalism: A Practical Introduction. SAGE, 2013
The Sports Writing Hand Book: Thomas Fensch.

Media Sport: edited by Lawrence A. Wenner, London and New York
BOS SYLLABUS COMMITTEE MEMBERS Prof. Gajendra Deoda (Convener) Mr. Mahesh Patil (Subject Expert) Miss. Amruta Bane (Subject Expert)

06

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**CRIME REPORTING**
COURSE CODE	**BAMMC EJCR 2B 606**
PAPER	**6 DSE 2B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI		
COURSE CODE	**COURSE NAME and DETAILED SYLLABUS**	
BAMMC EJCR 2B 606	**CRIME REPORTING**	
Course objectives		
Indian Journalism has progressed significantly. Despite the fact that print media is still at the bleeding edge of remarkable work in Indian news coverage there are sure faces in the advanced media that motivate you to take up news-casting. Their trustworthiness, coarseness, and determination are characteristics that make them few of the best Indian writers over the most recent few decades. Composing or covering news isn't as simple an accomplishment as we might suspect it might be. There is a great deal of elements included while covering a news piece, either in print or advanced. In any case, there are sure identities in the Indian news coverage world that cross all deterrents and hindrances and think of an approach to convey the news to India and the remainder of the world with most extreme trustworthiness. Students will learn the art of covering news as well as have a thorough learning of criminal journalism in this subject,		
UNIT	**TOPIC**	**LECTURES**
I	➢ **The ethics of crime and justice coverage:** • Fairness and objectivity, sensationalism and integrity • conflicts of interest • Interesting versus important. • Balancing justice: • justice to victim and the accused • No assumption of guilt or innocence.	**10**
II	➢ **Law enforcement machinery:** • Structure and hierarchy. Different entities: police, ATS, SBI, CID, SID, SRPF, Para-military forces, Rapid Action Force etc. ➢ **Understanding the Police system :** • Introduction to IPC • Important sections of IPC. ➢ **Sensitive law and order situation:**	**10**

	• Agitations, congregations for various reasons, elections. • Deployment of extra forces	
III	➢ **Covering Crime:** • Types and definitions. ➢ **Police Investigation techniques:** • From conventional to Modern techniques • Cognizable and non-cognizable offences. ➢ **Basic principles of crime reporting:** • News values: • New, unusual, interesting, significant and about people. ➢ **Sources of Crime Reporting:** • Collecting and cross checking information • Developing sources, verifying facts. Reporting agitations, riots. • Possible risks and precautions.	**10**
IV	➢ **Covering Courts:** • Structure of judicial system in India. • Hierarchy, functions and jurisdictions of each court. • Granting of bail to accused. • Types of cases heard in courts. • Tribunals, consumer and family courts. PILs, appeals etc.	**08**
V	➢ **Contemporary crime journalism:** • Crime shows on TV. • Emphasis on crime reporting in • Newspapers. Its impact. • Media influencing investigations and/or court proceedings? • Trial by media. ➢ **Case studies on Indian Crime Reporting** • The Hindu's Bofors Expose • Tehelka's Defence Deals Expose • Indian Express's Cement Scam Expose • Indian Express's Human Trafficking Expose • Open Magazine's Nira Radia Tapes	**10**
BOS SYLLABUS COMMITTEE MEMBERS **1. Prof. Gajendra Deoda** **2. Prof. Rashmi Gehlot** **3. Dr. Yatindra Ingle**		

References

1. Across the Bench: Insight Into the Indian Military Judicial System
2. book by Gyan Bhushan
3. Legal and Constitutional History of India: Ancient legal, judicial, and constitutional system book by Rama Jois
4. Police Administration and Investigation of Crime by J.C. Chaturvedi
5. Police Diaries: Statements, Reports and Investigation (With Special Reference to Scientific Evidence, DNA, Brain Mapping Tests, Narco-analysis Tests, Forensic Science and Cyber Crimes by P Venkatesh Revised by S K Sinha Ray
6. Indian Politics by Yassin Mohammad ,Srinanda Dasgupta
7. Breaking The Big Story: Great Moments in Indian Journalism by Penguin India
8. Crime and Justice in India **e**dited by: N. Prabha Unnithan
9. Handbook of Journalism and Mass Communication book by V. S. Gupta and Vir Bala Aggarwal
10. Journalism, Democracy and Civil Society in India (book)
11. History of Indian Journalism book by J. Natarajan

Indian Journalism in a New Era: Changes, Challenges, and Perspectives (book)

07

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**FAKE NEWS and FACT CHECKING**
COURSE CODE	**BAMMC EJFNF 2B 607**
PAPER	**7 DSE 2B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI		
COURSE CODE	**COURSE NAME and DETAIL SYLLABUS**	
BAMMC EJFNF 2B 607	**FAKE NEWS and FACT CHECKING**	
COURSE OUTCOME		

1. **To give media students the understanding of the differentiation between real news and fake news.**
2. **To make media students aware of information disorder.**
3. **To give students a thorough knowledge of information literacy and media.**
4. **To give students a hand on knowledge on fact checking.**
5. **To give students a practical overview of social media verification.**

Career Opportunities: Investigative Journalist, Jobs in Media Houses, Google ,Internship in International Fact Checking Network, Jobs in Social Media as Fact Checkers

Sr. No.		**Modules**	**Lecture**
1.	**Introduction**		**6**
	1.Concepts	Definition: News and Fake News,	
	2.News Integrity	Journalistic Integrity and News Production.	
	3.Propaganda	Propaganda, how to counter Propaganda, Ways adopted by Media to avoid Propaganda	
2	**Information Disorder:**	News Industry's Transformation with reference to Gatekeeping Theory and Agenda Setting Theory	6
	1.Digital Technology:	Digital convergence transforming content-commissioning, production, publication and distribution	
	2.Social Media Platforms	Different Social Media Platforms	
	3.Role of News Organization	Covering 'fake news' and countering 'information disorder.	
	4. Source credibility	Strategies for identifying real news and source credibility in line with the ethical principles guiding journalistic use of User Generated Content.	
3	**Media and Information Literacy (MIL)**		10
1	1.Requisite Literacy	Importance of acquiring the requisite literacy	
	2.Detection method	Detection of both flawed journalism and fraudulent news in various media	

	3.Healthy Skepticism	Development of healthy skepticism towards veracity of reports, posts, feeds, photos, videos, audio content, info-graphics, and statistics within appropriate contexts	
4.	**Fact Checking**		14
	1.Fact-checking organizations around the world	Brazil, Europe, Japan, South Korea, Latin America, America, Philippines, Britain and Indian Scenario	
	2.Basic image verification	Common types of false imagery and basic verification steps	
	3.Advanced verification	Approaches for content analysis, including metadata analysis and Geolocation of News	
	4. Reverse Image Search	Reverse Image Search using most reliable websites such as Google Reverse Image Search, TinEye, RevEye	
5.	**Social Media Verification**		12
	1.Verification tools	YouTube Data Viewer using most reliable websites such as Amnesty's YouTube Data Viewer, InVID, News Check	
	2.Account Analysis	Facebook and Tweeter account analysis : fake news generated on social media platforms	
	3.EXIF Viewer	EXIF is metadata attached to visual content that includes a wide range of data points created by digital cameras and phone cameras at the point of capture	

BOS SYLLABUS COMMITTEE MEMBERS

1. **Dr. Priyadarsini Poddar (Convener)**
2. **Mr. Sagar Bhalerao (Subject Expert)**
3. **Dr. Neil Joshi (Industry Expert)**

Reading and References:

- Philip N. Howard, Unless The Government Acts Soon, Fake News Will Produce Deep Information Inequality
- Peter Pomerantsev and Michael Weiss, "The Menace of Unreality: How the Kremlin Weaponizes Information, Culture and Money"
- Edward Lucas and Peter Pomerantsev: "Winning the Information War"
- Hannah Arendt: "Totalitarian Propaganda" Hannah Arendt: "Totalitarian Propaganda"

08

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-JOURNALISM**
SEMESTER	**VI**
COURSE:	**TELEVISION JOURNALISM**
COURSE CODE	**BAMMC EJTJ 2B 608**
PAPER	**8 DSE 2B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME and DETAIL SYLLABUS**
BAMMC EJTJ 2B 608	**TELEVISION JOURNALISM**

COURSE OUTCOME:

4. To provide students with technique of narration and story telling
5. To share the art of developing a story idea
6. To acquaint and sensitize them through assignments to the issues of deprivation around us and using writing as a tool for social justice

MODULE		DETAILS	LECTURES
1	**History and Development**		10
	11.	Brief History of the development of TV journalism- Globally and in India.	
	12.	Emerging Trends in journalism	
	13.	The International Scenario- John Baird (Inventor of TV) till date- Timeline.	
2	**Indian scenario - Doordarshan** -		
	16.	News; Entertainment, Culture, Sports and Films.	
3	**Private and Satellite channels**		
	16.	Growth of Private International, National and Regional TV Networks	
4	**Regional channels- Impact and critical study of**		
	19.	News Channels- Star Majha, IBN Lokmat , Zee 24 Taas, Aamchi Mumbai, Sun News Network, Aaj Tak	
	Module II		10
	Television formats : Content and presentation		
	30.	**News:** Main characteristics of News as against news in other media. Spot news, News Bulletins and News analysis	
	31.	**Features on TV :** Talk Shows • Reviews • Interviews • Discussions. • Documentaries. • Docudramas. • Commentaries.	
	32.	**Other Programs** • Music • Sports	
	Module III		
1	**Developing skills**		**10**
	1. Anchoring	Reporting or shooting anchor links in public . How and what to give in PTC or piece to camera . How to approach people for sensitive stories.	
	2. Beat reporting	Educational, Crime, Science, Court, Environmental, Political	
	3.Reporting	**Reporting national and International events**	
	4. Scripting and presentation	Scripting for Interviews/Documentary/Feature/Drama/Skits o TV.	

		Story idea, development and Presentation- Web series	
	5. Editing	Skills of editing, online and offline	
	Module – IV :		**08**
	Current and Emerging Trends in Television Journalism :		
	1. 24/7 news broadcast	• Features, Audience effectiveness, advertisements and Dumbing down of News. • TV v/s online streaming catering to infotainment genre majorly targeting the youth (Netflix, • Fake News on Internet v/s news on broadcast	
	2. Ethics	(Including Censorship) in presentation of News.	
	Module – V :		**10**
	1.	Evolution, Organization, Policies and Programming- News Service, Features, Concept of 24x7 news – Catering to Transnational audiences, Advertising and promotion.	
Total Lectures			**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. Dr. Navita Kulkarni (Convener)
2. Prof. Aparajeeta Deshpande (Subject expert)
3. Prof. Gajendra Deoda (Subject expert)

Reference Books

1. MacGregor, Brent; Live, Direct and Biased: Making TV news in the Satellite Age.
2. Parthasarthy, Ramaswamy; Here is the news; (1994) Sterling.
3. Herbert, John; Journalism in the Digital Age; 2000, Focal Press.
4. Hillard; Writing for TV, Radio and New Media; 7th Edition; Wadsworth.
5. Television Production by Phillip Harris.
6. Broadcast Journalism by David Keith Cohler (Prentice Hall).
7. De Maeseneer, Paul. Here's The News: A Radio News Manual. Asian Books.
8. Awasthi, G. C. Broadcasting in India. Allied Publi

SEMESTER V-ADVERTISING		
COURSE CODE	**CREDITS**	**COURSE NAME**
COMPULSORY-CORE	**04X2=08**	**DRG(DISCIPLINE RELATED GENERIC)**
BAMMC DRGA-501	**04**	**1. COPY WRITING**
BAMMC DRGA-502	**04**	**2. ADVERTISING & MARKETING RESEARCH**
ELECTIVES-	**03X04=12**	**DSE 1 A (DISCIPLINE SPECIFIC ELECTIVES-) (ANY FOUR COURSES)**
BAMMC EAGI 1501		**1. GLOBALIZATION & INTERNATIONAL ADVERTISING**
BAMMC EABB 1502		**2. BRAND BUILDING**
BAMMC EAAM 1503		**3. AGENCY MANAGEMENT**
BAMMC EAAP 1504		**4. ACCOUNT PLANNING & ADVERTISING**
BAMMC EASM 1505		**5. SOCIAL MEDIA MARKETING**
BAMMC EADM 1506		**6. DIRECT MARKETING & E-COMMERCE**
BAMMC EACB 1507		**7. CONSUMER BEHAVIOUR**
BAMMC EADF 1508		**8. DOCUMENTARY & AD FILM MAKING**
TOTAL	**20**	

COMPULSORY-CORE	**04X2=08**	**DRG(DISCIPLINE RELATED GENERIC)**
BAMMC DRGA-501	**04**	**3. COPY WRITING**
BAMMC DRGA-502	**04**	**4. ADVERTISING & MARKETING RESEARCH**

COMPULSORY 01	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**V**
COURSE:	**COPYWRITING**
COURSE CODE	**BAMMC DRGA-501**
PAPER	**DRGA (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC DRGA-501	**COPYWRITING**

COURSE OUTCOME:

1. To familiarize the students with the concept of copywriting as selling through writing
2. To learn the process of creating original, strategic, compelling copy for various mediums
3. To train students to generate, develop and express ideas effectively
4. To learn the rudimentary techniques of advertising headline and body copywriting, the economy of words and thought peculiar to this type of writing, and the necessity of creative thinking in written expression.
5. In an ad agency, as a copywriter, one cannot *"Just be creative and express self"* – here one is in a 'creative professional', and have to be able to use the power of creativity for a commercial/business reason – as someone is paying you to get a problem solved, using your creativity.
6. There are two basic disciplines through which we make our communication - verbal/written and visual, and both need different skills-sets to master them. The structure of the syllabus is designed to hone the necessary skills required for these two diverse disciplines.

	MODULE	DETAILS	LECTURES
1	**MODULE I**		**10**
	1.INTRODUCTION TO COPYWRITING	a. Basics of copy writing b. Responsibility of Copy writer	
	2.CREATIVE THINKING	a. How to inculcate a 'creative thinking attitude'. b. The idea incubation process c. What's the Big Idea? - How to get to the ONE BIG IDEA that will inspire creative d. Crafting the reasons why consumers should believe your brand and act	
	3.IDEA GENERATION TECHNIQUES	Idea generation techniques: eg. Brainstorming, Triggered brainwalking, Questioning assumptions, Picture prompts, Scamper, Observation, Referencing, Interaction, Imagination, Dreams, and Creative Aerobics	
	4.TRANSCREATIVITY	a. Introduction	

		b. Purpose	
2	**MODULE 2**	**WRITING FOR ADVERTISING**	**08**
	1. BRIEFS	a. Marketing Brief b. Creative Brief	
	2.WRITING PERSUASIVE COPY	a. Tone of Voice b. What's the Tone? c. Tonality and character matters, d. How to make your Writing, walk, Talk, and breathe e. Creating Breakthrough Writing f. How to Control the "Command Center" in Your g. Prospect's Mind h. How to Change Perception i. Emotionality, Storytelling	
3	**MODULE 3**	**CURRENT ADVERTISING CAMPAIGNS**	**12**
	COPY WRITING STYLE OF CURRENT ADVERTISING CAMPAIGNS OF THE BEST ADVERTISING AGENCIES FOR THEIR CLIENTS.	Two current campaigns for each of the following agencies including TVC, Print, Outdoor and digital should be studied, and analyzed in the class room. a. JWT b. Ogilvy c. Lowe Lintas d. FCB Ulka e. DDB Mudra f. Publicize Worldwide • At least three international awards winning previous year campaign (one or two year previous) should be analyzed and discussed in the class room. • Student to be taught the following when discussing the Campaigns: a. Copy writing style b. Idea and concept c. How copy is varied for differ media d. Copy for children, youth, women, Senior citizens, executives millianials, Baby Boomers, Gen X, Gen Y, Gen Z e. Advertising appeals f. Tone of Voice g. Story telling	
4	**MODULE 4**	**MEDIA AND AUDIENCES**	**10**
	1.WRITING COPY FOR VARIOUS MEDIA	a. Print: Headlines, sub headlines, captions, body copy, and slogans b. Television: Storyboard, Storyboarding Techniques**,** Balance between words and visuals | Power of silence, formats of TVS's c. Outdoor posters d. Radio e. Digital copy for social media like facebook,	

		Instagram etc f. Copy for web page	
	2.WRITING COPY FOR VARIOUS AUDIENCES	a. Children, b. Youth, c. Women, d. Senior citizen and e. Executives f. Baby Boomers, Gen X, Gen Y (Millennials), Gen Z	
5	**MODULE 5**	**WRITING COPIES, APPEALS, EXECUTION STYLES AND EVALUATION**	**08**
	1. **HOW TO WRITE COPY FOR**	a. Direct mailer, b. Classified, c. Press release, d. B2B, e. Email copy f. Advertorial, g. Infomercial	
	2.VARIOUS TYPES OF ADVERTISING APPEALS AND EXECUTION STYLES	a. Rational appeals b. Emotional appeals: Humor, Fear, Sex appeal, Music c. Various advertising execution techniques d. The techniques Evaluation of an Ad Campaign	
	3.THE TECHNIQUES FOR EVALUATION OF AN AD CAMPAIGN	a. Evaluate the ad in terms of its efficacy, that is, to what extent the campaign has achieved its set objectives; b. Learn to appreciate the aesthetic aspects of the ad – how the ad looks, its layout, colour scheme, typography, balance etc.	
	33.	Corruption issues faced by the common man	
	34.	Challenges faced by senior citizens and the physically/ mentally challenged.	

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. PROF.DR HANIF LAKDAWALA (CONVENER)
2. PROF. RANI D'SOUZA (SUBJECT EXPERT)

MANDATORY REQUIREMENT:

COPY WRITING LECTURES COMPULSORY SHOULD BE HELD IN AUDIO VIDEO ROOM WITH PROPER PROJECTOR AND SOUND

INTERNALS (The objective of internal exercise is to help the learner acquire skills) 25 MARKS

Producing the following:

a. 30 secs to two mins TVC: Marks shall be assigned for quality of screenplay, content of the film, narrative, preproduction and post-production quality.

b. A poster on any one social issue.

Every student should be instructed to maintain a scrap book where they write copy for one brand every week.

Reference Book

1. Looking Away by Harsh Mandar
2. Copywriting By J.Jonathangabay Frsa
3. Copywriting: Successful Writing For Design, Advertising And Marketing

Book By Mark Shaw
4. The Adweek Copywriting Handbook: The Ultimate Guide To Writing Powerful Advertising And Marketing Copy From One Of America'S Top Copywriters Paperback – By Joseph Sugarman
5. The Copywriter's Handbook: A Step-By-Step Guide To Writing Copy That Sells Book By Robert Bly
6. Hey, Whipple, Squeeze This: The Classic Guide To Creating Great Ads
7. By Luke Words That Sell: More Than 6000 Entries To Help You Promote Your Products, Services, And Ideas Paperback – By Richard Bayan
Sullivan , Sam Bennett , Edward Boches

COMPULSORY 02	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC -ADVERTISING**
SEMESTER	**V**
COURSE:	**ADVERTISING & MARKETING RESEARCH**
COURSE CODE	**BAMMC DRGA-502**
PAPER	**DRGA (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V

COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC DRGA-502	**ADVERTISING & MARKETING RESEARCH**

COURSE OUTCOME:

1. The course is designed to inculcate the analytical abilities and research skills among the students.
2. To understand research methodologies – Qualitative Vs Quantitative
3. To discuss the foundations of Research and audience analysis that is imperative to successful advertising.
4. To understand the scope and techniques of Advertising and Marketing research, and their utility.

MODULE		**DETAILS**	**LECTURES**
I	Fundamentals of Research	What is Literature review 2. Statement of the problem 3. Aims and objectives' of the study 4. Relevant Research questions	**02**
2	Research design	1. Meaning, Definition, Need and Importance, 2. Scope of Research Design 3. 2. Types- Descriptive, Exploratory and Causal.	**03**
3	Preparing Questionnaire	1. Survey instruments 2. Designing the questioning using projective 3. technique for Qualitative research 4. Designing the Questionnaire using attitude 5. measuring scale for Quantitative research	**03**

4	Sampling	1. Meaning of Sample and Sampling, 2. Process of Sampling 3. Methods of Sampling: Non Probability Sampling – Convenient, Judgment, Quota, Snow Ball, Probability Sampling – Simple Random, systematic, Stratified, Cluster, Multi Stage.	**06**
5	Preparing data sheet and data processing	Preparation of data sheet in excels format and rearranging the data as per the requirement of the Statistical software such as SPSS and the statistical tool.	**03**
6	Data Analysis	Data collected are to be presented and analyzed. Students will have to choose the methods that best Suite the data collected. Data could be presented using tables, pie charts, bar charts, histogram etc. Data presented should be accompanied with the interpretation of the associations and relationships Among the data groups with the appropriate implication to the study or the unit of study. The summary of interpretation should provide answers to the research Questions.	**03**
7	Methods of Data Analysis	The interpretations based on Descriptive statistics should include mode, mean, median, Range, Variance, Standard deviation, Kurtosis, and Skewness. Any of the following multivariate analysis may be used such as Regression, Correlation, t test, factor analysis and discriminant analysis	**04**
8	Report Writing	FORMAT OF RESEARCH REPORTS The research report shall have the following Components. 1. Title page 2. Index 3. Introduction and Research objective 4. Industry Overview 5. Literature Review 6. Statement of the Problem 7. Statement of Hypothesis (Min two hypothesis) 8. Research Methodology and Research Design 9. Data Analysis and Interpretations 10. Findings 11. Conclusion 12. Suggestions 13. Annexure (questionnaires) 14. Bibliography	**06**
9	Advertising Research	1. Introduction to Advertising Research 2. Copy Research: a. Concept testing, b. Name 3. testing, c. Slogan testing 4. Copy testing measures and methods: a. Free 5. association, b. Direct questioning, c. Direct 6. Mail tests, d. Statement comparison tests, e.	**10**

		7. Qualitative interviews, f. Focus groups 8. Pretesting: A. Print Pretesting: a. Consumer Jury Test, B. Portfolio test, C. Paired comparison test, D. Order-of-merit test, E. Mock magazine test, F. Direct mail test. G. Broad casting Pretesting: a. Trailer tests, b. Theatre tests, c. Live telecast tests, d. Clutter tests H. Challenges to pre-testing. Example: The Halo effect 9. Post testing: a) Recall tests, b) Recognition test, c) Triple association test, d) Sales effect tests , e) Sales results tests, f) Enquires test	
	Physiological rating scales	1.Pupil metric devices, 2.Eye-movement camera, 3.Galvanometer, 4.Voice pitch analysis, 5. Brain pattern analysis	**03**
10	10. Marketing Research	1. Introduction to Advertising Research 8 2. New product research, 3. Branding Research, 4. Pricing research, 5. Packaging research, 6. Product testing	**05**
		TOTAL LECTURES	**48**

INTERNALS (The objective of internal exercise is to help the learner acquire skills)

25 MARKS

Sr. no.	Project/Assignment
01 Print Media	Content Analysis
02 Electronic Media	Flip class presentation
03 Field work	Feature based in Mumbai or vicinity on any one of the issues of social justice

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. Dr. Hanif Lakdawala (Convener)
2. Prof. Payal Agarwal (Subject Expert)
3. Prof Sangeeta Makkad (Subject Expert)

Guidelines for Internals:

a. Internals should focus on conducting field survey on either Marketing or Advertising research with sample size not less than 125

Producing the following:

a. Complete Research report of the survey conducted

Reference Books and material

1. Research for Marketing Decisions Paul E. Green, Donald S. Tull
2. Business Research Methods – Donald Cooper and Pamela Schindler, TMGH, 9th edition
3. http://www.millwardbrown.com/docs/default-source/insight-documents/points-of-view/MillwardBrown_POV_NeuroscientePerspective.pdf

ELECTIVE 01	
PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**V**
COURSE:	**GLOBALIZATION AND INTERNATIONAL ADVERTISING**
COURSE CODE	**BAMMC EAGI 1501**
PAPER	**1 DSE 1A (Elective)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**Course Name & Detailed Syllabus**
BAMMC EAGI 1501	**Globalization and International Advertising**

COURSE OUTCOME:

1. To introduce to media students about the concept of Globalization and its impact on Global Media and International Advertising.
2. To help the student understand and practice Global Communication.
3. To develop media student's understanding on Global Brands.
4. To introduce to media students about concept and process of International advertising.
5. To help students formulate international advertising campaign by identifying strategies, barriers, challenges and steps to create international advertising.
6. **Career opportunities: As** Global Brand Managers, Global Content Writer for Ads and Ad Campaigns, Global Market Communicators in Digital Media, career in ad agencies for Global Market.

	MODULES	DETAILS	LECTURES
1.	**INTRODUCTION**		8
	1.Globalization	Concept, meaning, a brief history on Globalization, advantages and dis-advantages of globalization.	
	2.Global and International Market	A brief study on global and international market, overview of global and international marketing and the differences between them.	
	3.Global Media	Evolution of Global Media, Globalization and Media, Evolution of Free trades Across continents.	
	4.International Advertising	Meaning, objectives, evolution of International Advertising.	
	5.Globalization and Advertising	Impact of Globalization on Indian Advertising, Impact of Globalization on International Advertising.	
2	**GLOBAL COMMUNICATION**		**8**
	1.Introduction to Globalization and International Communication	Concept and meaning, a brief note on world as a global village, cosmopolitan and importance of identifying local habitat to define identity, theory and problems of Global Communication.	
	2.Flows of Global Content:	Non-Western and Western Media Contents, Compare and contrast between Western and Non-Western Media Content,	
	3.Popularity of Global Brands due to Content	Popularity of popular brands due to flow of Global content.	
	4.Culture and Global Communication:	Cultural heterogeneity, Cultural Barriers.	
	5.Culture and Social Groups	Cultural practices of different social groups globally	
3	**GLOBALIZATION & ITS IMPACT ON GLOBAL BRANDS**		**8**
	1.Immergence of Global Brands, trends	Immergence of Global Brands, Global Trends,	
	2.Local Going Global	Globalizing Brands - Local going Global, Advantage and Disadvantage of Global Branding and Advertising,	
	3.Brand Awareness	Brand Awareness Strategy	
	4.Global Brand Positioning and Perception	Global Brand Positioning & Perception	
	5.Regulations	Global Advertising Regulations	
4	**CONCEPTUAL UNDERSTANDING OF INTERNATIONAL ADVERTISING**		**12**
	1.Rise	Rise of International Advertising, International Advertising as an Industry.	

	2.Social Force	International Advertising as a Social Force,	
	3.Communication Process	International Advertising as a Communication Process	
	4.Promotion and Propaganda	International Advertising & Promotion, International Advertising and Propaganda	
	5.Rationale,Standardisation and Localization	Rationale for International Advertising, Standardization visa a vise Localization Adaptation (as a general tendency of the Cross National Advertising Literature), Evolution of the impact of International brands on Local Societies.	
5	**Insights of International Advertising**		**12**
	1.International Advertising Strategy -	A Review, Reassessment & Recommendation	
	2.International Advertising	Adaptation v/s Standardization International Advertising & Global Consumer.	
	3.The International Environment	Economic Environment, Demographic Environment, Cultural Environment, Political / Legal Environment.	
	4.Steps for creating Successful International Advertising Campaign	Conduct Market Research, Tailor your website to your target market, Export your experiences, Successes& Failures, and Customize your campaigns, Structuring your account: the most common methods.	
	5.Barriers and Challenges to International Advertising	Culture, Language, Education, Government regulation, Media limitation Internal Challenges: Corporate Mission, Managerial Attitude, Finance, Scale of operations, Product Based Challenges: Projection Based Challenges, Execution Based Challenges, Legal Consideration, Cultural Diversity, Media Limitation	
	Total Lectures		48

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. **Prof. Dr. Priyadarsini Poddar (Convener)**
2. **Prof. Harjeet Bhatia (Subject Expert)**

References:

- Chowdhury, P. (2010) "Bollywood Babes: Body and Female Desire in the Bombay Films" in Mehta B., and Pandharipande R., Bollywood and Globalization. Anthem Press, pp.51-73.
- Ganti, T. (2002) "And Yet My Heart is still Indian", in Ginsburg F. et. al Media Worlds,

Berkeley: UC Press, pp.281-300.

- Hafez, K. (2007), 'Entertainment Culture as the Core of Media Globalization', in Hafez, K., The Myth of Media Globalization, Polity, pp.82-99.
- Philip R Cateora and John L Graham, International Marketing_Irwin McGraw Hill 1999. William F Arens and Courtland L Bovee, Contemporary Advertising-Irwin 1994. Philip Kotler and Eduardo L Roberto, Social marketing strategies for changing public behaviour - The free Press-1989. Jib Fowles, Advertising and popular culture-Sage Publications 1996 Mary Cross, Advertising and Culture-Prentice Hall 2001

ELECTIVE 02

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**V**
COURSE:	**BRAND BUILDING**
COURSE CODE	**BAMMC EABB 1502**
PAPER	**2 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V		
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**	
BAMMC EABB 1502	**BRAND BUILDING**	
COURSE OUTCOME:		
1. 1. To understand the awareness and growing importance of Brand Building 2. 2. To know how to build, sustain and grow brands 3. 3. To know the various new way of building brands **4.** 4. To know about the global perspective of brand building.		
MODULE	**DETAILS**	**LECTURES**
1	**INTRODUCTION TO BRAND BUILDING, IDENTITY, PERSONALITY AND POSITIONING**	**10**
	1. Introduction to Brand Building — Meaning, Product v/s Brand. Why brand matters Process of Branding, Types of brand - National, Retail, Flanker, Distributor, Luxury , Global brands) Brand building blocks, Guidelines for effective branding, Brand Elements – types of brand elements	
	2. Brand Identity and Brand personality — Consumer, Industrial, Retail, Classified, Corporate ,Public service, ,Generic, National, Global, International, Social (CSR) and Advocacy	

	3. Brand Positioning	Product class, Consumer segmentation, Perceptual mapping, Brand benefits and attributes, Corne stones of positioning strategy Basis	**02**
2	**BRANDING LEVERAGING ,STRATEGIES, EQUITY , MODELS**		**08**
	1. Brand Leveraging	Line, Brand extension, Types of Brand Extensions, their advantages and disadvantages, Moving up/ Down, Co- branding	
	2. Brand Strategies	Multi- branding, Mix branding, Hierarchy- Building Equity at Different Hierarchy Levels, Brand Product Matrix, Brand Architecture- Breadth of a Branding Strategy, Depth of a Branding Strategy.	
	3.Brand Equity and Models	Elements/ Sources. Measurement. (Brand awareness, Brand loyalty) Models: Yand R – Graveyard model Brand Asset Valuator, Brand Equity Ten, Inter brand Equity brand	
3	**BRAND BUILDING THROUGH IMPERATIVE , GLOBAL AND CORPORATE IMAGE**		**10**
	1. Brand Imperatives	Co-ordination across organization,. Co-ordination across geography, Re-branding, revitalizing, Rural Advertising and brands.	
	2.Global Brands	Emergence of global brands, Advantages and Disadvantages, Global leadership brands and position , Globalization	
	3.Corporate image Building through brands	Corporate Image in Contemporary Management, , Advertising and Corporate Image	
4	**BRAND BUILDING THROUGH CSR ,BRANDS TO DIFFERENT SECTORS, BRAND LIFE CYCLE**		**10**
	1.Brand Building though Corporate Social Responsibility	CSR as part of business environment management, How CSR activities can be used for Brand Building ,Social activities other than CSR to enhance the brand	
	2. Conception and Growth	Important factors in conception and various stages of growth and maturity of brands with various case studies	
	3.Branding in Different Sectors	Customer, Industrial, Retail and Service Brands	**02**
		TOTAL NUMBER OF LECTURES	**48**
INTERNALS (The objective of internal exercise is to help the learner acquire skills)			**25 MARKS**

Sr. no.	Project/Assignment
01	Individual / Group – Presentation Brand augmentation for a well-known brand and campaign planning - market planning, strategy, segmentation, selection, advertising objective, Creative execution of the campaign, Campaign evaluation and measuring effectiveness

1. PROF. SHOBHA VENKATESH (CONVENER)
2. PROF.DR. RINKESH CHHEDA (SUBJECT EXPERT)
3. PROF PAYAL AGARWAL (SUBJECT EXPERT)
4. PROF. CHETAN DUBEY (INDUSTRY EXPERT)

References :

1. 1. David, A Aker, Building strong brands, the free press, 1996
2. Al Ries and Laura Ries, the 11 Immutable Laws of internet branding, Harper Collins, 2001
3. Brand management – the Indian context – Y L R Moorthi
4. Strategic Brand Management by Kevin keller, M.G Parameshwaran,Issac Jacob
5. Brand positioning – Strategies for competitive advantage – SubrotoSengupta
6. Kumar, Ramesh S, Marketing and branding-Indian scenario,----, 2007
7. Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation (Paperback) - Damian Ryan - Gives an overview
8. What great brands do Building Principles that Separate the ..Denise Lee yohn .
9. John Philip Jones, what's in a brand-building brand equity through advertising, Tata McGraw Hill
10. Brand Equity: An Indian Perspective by SangeetaTrott (Author), Vinod V. Sople (Author)

ELECTIVE 03

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**V**
COURSE:	**AGENCY MANAGEMENT**
COURSE CODE	**BAMMC EAAM 1503**
PAPER	**3 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EAAM 1503	**AGENCY MANAGEMENT**
COURSE OUTCOME:	

1. To acquaint the students with concepts, techniques and give experience in the application of concepts for developing an effective advertising campaign.
2. How an ad agency works and what opportunities exist
3. To familiarize students with the different aspects of running an ad agency
4. To inculcate competencies thereby enabling to undertake professional work with advertising industry.

	MODULE	DETAILS	LECTURES
1	**Module I**		10
	1 .Advertising Agencies	a. Agencies role, Functions, Organization and Importance b. Different types of ad agencies	
	2. Account Planning	a. Role of account planning in advertising b. Role of Account Planner c. Account Planning Process	
	3.Client Servicing	a. The Client - Agency Relationship b. 3P's of Service: Physical evidence, Process and People c. The Gaps Model of service quality d. Stages in the client-agency relationship e. How Agencies Gain Clients f. Why Agencies Lose Clients g. The roles of advertising Account executives	
	4.Advertising campaign Management	a. Means-End chaining and the b. Method of Laddering as guides to Creative Advertising Formulation	
2	**Module II**		**08**
	1.Study and Analyze current Advertising campaigns of the best advertising agencies for their clients	1. Two current campaigns (Previous two years) for each of the following agencies including TVC, Print, Outdoor and digital should be studied, and analyzed in the class 15 room. a. JWT b. Ogilvy c. Lowe Lintas d. FCB Ulka e. DDB Mudra f. Publicize Worldwide 2. At least three international awards winning previous year campaign (one or two year previous) should be analyzed and discussed in the class room. The application questions are Expected on the latest campaigns.	

3	**Module III**		**10**
	1.Entrepreneurship	a. Entrepreneurship- Definitions, Meaning Concept, Functions, Need and Importance. b. Entrepreneurship-As Innovation, risk taking and problem solving. c. Social Entrepreneurship	
	2.Sources of capital for startup Company	a. Personal investment. b. Family c. Venture capital. d. Angels Finance e. Business incubators. f. Government grants and subsidies. g. Bank loans.	
	3.Creating and Starting the Venture	a. Sources of new Ideas, b. Methods of generating ideas, creating problem solving, c. product planning and development process	
4	**Module IV**		**10**
	1.Business Plan for Setting up anAgency	a. Business plan introduction, b. Various Stages in setting up a new Agency	
	2.Marketing plan of the client	a. The Marketing brief, b. Marketing Audit, c. Marketing Objectives, d. Marketing Problems and Opportunities Review, e. STP, f. Executing the plan, g. Evaluating the plan	
5	**Module V**		**08**
	1.The Response Process	a. Traditional Response Hierarchy Models: AIDA b. Communications Objectives c. DAGMAR: An Approach to Setting Objectives	
	2.Agency Compensation	a. Various methods of Agency Remunerations	
	3.Growing the Agency	a. The Pitch: request for proposal, speculative pitches, Pitch Process b. References, Image and reputation, PR	
	4.Sales Promotion Management	a. The Scope and Role of Sales Promotion b. Reasons for the Increase in Sales Promotion	*02*

		c. Objectives of Trade-Oriented Sales Promotion d. Techniques of Trade-Oriented Sales Promotion e. Objectives of Consumer-Oriented Sales Promotion f. Techniques of Consumer-Oriented Sales Promotion	

Total Lectures	**48**

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. PROF. GAJENDRA DEODA (CONVENER)
2. PROF. DR.HANIF LAKDAWALA (SUBJECT EXPERT)

INTERNAL EVALUATION **25 MARKS**

Starting and maintaining a blog –the learner shall make the blog after consultation with the teacher concerned during the period of learning of the course and run the blog for the period of the course. The subject of the blog should be any one social issue. The blog shall be supervised by the concerned teacher and marks shall be assigned for quality of language, design and layout, frequency of updating, the quality of comment by the blogger, interactivity on the blog. The blog must be updated a minimum of twice a week.

2. The college should support the Incubation projects or the start up agency of their own students

Mandatory Requirement:

1. Agency Management lectures compulsory should be held in audio video room with proper projector and sound.

Suggested Reading:

1. Advertising and Promotion by G. Belch and M. Belch

2. Advertising Promotion and Other Aspects of Integrated Marketing Communications by Terence A. Shimp

ELECTIVE 04

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**V**
COURSE:	**ACCOUNT PLANNING & ADVERTISING**
COURSE CODE	**BAMMC EAAP 1504**
PAPER	**4 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EAAP 1504	**ACCOUNT PLANNING & ADVERTISING**
COURSE OUTCOME:	

1. You will learn the skills of a strategist/planner, which include learning how to:
2. To familiarize the students with the concept of Account Planning
3. Provide students with an understanding of the discipline of account planning and strategy development, and advertising research methods.
4. Think critically and analytically
5. Connect what a brand offers to what an audience wants
6. Persuade others to see what you see
7. Telling a compelling story, verbally and in writing (persuasive communications)

	MODULE	DETAILS	LECTURES
1	**Modules I**		**10**
	1.Introduction	a. Definition b. Various views and practice in account planning	**01**
	2.What is Account Planning	a. Knowing the difference between facts and insights b. The Creative Pursuit of Insights c. Identifying the true problem d. Asking the right questions, in the right ways. e. Setting objectives	**02**
2	**Module II**		**08**
	1. Where Does Insights Come From	a. Consumer insights b. Cultural insights c. Future insights d. Project insights e. Brand insights f. Market insights g. Purchase insights h. Usage insights i. Owner insights	
	2.Study of insight of three awards winning advertising campaign of the Previous two years.	a. What kind of insight is been used by the campaign should be Discussed.	
	3.Research In Accounts Planning	a. Techniques of In-depth interviews for discovering consumer insights b. Ethnography for in-depth consumer insight c. Google analytics for digital account planning	
3	**Module III**		**10**
	1.The Account Planning Process	a. Role of account planning in advertising b. Role of Account Planner c. Account Planning Process	
	2.The Importance Of Preparation	a. Why it's so important to prepare b. how to prepare c. Why this skill is vital for planners and strategists.	

	3.Propogation Planning	a. Definition b. Adoption curve with propagation c. Propagation platforms d. Propagation process	
	4.Transmedia Planning	a. Definition b. Who does trans media planning c. Why trans media d. How is trans media different e. Elements of Trans media Storytelling	
4	**Module IV**		**10**
	1.Review of different types of briefs from – major agencies	a. JWT b. Ogilvy and Mather c. DDB d. FCB e. BBDO f. YandR Discussion on the role of the briefing. What's the hallmark that makes a brief inspiring? Uninspiring? Pitfalls and how to avoid them	
5	**Module V**		**10**
	1.Defining the Benefit	a. What is an Attribute? b. Attribute Versus Benefit c. Attribute to Functional Benefit d. Emotional Benefits e. Plus or Minus Emotions f. Benefit Laddering g. Benefit Matrix	**02**
	2.Developing a Brand Story	a. The Story Problem b. Elements of story c. Building story brand d. Crafting the Story e. SB7 Frame work (CHARACTER, PROBLEM, GUIDE, PLAN, CALLS THEM TO ACTION, FAILURE, and SUCCESS).	
Total Lectures			**48**

BOS SYLLABUS SUB-COMMITTEE MEMBER

1. **Dr. Hanif Lakdawala (Convener)**

MANDATORY REQUIREMENT:

Account Planning and Advertising, lectures compulsory should be held in audio video room with proper projector and sound

Suggested reading:

Truth, Lies and Advertising: The Art of Account Planning by Jon Steel, John Wiley and Sons, 1998 The Practical Pocket Guide to Account Planning by Chris Kocek, Yellow Bird Press Building a story brand by Donald Miller

ELECTIVE 05

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**V**
COURSE:	**SOCIAL MEDIA MARKETING**
COURSE CODE	**BAMMC EASM 1505**
PAPER	**5 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EASM 1505	**SOCIAL MEDIA MARKETING**

COURSE OUTCOME:

Learn to communicate and tell stories through the web.

1. Students learn real-world skills from leading designers, artists, and entrepreneurs.
2. The primary goal is to create problem solvers who strike a balance between traditional art and technology, and between individual vision and teamwork.
3. With a fundamental understanding of digital tools and their creative applications, graduates meet the demands of a diverse and expanding job market in visual story telling.
4. Identify and apply strategies to improve and succeed no matter what their initial skills.
5. Solve problems and learn from creative risks by using people skills, design principles, and processes.
6. Build a strong foundation in all aspects of design and production for storytelling in motion.
7. Use inspiration in fields outside of digital media such as poetry, science, music, astronomy, history, dance, and more.
8. Develop a professional commitment to their field, their work, and themselves; preparing them to be members and leaders in their profession, as well as learning how to act both as individuals and as team members to support the whole.

	MODULE	**DETAILS**	**LECTURES**
1	**Digital ERA**		10
	1.Introduction to E-Marketing	What is the E-marketing? The changing marketing landscape. The internet and business.	
	2.E-Marketing	E- marketing strength and application, Communication modes, The behavioral internet (B2C, B2B, C2Cand C2B) E –marketing and Online advertising. E-marketing and Consumer segmentation , E- marketing and Sales and Trade promotions	
	3.Types of Digital Marketing	Types E- mail marketing, Types Internet marketing Types of Mobile marketing	
	4.Generation Y	Expectation and influence , Implication of Digital change , Emerging consumer segmentation in India	
2	**Social Media Marketing**		**08**

	1.Introduction to Social Media Marketing	Meaning , Importance , Myths about Social media marketing, Brief History Characteristics of Social Media marketer and Careers in Social media marketing	
	2.Content Strategy For Social Media Marketing	10- step framework for creating successful SMM strategy, Building content for sharing, Generating Ideas, Creating content for Multiple platforms	
	4.Face Book Marketing	Face book – the Origin and Eight different version of Facebook , What is Face book marketing ? Facebook page best practices, KPI and insights , How does Face book advertising work – Face book ad campaign Objectives and targeting and Content creation and sharing .	
	5.Instagram Marketing	Optimizing Instagram profile, Creating content strategy, Influencer marketing and Instagram Ads	
	6.Linked In Marketing	LinkedIn for personal branding, LinkedIn for Company pages ,Brand marketing for LinkedIn, Ads on LinkedIn	
	7.Pinterest Marketing	Pinterest for business, Marketing on Pinterest, Leveraging Rich Pins	
	8.Youtube Marketing	How to build foundation for your Youtube channel, Usage of free resource , Optimize organic traffic by selecting key words for videos , Optimization of advertisements	
4	**Social Media Marketing Plan, and Campaign management**		**10**
	1.Social Media Marketing Plan	What is SMM plan? Social Media Marketing cycle, Listen and Observe -5 stages, Setting Social Media Marketing goals and objectives (Exposure, Engagement, Influence , Impact and advocacy) , Eight C's of strategy development Uses of keywords, hashtags, and emoji in targeting branded posts , Evaluating Social media marketing success	
	2.Campaign Marketing	What is campaign management? Solutions, How to use campaign management for Facebook, Twitter etc, Sentiment mining, Using Corporate blog as a CRM tool. How Companies use blogs for effective campaign management?	
5	**Ethics and Careers**		**10**
	1.Ethics	Code of ethics , 9 Rules of engagement for Social Media Marketing	
	2.Careers	Careers in Social media marketing	
Total Lectures			**48**

BOS SYLLABUS SUB-COMMITTEE MEMBERS

- Prof. Shobha Venkatesh (Convener)
- Prof. Dr. Hanif Lakdawala (Subject Expert)
- Prof. Vishal Parekh (Industry Expert)

INTERNALS (The objective of internal exercise is to help the learner acquire skills)

	25 MARKS
Sr. no.	Project/Assignment
01	Launch online campaign for Facebook, Instagram, YouTube, and LinkedIn

References

1. **Digital marketing by Vanadana Ahuja**
2. **Social Media Marketing: a strategic approach by Barker and Barker**

ELECTIVE 06

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**V**
COURSE:	**DIRECT MARKETING & E-COMMERCE**
COURSE CODE	**BAMMC EADM 1506**
PAPER	**6 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EADM 1506	**DIRECT MARKETING & E-COMMERCE**

COURSE OUTCOME:

1. To understand the awareness and growing importance of Direct Marketing

2. The objective is to use various direct marketing techniques (traditional and modern) for reaching to ultimate customers and build up customer loyalty and database management

3. To understand increasing significance of E-Commerce and its applications in business and various sectors.

4. To provide an insight on Direct Marketing activities on various Social Media platforms through E-commerce and its emerging significance in business.

MODULE		DETAILS	LECTURES
1	**Introduction to Direct Marketing , Integrated Marketing Communication& Customer Relationship Management**		**10**
	1.Introduction to Marketing, Basics of Direct and Interactive Marketing, Legal framework towards Direct Marketing	Meaning and Introduction to Marketing, Evolution of Marketing, Study of Marketing Mix, Traditional Versus Modern Marketing Techniques, Meaning and Definition of Direct Marketing, Importance of Direct Marketing, Advantages and Disadvantages of Direct Marketing, Approaches of Direct Marketing, Reasons for the growth of Direct Marketing, Techniques of Direct Marketing, Economics of Direct Marketing, Economics of Direct Marketing, Laws pertaining to Patents, Trademark, Copyright, etc., Privacy -	

		The key Issue.	
	2.Integrated Marketing Communication versus Direct Marketing	Meaning, Introduction of IMC , Role of IMC in the Marketing Process, Relationship of IMC with Direct Marketing, Importance of IMC, Tools of IMC - Advertising ,Sales Promotion, Publicity, Personal Selling, etc., Person to person ,Group Selling, Direct Mail, Direct response Television(DR-TV), Direct Response Print Advertising, Catalogues, Inserts, Videos, E-mail, Trade shows	
	3.Customer as the only project center: Segmentation, Targeting and customer Focus	What is Customer Relationship Management (CRM), Importance of CRM, Planning and Developing CRM, Customizing Products to different needs, Studying the customers mix and Managing the Key customers, Relationship Marketing - Customer Loyalty, 3 Tasks of Direct and Interactive Marketing = Customer Acquisition, Development and Retention, Market Segmentation	*02*
2	**Database Management, Marketing Strategies, Research Analysis and Testing, LTV Sums and Theory**		**08**
	1.Understanding the business of Direct Marketing – Database Management/ Marketing Strategies	Database Management: Meaning, Importance, Functions of Database, Sources and uses of E-database, Techniques of Managing Database - Internal/External, Steps in developing a database, Advantages and Disadvantages of Database Management. Direct Marketing Strategies: Meaning of Marketing Strategies - Why it is needed, Internal and External Analysis, Objectives of Strategies, Creating a Direct Marketing Budget.	
	2.Direct Marketing Research and Testing	What is customer Life time Value (LTV), Factors affecting Life time Value, How we use LTV, LTV - Sums (3 methods - Present/Historical and Discounted), Using LTV analysis to compare the Effectiveness of various marketing strategies.	
	3.Direct Marketing Analysis	List Selection, Prospecting, Product Customization, Response Modeling and Experimentation, Mail order, Lead generation, Circulation, Relationship/loyalty programs,	

		Store traffic/Site traffic generation, Fund raising, Pre-selling, selling(Cross selling, Up selling) and Post-Selling	
3	**Introduction to E-commerce, E-business , Building up a Website**		**10**
	1.Introduction to E-Commerce	Ecommerce- Meaning, Features of E-commerce, Categories of E-commerce, Advantages and Limitations of E-Commerce, Traditional Commerce and E-Commerce, Factors Responsible for Growth of E-Commerce, Issues in Implementing E-Commerce, Trends in E-Commerce in Sectors like: Retail, Banking, Tourism, Government, Education	*02*
	2. E-Business	Meaning, Launching an E-Business, Different phases of Launching an E-Business, Important Concepts in E-Business: Data Warehouse, Customer Relationship Management, Supply Chain Management, and Enterprise Resource Planning	*02*
	3.Website	Design and Development of Website, Advantages of Website, Principles of Web Design, Life Cycle. Approach for Building a Website, Different Ways of Building a Website	*02*
4	**Payment, Security in E-Commerce , Integration of Direct Marketing & E-Commerce through social media**		**10**
	1.Electronic Payment Systems	Features, Different Payment Systems :Debit Card, Credit Card ,Smart Card, E-cash, E-Cheques, E-wallet, Electronic Fund Transfer, Issues Relating to Privacy and Security in E-Business	
	2.Payment Gateway	Introduction, Payment Gateway Process, Payment Gateway, Types, Advantages and Disadvantages of Payment Gateway, Types of Transaction Security	
	3.Integration of Direct Marketing and E-Commerce through the use of Internet and Social Media	What is Internet, How companies use internet to promote the product, Impact of Internet on Direct Marketing and E-Commerce industry, Growing Importance of Social Media, Role of Social Media on Consumers and Business	
Total Lectures			**48**

BOS SYLLABUS COMMITTEE MEMBERS

- **Prof. Shobha Venkatesh (Convener)**
- **Dr. Rinkesh Chheda (Subject Expert)**
- **Prof Deepali Mangrekar (Subject Expert)**

INTERNALS (The objective of internal exercise is to help the learner acquire skills)
25 MARKS

Sr. no.	Project/Assignment
01	Individual / Group – Presentation Marketing plan integrating both Direct marketing and E-

	commerce on any product or Service

References :

1. Alan Tapp, Principles of Direct and Database Marketing - Financial Times - Prentice Hall 2000
2. Drayton Bird, Commonsense Direct Marketing - Kogan Page 1996
3. Jim Sterne and Anthony Prior - E-mail Marketing - John Wiley and Sons 2000
4. Robin Fairlie, Database Marketing and Direct Mail - Exley Publications 1990
5. Successful Direct Marketing Methods Hardcover – (7th edition) by Bob

6. Direct Marketing: Strategy, Planning, Execution by Edward L Nash
7. The New Direct Marketing: How to Implement a Profitdriven Database, by Rajeev Batra
8. Reinventing Interactive and Direct Marketing: Leading Experts Show How to ...by Stan Rapp
9. Digital marketing (E commerce) – Vandana Ahuja.

ELECTIVE 07

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**V**
COURSE:	**Consumer Behaviour**
COURSE CODE	**BAMMC EACB 1507**
PAPER	**7 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V		
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**	
BAMMC EACB 1507	**CONSUMER BEHAVIOUR**	
COURSE OUTCOME:		
1. To understand the sociological & psychological perspective of consumer behaviour. 2. To introduce students to the complexities of consumer behaviour, its importance in marketing & advertising. **3.** To sensitize students to the changing trends in consumer behaviour.		
MODULE	**DETAILS**	**LECTURES**
1 **Module I**		**10**
1.INTRODUCTION TO CONSUMER BEHAVIOUR	**1.** Need to study Consumer Behaviour. 2. Psychological & Sociological dynamics of consumption. 3. Consumer Behaviour in a dynamic & digital world	
2.MARKETING & CONSUMER BEHAVIOUR	1. Segmentation Strategies – VALS 2. Communication process. 3. Persuasion - Needs & Importance. ELM. Persuasive advertising appeals.	
2 **Module II**		**08**

	1.PSYCHOLOGICAL DETERMINANTS & CONSUMER BEHAVIOUR	1. Motivation – Types & Theories – Maslow. 2. Attitude – Characteristics – Theories – Tricomponent. 3. Multiattitude Model. 4. Cognitive dissonance. 5. Personality - Facets of personality. i. Theories – Freud & Jung. ii. Personality traits & consumer behaviour. iii. Self-Concept. **Application of these theories in the marketing and consumer behaviour.**	
3	**Module III**		**10**
	1.RELEVANCE OF LEARNING IN CONSUMER BEHAVIOUR	1. Perception - Elements in perception. a. Subliminal perception. b. Perceptual Interpretation – Stereotyping in advertising. 2. Learning – Elements in Consumer Learning. 3. Behavioral & Classical Theory. 4. Cognitive Learning.	
4	**Module IV**		**10**
	1.SOCIO - ECONOMIC& CULTURAL DETERMINANTS OF CONSUMER BEHAVIOUR	1. Family - Role of family in Socialization & Consumption – FLC. 2. Culture – Role & Dynamics. i. Subculture & its influence on consumption. ii. Changing Indian core values. iii. Cross culture consumer perspective. 3. Social group- primary and secondary and the role of Reference group & Consumer Behaviour. 4. Economic- social class as the economic 5. determinants of consumer behaviour	
5	**Module V**		**10**
	1. CONSUMER DECISION MAKING.	a. Process of decision making. b. Models of decision making. c. Opinion Leadership. 2. Diffusion & Adoption Process. a. Process of decision making. b. Models of decision making. c. Opinion Leadership. 3. Diffusion & Adoption Process.	
Total Lectures			**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. **PROF. PAYAL AGGARWAL (Convenor)**
2. **PROF.DR. PADMAJA ARVIND (Subject Expert)**

INTERNAL EVALUATION METHODOLOGY **25 MARKS**

1. Continuous Assignments
2. Oral & Practical Presentations
3. Projects
4. Class Test
5. Open Book Test
6. Group Interactions
7. Debates & Discussions
8. Quiz

Reference Book

- Leon. Schiffman, Joseph Wiserblit, S.Ramesh Kumar – Consumer Behaviour.
- Pearson 11th Edition.
- David.L.Louder, Albert Jdello Bitta, Consumer Behaviour- Concepts & Applications. Mcgrow Hill.
- Ramaniy Majumdar, Consumer Behaviour, Insights from Indian Market. Ph I Learning Pvt Ltd . Delhi.

ELECTIVE 08

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**V**
COURSE:	**DOCUMENTARY & AD FILM MAKING**
COURSE CODE	**BAMMC EADF 1508**
PAPER	**8 DSE 1A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER V	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EADF 1508	**DOCUMENTARY & AD FILM MAKING**

COURSE OUTCOME:

1. Understanding the planning involved in making audio visual communication effectively.
2. To prepare students for effective and ethical public communication.
3. To help students acquire basic skills in the practical aspects of Documentary and Ad Film making.
4. Equip students with skills to write and shoot effective Documentary and Ad film.

MODULE		DETAILS	LECTURES
1	**Understanding Documentary**		**10**
	1.Category	**Non-fiction (Limitation and Wonders)/Docu-drama** Anthropological/Ethnographic Biographical/Historical Arts/Cultural Science and Technology Promotional Environment including Agricultural Social Issues Educational Investigative Family Values Exploration/Adventure	*08*
	2.Writing	Formation of Concept Research Modes : Library, Archives, Location, Life stories, ethnographic. Synopsis Script and Visualization Commentary Subtitling/Translation	*04*
	3.Production	**Pre-Production** : Engaging technical team & equipments. Acquiring shooting permissions. Production : On locale and studio shooting. Technology involved. **Post Production** : Editing (Technique & Grammar), Voice over, Music, Foley, Sp. Effects/Graphics, Sound Re- recording and Mixing, DI and Subtitling. Making final master& telecast copy.	*18*
2	**AD Film Making**		08
	1.Ad Film Making	Writing a selling concept. Budgeting. Preparing Storyboard (Using different formats of making) Agency/Client approval.	*10*
	2.Pre to Post Production	Finalization of Cast and Crew. Set erection/Location, Scheduling, Shooting. Editing, Voice over, Music, Foley, Sp. Effects/Graphics, Sound Re-recording & Mixing, DI & Subtitling. Making final master & telecast copy.	*08*
Total Lectures			**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. **Prof. Gajendra Deoda (Convener)**
2. **Prof. Mathur (Subject Expert)**
3. **Prof. Ganatra (Industry Expert)**

INTERNALS

(The objective of internals is to help the students practice the practicalities of making Documentary& Ad films.) 25MARKS

SEMESTER VI-ADVERTISING		
COURSE CODE	**CREDITS**	**COURSE NAME**
COMPULSORY-CORE	**04X2=08**	**DRG(DISCIPLINE RELATED GENERIC)**
BAMMC DRGA-601	**04**	**1. DIGITAL MEDIA**
BAMMC DRGA-602	**04**	**2. ADVERTISING DESIGN**
ELECTIVES-	**03X04=12**	**DSE 1 A (DISCIPLINE SPECIFIC ELECTIVES-) (ANY FOUR COURSES)**
BAMMC EAAC 2601		1. ADVERTISING IN CONTEMPORARY SOCIETY
BAMMC EABM 2602		2. BRAND MANAGEMENT
BAMMC EAMP 2603		3. MEDIA PLANNING & BUYING
BAMMC EAAS 2604		4. ADVERTISING & SALES PROMOTION
BAMMC EARM 2605		5. RURAL MARKETING & ADVERTISING
BAMMC EARE 2606		6. RETAILING & MERCHANDISING
BAMMC EAEM 2607		7. ENTERTAINMENT & MEDIA MARKETING
BAMMC EATP 2608		8. TELEVISION PROGRAM PRODUCTION
TOTAL	**20**	

COMPULSORY 01

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**DIGITAL MEDIA**
COURSE CODE	**BAMMC DRGA-601**
PAPER	**DRGA (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI			
COURSE CODE		**COURSE NAME & DETAILED SYLLABUS**	
BAMMC DRGA-601		**DIGITAL MEDIA**	
COURSE OUTCOME:			
1. Understand digital marketing platform 2. Understand the key goals and stages of digital campaigns 3. Understand the of use key digital marketing tools **4.** Learn to develop digital marketing plans			
MODULE		**DETAILS**	**LECTURES**
1	**About features**		**10**
	1.Introduction to Digital Marketing	a. Understanding Digital Media b. Advantages of Digital Media c. Principles of Digital Media Marketing d. Key Concepts in Digital media	**04**

		e. Traditional Vs Digital Media	
2	2.Search Engine Optimization (SEO):	a. How search Engine works b. Introduction to SEO c. On Page Optimisation d. Off Page optimisation e. SEO Audit, Tools and Measurement f. SEO Resources, Careers in SEO	**08**
3	3.Search Engine marketing (SEM)	a. What is SEM? b. Why SEM c. What is Google Adwords? Why Google Adwords d. Google network e. Adwords terminologies f. Campaign types g. Creation of Google Display NETWORK (GDN) h. Display Ads format i. Conversion tracking j. GDN Campaign creation (DEMO) k. Remarketing l. What are Google shopping Ads	**04**
4	Social Media Marketing (SMM)	a. Introduction to Social Media b. Facebook Marketing c. Intagram Marketing d. LinkedIn Marketing e. Twitter Marketing f. SMM Tools g. Creating a successful social media strategy	**04**
5	Email marketing	1.key terms and concepts 2.Customer acquisition strategies 3.Best Practices : CRABS 4.Tools to enhance lead nurturing 5.Enhance better reach	**05**
6	Web Analytics	a. Introduction to analytics b. Social CRM and analysis c. Google analytics d. Digital Analytics e. Content performance analytics f. Visitor analysis g. Social media analytics	**06**
7	Affiliate Marketing and Programmatic Marketing	a. Affiliate Marketing b. Definition, Purpose, Resources required, Top Players in Affiliate Marketing, Segregation of Affiliate marketing c. Programmatic Marketing d. Evolution and growth of programmatic Marketing e. Real Time bidding, f. Types of Programmatic Advertising, Advantages and Challenges, Myths of	**10**

		Programmatic Marketing	
8	Content writing	a. Intro to content writing b. Core Principles of Content writing c. Why blogs matter d. Principles of writing blogs e. How to write content for twitter and Mobile	**04**
9	Cyber laws	a. Information Technology Act b. Copyright Act c. Cyber ethics d. Digital Security	**02**
Total Lectures			**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. Prof. Pradeep Sasidharan (Convener)
2. Prof. Dr Hanif Lakdawala(Subject Expert)

Reference Book And Material

1. Digital marketing By Seema Gupta
2. Digital Marketing By Puneet Singh Bhatia

COMPULSORY 02

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**ADVERTISING DESIGN**
COURSE CODE	**BAMMC DRGA-602**
PAPER	**DRGA (COMPULSORY)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC DRGA-602	**ADVERTISING DESIGN**

COURSE OUTCOME:

1. Learner shall understand the process of planning & production of the advertisement.
2. To highlight the importance of visual language as effective way of communication.
3. To provide practical training in the field of advertising & make learner industry ready.

	MODULE	**DETAILS**	**LECTURES**
1	**INTRODUCTION: ADVERTISING DESIGN=COMMUNICATION DESIGN**		10
	1. Project Paper	**Intro to Project paper & Campaign** **Campaign outline, Elements to be produced, Viva voce**	
	2.Role of Agency Departments	1.Accounts dept.: Client handling, Strategy planning 2. Media dept.: Media research, Media planning, Buying & billing 3. Creative dept.: Prime calibre, All of visualisation,	

		Creative thinking, Execution, 4. Production dept.: (in-house or outsource) Photography, TVC, Print of promotional material.	
	3.Process of Design	Research of: 1. Product (features & benefits) 2. Market: (TA) Psycho & Demography 3. Message Strategy: What to say & How 4. Competition & claim 5. Visualisation& Copy 6. Illustration: Choosing one among 7. Execution: Graphic design	
	4.Art Direction	Role of art director in various media Detailing in illustration Detailing in TVC: Location, Models, Costume, Working on storyboard	
	5.Analysing Ads & Logos	Discussion of existing ads: Print ads: For layout, Colours, Message TVCs: AV, Pace, Tone etc Innovative, Ambient, Transit for relevancy PoS: For size, Place, Consumer psychology	
2	**DESIGN BASICS: LANGUAGE OF VISUALS**		08
	1.Elements of Design	Vocabulary: Point, Line, Shape, Size, Tone, Colours, Texture, Space	
	2.Principles of Design	Grammar: Proportions, Contrast. Harmony, Balance, Rhythm, Unity	
	3.Rules of Design	Rules/Guides: Emphasis, Proximity, Alignment, Visual path, Syntax Gestalt: Completion, Closure, Invariance, Multi-stability, Figure & ground etc	
	4.Optical illusions	Visual Influence: Shapes & proportions, Tones & contrast, Lines & length	
	5. 5.Typography	Type as Design element: Classification: Serif, Sans serif, Decorative, Trendy etc. Measurement: size, weight, Kern, Track, leading, Baseline etc. Word Expression, Meaning expressed by appearance	
3	**LAYOUT: THE BLUE PRINT**		10
	1.Types of Layout	Mondrian, Picture window, Split, Big type, All text, All art, Circus etc.	
	2.Stages of Layout	Thumbnail sketches, Rough layout, Finished layout, Comprehensive	
	3.Choosing Picture	Strong visual capable of selecting Target Group, Suitable with headline, Trial close	
	4.Choosing Typo	Sorting text into parts of copy. Choosing appropriate typeface for Headline, Subheads Slogan, Body etc.	
	5.Putting all	Choosing canvas size, Trying formats, orientations,	

	Together	Various proportions of verbal & Visual	
4	**PLANNING A CAMPAIGN: WORKING ON FINAL PROJECT**		**10**
	1.Choosing a product	Finalizing what to sell. Designing a Logo: Type based, Shape based, combo, Symbolic etc. Planning tagline	
	2.Research	Product/Service (features & benefits) Market: Wants & Needs, Psycho & Demography, What words may click their minds. Tone & Voice.	
	3.Idea generation	Coming to big idea, Trying various idea generation techniques	
	4.Visualising Layout	Choosing appropriate image/s & working on rough layout Finalizing layout for highest effectiveness.	
5	**EXECUTION: ON SYSTEM WORK (FACULTY TO GUIDE & INSTRUCT)**		**10**
	1.Logo Design	Working on system: Corel Draw/Illustrator Designing Logo, Deciding color scheme (Logo is vector based) Modifying Typo, Using glyphs, Considering shape as identity	
	2.Logo Manual	Creating a Logo design Philosophy Explaining the logic behind choice of Type, Choice of colour, Reason for shape, Tagline as brand promise. Making all compact. Creating 4 diff sizes & also reverse	
	3.Print Ads/ Press ads	Press: Using finalized layout for creating series of three ads (Synergy maintained) Diff image same typo OR Diff expressions same model-(brand ambassador) & same typo Creating headlines suitable to image (syntax)	
	4.Outdoor ad, Innovative/ Transit /Ambient Point of purchase	Outdoor: Deciding location, Format, Spotting frequency, Advantage of location, Advantage of local surroundings, Spotability, Appropriate headlines	
	5.TVC or Web Ads	TVC: Story line, Script, Floor plan, Camera plot, Storyboard with , VFX, OSD, SFX, VO Web ad: Pop up, Scroll, Banner etc Printing, Mounting & Preparing for viva	
Total Lectures			**48**

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. **Prof. Arvind Parulekar (Convener)**
2. **Prof. Arvind Hate (Subject Expert)**
3. **Prof. Ashish Gandhre (Industry Expert)**

Note:

1. Students have to choose an existing product with new fresh brand name & new logo &

not the existing brand.

2. Students should not be encouraged to bring in 'innovation' in the product or not to 'invent' totally new. Invention is job of engineers & we are in communication. (If agency has to rely on innovation for the advertisement then it's a failure of their efficiency.)

3. The viva will be based on the project & the evaluation will be based on its effectiveness as communication design.

4. Make students aware that marketing & advertising are different things & advertising has to be self-explanatory. If student has to verbally push to sell 'his work' then the work is weak.

Internal Assessment: (25 Marks)

Learning process in art has four phases:

1. Appreciation
2. Imitation
3. Inspiration
4. Creation

To take the students through all these phases the internal assessment comprise of: Scrap book: (appreciation) Collection of print ads from magazine & Newspaper as well as **Logos of different brands**. Students are supposed to analyse the ads in the scrap book for the layouts, colour harmonies used, typography, mood, type of headlines & visual path along with various design aspects.

Logos has to be analyzed for their shape, symbolism, typo treatment, uniqueness, connectivity to the industry & unity as well as alignment within logo elements.

Drawing book: (imitation & inspiration)The exercise in the book is based on various design principles such as harmony, contrast, illusions etc& to carry out rough layout & rough designs for new logo. This also comprise of idea generation & rough story board.

Final campaign: Creative brief & finalized layouts for press & print media that will follow Synergy. Student to start campaign on approval of creative brief.

Project: Elements of Campaign: Language can be English, Hindi, Marathi.

1. Logo Design: (Fresh) presented in Logo Manual
2. Stationary: Visiting Card, Letterhead, Envelope in hard copy crafted in actual.
3. Press Ads: Series of 3 ads for Newspaper maintaining synergy.
4. Print Ads: Series of 2 ads for Magazine maintaining synergy. English and/or regional
5. Outdoor Ad: Billboard, Hoarding (one as reminder ad or warm up campaign)
6. Innovative/ Transit/ Ambient Ad: Any one of these suitable to the product/service
7. Point of Sale: Standee/ Danglers/ Strut cad/ Tent card/ kiosk etc: any one suitable
8. TVC Storyboard: 12 to 16 key frames with Floor plan, Camera plot, OSD, SFX, VFS, VO
9. Internet Ads: Scroll/ Banner/ Pop up etc: Any one ad suitable to product/service

References:

1. Art & Ideas: G. S. Rege
2. Art & Production: N. N. Sarkar
3. Advertising by Design Robin Landa
4. Elements of Graphic Design Alexander White
5. Ogilvy on Advertising David Ogilvy

ELECTIVE 01

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**

COURSE:	**ADVERTISING IN CONTEMPORARY SOCIETY**
COURSE CODE	**BAMMC EAAC 2601**
PAPER	**1 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI			
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**		
BAMMC EAAC 2601	**ADVERTISING IN CONTEMPORARY SOCIETY**		
COURSE OUTCOME:			
1. To understand the environment of Advertising in Contemporary Society 2. To understand Liberalization and its impact on the economy and other areas of Indian society **3.** To compare and analyse the advertising environment of different countries			
Sr. no.	**Module**	**Details**	**LECTURES**
01	Module 1. Changes in Advertising Environment	Advertising Environment post-independence; Liberalization Privatization, Globalization Policy 1991: FDI, Entry of MNCs in India, It's effect on Indian Companies and the advertising strategy. Effects of Liberalization on Advertising Industry in context to Economy, Business, Employment and Life Style	**10**
02	Module 2. Effect of Advertising, Criticism of Advertising, Social implication of advertising	The use and effect of Advertising on the following factors: 1. Women 2. Children 3. Old people 4. Youth Criticism of Advertising: Controversial Advertising; Gender Bias Advertising and Popular culture; Social implication of advertising; The effect of advertising on market and economy.	**10**
03	Module 3. Types of Advertising; Internet Advertising and Digital Advertising	Types of Advertising: Political advertising, B to B, Consumer advertising, Retail advertising, Industrial advertising, Financial advertising. Internet Advertising and Digital Advertising : Upcoming different ways in New Media	**08**
04	Module 4. The analysis of Advertising environment of India and other foreign countries	National, International and Global Advertising & Marketing: The environmental analysis of India and other foreign countries, specifically, USA, UK, FRANCE, CHINA, JAPAN, BRAZIL, UAE, THAILAND The use of this analysis in marketing and Advertising. (CASE STUDY)	**12**
05	Module 5.	Social Marketing: Definition, Need for Social	**08**

	Social Marketing	Marketing; The difficulties of Social Marketing; The various subjects for Social Marketing; Effects of social marketing. (CASE STUDY)	
		TOTAL NUMBER OF LECTURES	**48**

BOS SYLLABUS COMMITTEE MEMBERS

1. **Prof. Gajendra Deoda (Convener)**
2. **Prof. Smita Jain (Subject Expert)**
3. **Prof. Ashish Mehta (Subject Expert)**

Reference Books and material

1. Advertising by Amita Shankar
2. Advertising by London & Britta
3. Advertising by Ramaswamy & Namakeeman

ELECTIVE 02

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**VI**
COURSE:	**BRAND MANAGEMENT**
COURSE CODE	**BAMMC EABM 2602**
PAPER	**2 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI

COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EABM 2602	**BRAND MANAGEMENT**

COURSE OUTCOME

1. To understand the awareness and growing importance of brand management.
2. To know how to build, sustain and grow brands
3. To know the various sources of brand equity.
4. To know about the global perspective of brand management

	MODULE	**DETAILS**	**LECTURES**
1	**INTRODUCTION TO BRAND MANAGEMENT**		**12**
	1.Introduction to Brand Management:	Meaning of Brand, Branding, Brand Management, Importance of Branding to Consumers, Firms, Brands v/s Products, Scope of Branding, Branding Challenges and Opportunities,	
	2.Models	Strategic Brand Management Process, Customer Based Brand Equity model (CBBE)	
	3.Brand Positioning:	Meaning, Importance, Objectives , Scope Basis of Brand Positioning, Brand Mantras Brand Repositioning and its characteristics, Point of Parity and Point of Differences	
2	**PLANNING AND IMPLEMENTING BRAND MARKETING PROGRAMS**		**12**
	1. Brand Elements	Meaning, Criteria for choosing Brand Elements,	

		Types of Brand Elements, Integrating Marketing Programs and Activities	
	2.Personalising Marketing	Experiential Marketing, One to One Marketing, Permission Marketing. Product Strategy: Perceived Quality and Relationship Marketing, Pricing Strategy: Setting Prices to Build Brand Equity Channel Strategy: Direct, Indirect Channels, Web Strategy	
	3.Cause Marketing to Build Brand Equity	Meaning of Cause Marketing, Advantages, Green Marketing Building Global Customer Based Brand Equity	
3	**GROWING AND SUSTAINING BRAND EQUITY**		**12**
	1.The Brand Value Chain- Model	Value stages and implication , What to track , designing brand tracking studies	
	2.Brand Equity	Meaning , Importance , Objectives, Sources of Brand Equity, Steps of Brand Building including Brand Building, Blocks, Leveraging Secondary Brand Associations to Build Brand Equity	
	3.Measuring Sources of Brand Equity	Qualitative Research Techniques: Projective Techniques: Completion, Comparison, Brand Personality and Values: The Big Five, Free Association Quantitative Research Techniques: Brand Awareness: Recognition, Recall, Brand Image, Brand Responses.	
4	**MEASURING AND INTERPRETING BRAND PERFORMANCE**		**12**
	1.Brand Performance and Management	Global Branding Strategies ,Brand Audit, Role of Brand Managers	
	2.Brand Communication	Online Brand Promotions, Role of Brand Ambassadors , Celebrities , Loyalty Program	
	3.Managing Brands over Geographical Boundaries	Global Marketing Program, advantages and disadvantages, Cultivate Brand Partnership	
		TOTAL NUMBER OF LECTURES	**48**

1. **PROF. SHOBHA VENKATESH (CONVENER)**
2. **PROF. DR. RINKESH CHEDDA (SUBJECT EXPERT)**
3. **PROF. POONAM CHINTANKAR (SUBJECT EXPERT)**
4. **PROF. CHETAN DUBEY (INDUSTRY EXPERT)**

INTERNALS (The objective of internal exercise is to help the learner acquire skills) 25 MARKS

PROJECT/ASSIGNMENT

- Rebranding or Revitalizing of a well-known national brand or global brand

Reference books:

1. Strategic Brand Management – Building measuring and managing brand equity Kevin

Lane
2. Keller , M.G Parmeswaran, Issac Jacob (3 rd edition)
3. Brand Management – Text and cases by Harsh Verma
4. Strategic Brand management – Indian Edition by Richard Eilliot and Larry percy
5. Brand Management – Principles and Practices by Kirti Dutta

ELECTIVE 03

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-ADVERTISING**
SEMESTER	**VI**
COURSE:	**MEDIA PLANNING & BUYING**
COURSE CODE	**BAMMC EAMP 2603**
PAPER	**3 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EAMP 2603	**MEDIA PLANNING & BUYING**

COURSE OUTCOME:

1. To develop knowledge of major media characteristics
2. To understand procedures, requirements, and techniques of media planning and buying.
3. To learn the various media mix and its implementation
4. To understand budget allocation for a Media plan and fundamentals

	MODULE	DETAILS	LECTURES
1	**INTRODUCTION TO MEDIA PLANNING**		**06**
	1.Introduction to Media Planning	a. Basic Terms and Concepts b. The function of Media planning in advertising c. Objectives of MP. d. Role of Media planner e. Challenges in Media planning f. BARC and NCCS Grid g. Factors influencing media strategy decisions h. Criterion for selecting media vehicles	
	2.Negotiation skills in Media Buying	a. Negotiation Strategies b. Laws of Persuasion	**02**
	3.Media planning process	a. Situation analysis and Marketing strategy plan b. Media Briefing c. Media objectives and target audience analysis d. Media selection and strategy	**06**

		e. Media budgeting f. Media Buying g. Evaluation	
	3.Media Mix	Factors Affecting Media Mix Decision	**02**
	4.Media Measurement	a. Reach b. Frequency c. GRPS/GVT Ratings d. TRP/TVT Ratings e. Impressions f. Cost efficiency g. Cost per thousand h. Cost per rating i. Circulation / Readership /AIR j. Selectivity Index k. Share of Voice	**06**
	5.Sources of media research	a. Nielson Clear Decision (NCD for Print) b. Broadcast Audience Research Council c. Audit Bureau of Circulation d. RAM e. Comscore – Digital f. Alexa	**06**
	6.Selecting suitable Media option (Advantages and disadvantages)	a. Newspaper b. Magazine c. Television (National, Regional and Local) d. Radio e. Outdoor and out of home f. Transit g. Cinema Advertising	**04**
	7.Media Buying	a. Newspapers b. Magazine c. Television d. Radio	**04**
	8.Communication mix	Communication mix	***02***
	9.Digital Media Buying	1.Buying Digital Advertising: An Overview Paid media, Owned media and Earned media). 2. Digital Sales Funnel 3. Direct buys from the websites / Impact Buys 4. Programmatic Buying: [DSP (Demand side platform) or RTB (Real time bidding)] 5. Advertising via Premium Publishers 6. Advertising via Networks and Exchanges 7. Affiliate Network (Click bank, Commission junction, adfuncky,	**10**

		7search.com) 8. The Local Publishing Market 9. OTT Platforms 10. Influencers Marketing or social media influencers 11. Content advertising 12. Native advertising 13. App installed campaign 14. Push notification 15. Google ads 16. Bing ads 17. Lead Progression a. Cost per impression b. Cost per click(CPC) c. Cost per lead (CPL) Cost per action (CPA) or pay per action (PPA) d. cost per conversion or Revenue sharing or cost per sale.	
		TOTAL NUMBER OF LECTURES	**48**

1. **PROF.DR. HANIF LAKDAWALA (CONVENER)**
2. **PROF DEEPALI MANJREKAR (SUBJECT EXPERT)**
3. **PROF SANGEETA MAKKAD (SUBJECT EXPERT)**

GUIDELINE FOR INTERNALS:

Every student must submit a media plan for local television along with the rates, and detailed media scheduling. Product, Budget and city to be given by the faculty.

a. Six hours workshop on Media scheduling software conducted by industry practitioner

b. Two case studies on actual Media plans particularly "television media plan".

Reference Books and material:

Advertising Media Planning, by Roger Baron, Jack Sissors, McGraw Hill, Seventh Edition

2. Advertising Media Planning-. Jack Z Sissors, McGraw Hill 6th Edition

ELECTIVE 04

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**ADVERTISING & SALES PROMOTION**
COURSE CODE	**BAMMC EAAS 2604**
PAPER	**4 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI			
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**		
BAMMC EAAS 2604	**ADVERTISING & SALES PROMOTION**		
COURSE OUTCOME:			
1. Students should be able to demonstrate a thorough understanding of the major sales promotion concepts, 2. Use a framework to make effective sales promotion decisions, and 3. Adopt the necessary skills and point of view of an effective sales promotion campaign			
	MODULE	**DETAILS**	**LECTURES**
1	**1. INTRODUCTION**		10
	1. Introduction	a. Nature and importance of sales promotion, b. Role of Promotion in the Marketing Mix c. The Scope and Role of Sales Promotion d. Reasons for the Increase in Sales Promotion e. Consumer franchise building versus non franchise building promotions	
	2.Theories in Sales Promotion	a. Push promotion b. Pull Promotion c. Combination theory	
	3.The psychological theories behind sales promotion	a. Reciprocation b. Social Proof c. Foot-in-the-Door Technique d. Door-in-the-Face Technique e. Loss Aversion f. Social Norms Marketing g. High, Medium, low	
2	**Module III**		08
	1. Methods of consumer oriented sales promotion	a. Sampling b. Coupons c. Premiums d. Refund, rebates, cash backs e. Contests and Sweepstakes f. Bonus packs g. Price off h. Exchange offers i. EMI j. Demonstration of product k. After Sale Service	
	2.**Methods of Trade oriented sales promotion**	a. Contest & Incentives for dealers b. Trade allowances (Buying allowances, slotting allowances, promotional allowances) c. Point of purchase displays d. Sales training programs e. Trade shows and dealer conferences f. Stock return g. Credit terms h. Dealer trophies	

	3.Methods of sales force oriented sales promotion	a. Bonus and incentives to Sales Force b. Sales Promotion Contest c. Sales Meetings and Conferences: d. Free travel e. Sales literature: f. Demonstration kits g. Honor or recognition	
3	**Module IV**		10
	1.Study and analyse sales promotion campaign of the major brands	a. Three loyalty programs. (One each of FMCG, Consumer durable and service) b. Three Consumers oriented sales promotion program. (One each of FMCG, Consumer durable and service) c. Three trade oriented sales promotion program. (One each of FMCG, Consumer durable and service) d. Three sales force oriented sales promotion program. (One each of FMCG, Consumer durable and service) e. Two sales promotion of any luxury brands	
4	**Module V**		08
	1. Predicting Sales Promotion Effects	a. Evaluation Methods of sales promotion b. Short term and long term effects of sales promotions c. Long-term impact of sales promotion on brand image d. Influence of Sales Promotion on Customer Purchasing Behaviour	
	2. Steps in Designing of sales promotion campaign	a. Designing Loyalty, continuity and frequency program b. Big Data and Loyalty c. Gratification and Loyalty	
	3. Coordination sales promotion & Advertising	a. Budget allocation b. Coordination of Ad and Promotion Themes c. Media Support and Timing	
	4. Sales promotion Abuse	a. Over use b. Sales promotion trap	
	TOTAL NUMBER OF LECTURES		48

BMM BOS SYLLABUS COMMITTEE MEMBERS

1. PROF. PRADEEP SHASHIDHARAN (CONVENER)
2. PROF.DR. HANIF LAKDAWALA (SUBJECT EXPERT)

ELECTIVE 05

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**RURAL MARKETING & ADVERTISING**

COURSE CODE	**BAMMC EARM 2605**
PAPER	**5 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI		
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**	
BAMMC EARM 2605	**RURAL MARKETING & ADVERTISING**	
COURSE OUTCOME:		
1. To introduce to Media students about the concept of Rural Marketing and Rural economy. 2. To make students to understand about Rural Environment and demography of Rural India. 3. To help students to understand marketing Mix Strategies for Rural Consumer and Agricultural goods and service. 4. To develop communication skills in media students and to understand Rural communication in contemporary society. 5. To help students for developing more creative skills for advertising strategies.		
MODULE	**DETAILS**	**LECTURES**
1 **INTRODUCTION TO RURAL MARKETING**		**10**
1.	Introduction, Scope and an overview of Rural Marketing. Evolution of Rural Marketing in India. Emerging trends of Rural Marketing in India.	
2.	Rural Market Research	
3.	Agricultural marketing: Marketing of Agricultural Produce.	
4.	Rural Economy : Concept and characteristics of Rural Economy, Factors affecting rural economy, Basic needs of rural economy, Rural-Urban disparities and Policy interventions, Role of Agriculture in the economic development of India.	*02*
5.	Channels of Distribution like ITC E-choupal, Godrej Adhar, HUL ,Shakti and Trade Management, Rural Retailing	*01*
2 **RURAL ENVIRONMENT**		**08**
1.	Demography of Rural marketing- Population, Occupation Pattern, literacy rate	
2.	Income source, Expenditure Pattern, Rural Demand and Consumption pattern, Rural Infrastructure Housing, Education, Electricity, Roads.	
3.	Understanding Rural Consumer Behaviour: Rural Society- Demographic Sociological, cultural perspective and lifestyle of Rural India.	
4.	Factors affecting rural consumer behaviour- Globalization/Modernization and Technological factors	
5.	Rural consumer V/s Urban consumers- Understanding	

		basic difference between Rural and Urban consumers behavior, Understanding nature of competition in Rural marketing	
3	**MARKETING MIX STRATEGIES FOR RURAL CONSUMER**		**10**
	1.	Rural market strategies with special reference to segmentation, targeting and positioning.	
	2.	Product and service strategies. Rural Product categories-FMCGs, Agriculture Goods and Service. Importance of Branding, Packaging and labeling.	
	3.	Pricing strategies, Promotional strategies. Segmentation, Targeting and Positioning for Rural marketing.	
	4.	Challenges and Innovative measures for Rural marketing	
4	**RURAL COMMUNICATION METHODS AND RURAL ADVERTISING**		**10**
	1.	Rural Communication: Meaning and scope. Communication strategies for rural market Advertising and Sales Promotion Strategies New Product launch Techniques for Rural Markets	
	2.	Different approaches of Rural communication in contemporary Rural Society- Rural radio. Community based Radio. Television. Audio Visual media.	
	3.	Rural Advertising. Meaning and definition of Advertising. Objectives of Advertising. Characteristics of Advertising. Effects of advertising on Society.	
	4.	Traditional Media- Puppetry, Dance-Drama, Rural Specific Art forms like 'Harikatha' etc. Decorated Bullock carts. Folk Theatre. Demonstration house to house. Hats and Mela. Wall paintings. Posters. Agricultural Games.	
	5.	Modern Media: Selecting Media mix- Radio. Television. Print Media. Cinema hall. Outdoor. POPs. Music Records. Study Classes.	
5	**ADVERTISING STRATEGIES FOR RURAL MARKETING**		10
	1.	Understanding Rural Consumer.	
	2.	Effective use of Language and content.	
	3.	Copy writing and creative advertisement for Rural Consumer. Designing the Message.	
	4.	Determining Communication objects. Effective use of	

		Conventional and Non-Conventional media. Branding and Positioning.	
	5.	Case study- TATA Namak, Coco-Cola, Colgate toothpaste. Dabur Dantmanjan Tooth powder. Case study – Rural and Urban Babool Tooth Pest. Navratan Hail Oil.	
Total Lectures			**48**

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. **PROF. DR. PRIYADARSINI PODDAR (CONVENER)**
2. **PROF. DR. KOEL ROY CHOUDHURY (SUBJECT EXPERT)**
3. **PROF. DR. SAVITRI DHOLEY (SUBJECT EXPERT)**

INTERNALS (The objective of internal exercise is to help the learner acquire skills)
25 MARKS

Sr. no.	Project/Assignment
01	Rural Economy and Education
02	Rural economy and government policies
03	Role of Modern Communication in Rural Economy
4	Project on contrastive advertising campaign for the same product category in rural and urban set-up.
05	Designing Advertising Campaign for rural area.
6	Designing Communication strategies for Rural Market

References:

1.Chaudhuri C.M, Rural Economics, Jaipur, Sublime Publication

2.Dutt, Rudra and Sundaram, Indian Economy, New Delhi

3.Kashyap Pradeepand Raut Siddhartha, (2009), Rural Marketing Biztantra Publishers. ISBN: 978-81-317-6035-2

4. Dogra B. and Ghuman K. (2010), Rural Marketing Concepts and Practices, Tata McGraw-Hill. ISBN: 81-7992-085-2

5. Krishnamacharyulu C.S.G. and Ramakrishnan Lalitha (2011), Rural Marketing Text and Cases, Pearson Education ISBN:978-81-317-3263-2

6.Agricultural Marketing in India – S. S Acharya and N L Agarwal -Oxford and IBH Publishing Co Pvt. Ltd Calcutta.

ELECTIVE 06

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**RETAILING & MERCHANDISING**
COURSE CODE	**BAMMC EARE 2606**
PAPER	**6 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI			
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**		
BAMMC EARE 2606	**RETAILING & MERCHANDISING**		
COURSE OUTCOME:			
1 To introduce the students the concept of Retailing. 2 To make them understand the strategies of Retail Marketing. 3 To make the students aware about the need of retail consumers and their behavior. 4 To introduce the concept of merchandising. 5 Introducing social behavior and attitude of consumers over merchandising and Retailing. 6 Introduces students to different skills of merchandising. 7 Skills of retail communication and trends of information technology tools.			
	MODULE	**DETAILS**	**LECTURES**
1	**ABOUT FEATURES**		10
	1.Introduction to the World of Retailing	Introduction to the World of Retailing	
	2.Types of Retailers,	Multichannel Retailing , Customer Buying Behaviour, Retail Market Strategy , Overview of Merchandising	
	3.Identifying and Understanding Retail Consumer:	Factors affecting retail strategies, Consumer Demographic and lifestyles,	
	4.Social Factor	Social factors , Consumer needs and desires , Shopping attitudes and behaviour , Consumer decision making process, Retailers' actions	
	5.Formats based on Pricing	Pricing as a competitive advantage, Discount retailing , Super Store retailing , Off Price retailing	
2	**RETAIL COMMUNICATION AND IT**		**08**
	1.Managing Communication for a Retail Store Offering:	Introduction, Objectives, Marketing Communication, Thematic Communication,	
	2.Methods of Communication	Methods of Communication, Graphics, Signage	
	3.IT for Retailing:	Information Systems, Barcoding, Retail ERP	
	4.Trends & Innovation	Analytics & Tools	
3	**INTRODUCTION TO MERCHANDISING**		**10**
	1.Concept of Retail Merchandising	Meaning of Merchandising, Major Areas of Merchandise Management, Role and Responsibilities of Merchandisers	
	2.Merchandise	Merchandise Mix, Concept of Assortment	

	Mix	Management, Merchandise Mix of Show off	
	3.Merchandise Displays	Concept of Merchandise Displays, Importance of Merchandise Displays	
	4.Space Management	Concept of Space Management, Role of IT in Space Management, Concept of Planogram	
	5.Formats based on Merchandise selection:	Merchandise selection as a competitive advantage, Specialty store retailing, Department store retailing, Super specialist, Niche specialist	
4	**VISUAL AND ON-LINE MERCHANDISING**		**12**
	1. Visual Merchandising	Merchandising: Meaning of Visual Merchandising, Objectives of Visual Merchandising, Growth of Visual Merchandising	
	2. Visual Merchandising in India	Visual Merchandising in India, Product Positioning and Visual Merchandising	
	3.Non Store Merchandising	Introduction, Objectives, Non-Store Retail Merchandising, Television retailing/home shopping, Product Presentation in Non-Store Retail Merchandising	
	4.Online Merchandising	Internet retailing/online shopping, Catalogue Management	
	5.Trends &Innovation	Analytics and Tools	
	Total Lectures		48

BOS SYLLABUS SUB-COMMITTEE MEMBERS

1. **PROF. DR. PRIYADARSINI PODDAR (CONVENER)**
2. **PROF. YOGESH DHANJANI (SUBJECT EXPERT)**
3. **PROF. RAJESH NAIR (SUBJECT EXPERT)**

Reading and References:

Robolt, N. J, Concept and Cases in Retail and Merchandise Management. New York, Fairchild Fernie, J, Logistics and Retail Management. London, Kogan PageTepper, Bette K, Mathematics for Retail Buying.New York, Fairchild

Drake, M .F, Retail Fashion Promotion and Advertising. New York,

Macmillan Berman, Retail Management. New Jersey, Prentice Hall

Lucas, G. H. , Retail Management, 3rd Edition, London, Pitman

Publication Gercas , G. H , Retailing, Chennai, All India Publication

Levy, Michael (2012)Retailing Management 8 th Ed. New York, NY: McGraw-Hill

Donnellan, John (2016) Merchandising and Buying Management, 4 th Edition, Bloomsbury Publications.

ELECTIVE 07

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**ENTERTAINMENT & MEDIA MARKETING**

COURSE CODE	**BAMMC EAEM 2607**
PAPER	**07 DSE 2B (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI		
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**	
BAMMC EAEM 2607	**ENTERTAINMENT & MEDIA MARKETING**	
COURSE OUTCOME:		
1.To equip students with an understanding of marketing practices, frameworks, and trends in the Entertainment Sector 2. Introducing the students to television industry and film industry. 3. Will make students go through different case studies regarding radio marketing skills, Social media marketing skills etc. 4.Will help to know the impact of media industry on the viewers, understanding its characteristics		
MODULE	**DETAILS**	**LECTURES**
1 INTRODUCTION TO MARKETING	• What is marketing? • Review the emerging marketing communications area of 'entertainment marketing' and reconceptualises the phenomenon • 7 Ps • Brand Basics • Case Studies	*06*
2. LATEST ENTERTAINMENT MARKETING STRATEGIES	• Integrated Marketing Communications • Experiential Marketing • Advertiser Funded Programing • Why Entertainment Marketing? • The Scope and Growth of Entertainment Marketing Practice • The Effect of Entertainment Marketing on Consumers	*06*
3. OVERVIEW OF INDIAN MEDIA INDUSTRY	• Explore various media in terms of size and impact • Media characteristics • Compare various media • Opportunities for cross-promotions	*08*

4.	**MARKETING IN TELEVISION INDUSTRY**	• Structure and function of TV • Terminology used in TV • TV Planning, Marketing • Future trends in TV • Maintaining aggressive promotion and packaging approach for all programmes. • Hold on to the leadership position in prime time slot through timely innovations based on audience feedback. • Expand the market by launching programmes that are relatable to all generations' audience. • Advertisement of programmes by print media • Celebration of festivals • Broadcasting famous TV show for full day	*08*
5.	**NICHE MARKETING**	• Niche TV and there marketing strategies (Sports TV, Lifestyle TV, Kids TV, Regional TV)	*02*
6.	**MARKETING IN FILM INDUSTRY**	• Marketing and Distribution Structure of films (Domestic and International) • Create Film Marketing Plan. • Research for reach to target market. • Set up marketing schedule. • Film marketing budget. • Designing EPK (Electronic Press Kit)	06
7.	**MARKETING IN ONLINE AND SOCIAL MEDIA**	• Strategy and Case studies of social media marketing in India. • **Using Social Media Marketing For Entertainment Industry** • *YouTube Marketing For Entertainment Industry* • *Facebook Marketing For Entertainment Industry* • *Instagram Marketing For Entertainment Industry* • **Launch Trailers, Teasers, Snippets** • **Keep Sharing Across Social Media Platforms** • **Actively Engage With Your Audience** • **Post A Variety Of Content** • **Capitalize On The Power Of IGTV**	*06*
	8.MARKETING IN RADIO INDUSTRY	• Exploring the Radio industry in India, Radio channels and radio programs Marketing case studies • Strengths of Radio in Communicating a Message niche market and listening	*06*

		demographic • Variety of promotional activities by Radio stations • Radio advertising works as an everywhere medium • Cost-effectiveness of advertising on radio	
Total Lectures			**48**
BOS SYLLABUS SUB- COMMITTEE MEMBERS **1. Gajendra Deoda (Convener)** **2. Priyanka Khanvilkar (Subject Expert)** **3. Atul Ketkar (Industry Expert)**			
INTERNALS			**25 MARKS**
Group presentations that will explore both product build and marketing campaigns.			
Recommended Readings: The Insider's Guide to Independent Film Distribution by Stacey Parks The Complete Independent Movie Marketing Handbook by Mark Steven Bosko Marketing to Moviegoers: A Handbook of Strategies and Tactics by Robert Marich Movie Marketing: Opening the Picture and Giving It Legs by TiiuLukk Marketing and Selling Your Film Around the World: A Guide for Independent Filmmakers by John Durie, Annika Pham and Neil Watson			

ELECTIVE 08

PROGRAM	**BAMMC**
YEAR	**TYBAMMC-Advertising**
SEMESTER	**VI**
COURSE:	**TELEVISION PROGRAM PRODUCTION**
COURSE CODE	**BAMMC EATP 2608**
PAPER	**8 DSE 2A (ELECTIVE)**
TOTAL MARKS	**100 (75:25)**
NO OF LECTURES	**48**

SEMESTER VI	
COURSE CODE	**COURSE NAME & DETAILED SYLLABUS**
BAMMC EATP 2608	**TELEVISION PROGRAM PRODUCTION**
COURSE OUTCOME:	
1. Making Understand the Indian Television History. 2. Will help to analyse the cultural impact of television on the audience. 3. Understating Television Journalism. 4. Introducing the Contemporary Trends of Television programming to students. **5.** Help the students to gain knowledge regarding the various measurement formats and reporting skills of television.	

MODULE	DETAILS	LECTURES
1	**TELEVISION IN INDIA**	10
	News, Information and Entertainment – Doordarshan Audience Segments and Cultural Impact Satellite TV and Private TV Channel	
2	**FORMATS AND TYPES OF TV PROGRAMMES**	08
	Theories of Visual Literacy: Gestalt, Semiotics Reporting Skills, Research and Editing Use of graphics and special effects Positioning the Camera for TV shots	
3	**TELEVISION NEWS GATHERING**	10
	The Camera - News for TV Finding the Story and Sources Packaging Ethical issues in TV Journalism	
4	**PRESENTING REALITY IN TV**	10
	News/Debates/ Opinions Breaking News Interviews The Soap Constructing Reality in Reality shows	
5	**CONSUMING TELEVISION**	10
	SEC Vs NCCS Measurement Of Viewership: TAM, TRP, TVT, GVT and so on	
Total Lectures		**48**

SYLLABUS DESIGNED BY:
1.Gajendra Deoda (Convener)
2.Priyanka Khanvilkar (Subject Expert)
3.Atul Ketkar (Industry Expert)

Indicative Reading List

Boyd, Andrew. Broadcast Journalism, Oxford.
• Broughton, Iry. Art of Interviewing for Television, Radio &Film, Tab Books Inc.1981.
• Kumar, Keval J. Mass Communication in India, Jaico Publishing House.
• Lawrence Lorenz, Alfred andVivian John. News Reporting and Writing, Pearson Education.
• Mankekar, Purnima. Screening Culture, Viewing Politics: An Ethnography of Television,
Womanhood, and Nation in Postcolonial India, Duke University Press Books, 1999.
• Trevin, Janet, Presenting on TV and Radio, Focal Press.
• Yorke, Ivor, Television News (Fourth Edition), Focal Press.

**********The End**********

University of Mumbai

Bachelor of Commerce (B.Com) Programme
Three Year Integrated Programme - Six Semesters
Course Structure

Under Choice Based Credit, Grading and Semester System

To be implemented from Academic Year- 2016-2017 Progressively

Faculty of Commerce

B.Com Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	*Elective Courses (EC)*		*1*	*Elective Courses (EC)*	
1A	*Discipline Specific Elective(DSE) Courses*		*1A*	*Discipline Specific Elective(DSE) Courses*	
1	Accountancy and Financial Management - I	03	1	Accountancy and Financial Management - II	03
1B	*Discipline Related Elective(DRE) Courses*		*1B*	*Discipline Related Elective(DRE) Courses*	
2	Commerce - I	03	2	Commerce - II	03
3	Business Economics - I	03	3	Business Economics - II	03
2	*Ability Enhancement Courses (AEC)*		*2*	*Ability Enhancement Courses (AEC)*	
2A	*Ability Enhancement Compulsory Courses (AECC)*		*2A*	*Ability Enhancement Compulsory Courses (AECC)*	
4	Business Communication - I	03	4	Business Communication II	03
5	Environmental Studies I	03	5	Environmental Studies II	03
2B	**Skill Enhancement Courses (SEC)*		*2B*	***Skill Enhancement Courses (SEC)*	
6	Any one course from the following list of the courses	02	6	Any one course from the following list of the courses	02
3	*Core Courses (CC)*		*3*	*Core Courses (CC)*	
7	Mathematical and Statistical Techniques - I	03	7	Mathematical and Statistical Techniques - II	03
	Total Credits	20		Total Credits	20

**List of Skill Enhancement Courses (SEC) for Semester I (Any One)*		***List of Skill Enhancement Courses (SEC) for Semester II (Any One)*	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

S.Y.B.Com

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	*Elective Courses (EC)*		*1*	*Elective Courses (EC)*	
1A	*Discipline Specific Elective(DSE) Courses*		*1A*	*Discipline Specific Elective(DSE) Courses*	
1	Accountancy and Financial Management III	03	1	Accountancy and Financial Management IV	03
2	Financial Accounting and Auditing V - Introduction to Management Accounting	03	2	Financial Accounting and Auditing VI - Auditing	03
1B	*Discipline Related Elective(DRE) Courses*		*1B*	*Discipline Related Elective(DRE) Courses*	
3	Commerce III	03	3	Commerce IV	03
4	Business Economics III	03	4	Business Economics IV	03
2	*Ability Enhancement Courses (AEC)*		*2*	*Ability Enhancement Courses (AEC)*	
2A	**Skill Enhancement Courses (SEC) Group A*		2A	***Skill Enhancement Courses (SEC) Group A*	
5	*Any one course from the following list of the courses	03	5	*Any one course from the following list of the courses	03
2B	**Skill Enhancement Courses (SEC) Group B*		2B	***Skill Enhancement Courses (SEC) Group B*	
6	Any one course from the following list of the courses	02	6	Any one course from the following list of the courses	02
3	*Core Courses (CC)*		*3*	*Core Courses (CC)*	
7	Business Law I	03	7	Business Law II	03
	Total Credits	20		Total Credits	20

**List of Skill Enhancement Courses (SEC) Group A for Semester III (Any One)*		**List of Skill Enhancement Courses (SEC) Group A for Semester IV (Any One)*	
1	Advertising I	1	Advertising II
2	Field Sales Management I	2	Field Sales Management II
3	Public Relations I	3	Public Relations II
4	Mass Communication I	4	Mass Communication II
5	Travel & Tourism Management Paper I	5	Travel & Tourism Management II
6	Journalism I	6	Journalism II
7	Company Secretarial Practice I	7	Company Secretarial Practice II

8	Rural Development I	8	Rural Development II
9	Co-operation I	9	Co-operation II
10	Mercantile Shipping I	10	Mercantile Shipping II
11	Indian Economic Problem I	11	Indian Economic Problem II
12	Computer Programming I	12	Computer Programming II
13	Logistic and Supply Chain Management I	13	Logistic and Supply Chain Management I
14	Direct & Indirect Taxation I	14	Direct & Indirect Taxation II
Note: Course selected in Semester III will continue in Semester IV			

**List of Skill Enhancement Courses (SEC) Group B for Semester III (Any One)*		*** List of Skill Enhancement Courses (SEC) Group B for Semester IV (Any One)*	
1	Foundation Course - III	1	Foundation Course - IV
2	Foundation Course in NSS - III	2	Foundation Course in NSS - IV
3	Foundation Course in NCC - III	3	Foundation Course in NCC - IV
4	Foundation Course in Physical Education - III	4	Foundation Course in Physical Education - IV
Note: Course selected in Semester III will continue in Semester IV			

T.Y.B.Com

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	*Elective Courses (EC)*		*1*	*Elective Courses (EC)*	
1A	*Discipline Specific Elective(DSE) Courses*		*1A*	*Discipline Specific Elective(DSE) Courses*	
1 & 2	*Any one group of courses from the following list of the Groups (A/B/C/D/E/F)	04+04	1 & 2	*Any one group of courses from the following list of the Groups (A/B/C/D/E/F)	04+04
1B	*Discipline Related Elective(DRE) Courses*		*1B*	*Discipline Related Elective(DRE) Courses*	
3	Commerce V	03	3	Commerce VI	03
4	**Any one course from the following list of the courses	03	4	**Any one course from the following list of the courses	03
5	Business Economics V	03	5	Business Economics VI	03
2	*Project Work*		*2*	*Project Work*	
6	Project Work I	03	6	Project Work II	03
	Total Credits	20		Total Credits	20

Note: Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 03 credits. A project work may be undertaken in any area of discipline specific courses/ discipline related elective courses

*List of groups of Discipline Specific Elective(DSE) Courses for Semester V (Any One Group)		*List of groups of Discipline Specific Elective(DSE) Courses for Semester VI (Any One Group)	
Group A: Advanced Accountancy			
1	Financial Accounting and Auditing VII - Financial Accounting	1	Financial Accounting and Auditing IX - Financial Accounting
2	Financial Accounting and Auditing VIII - Cost Accounting	2	Financial Accounting and Auditing X - Cost Accounting
Group B: Business Management			
1	Business Studies Paper I	1	Business Studies Paper III
2	Business Studies Paper II	2	Business Studies Paper IV
Group C: Banking and Finance			
1	Banking and Finance Paper I	1	Banking and Finance Paper III
2	Banking and Finance Paper II	2	Banking and Finance Paper IV
Group D: Commerce			
1	Commerce Paper I	1	Commerce Paper III
2	Commerce Paper II	2	Commerce Paper IV
Group E: Quantitative Techniques			
1	Quantitative Techniques Paper I	1	Quantitative Techniques Paper III
2	Quantitative Techniques Paper II	2	Quantitative Techniques Paper IV
Group F: Economics			

1	Economics Paper I	1	Economics Paper III
2	Economics Paper II	2	Economics Paper IV
Note: Group selected in Semester V will continue in Semester VI			

***List of Discipline Related Elective(DRE) Courses for Semester V (Any One)*		***List of Discipline Related Elective(DRE) Courses for Semester VI (Any One)*	
1	Trade Unionism and Industrial Relations Paper I	1	Trade Unionism and Industrial Relations. Paper II
2	Computer system & Applications Paper I	2	Computer system & Applications Paper II
3	Export Marketing Paper I	3	Export Marketing Paper II
4	Marketing Research Paper I	4	Marketing Research Paper II
5	Investment Analysis Portfolio Paper I	5	Investment Analysis Portfolio Paper II
6	Transport Management Paper I	6	Transport Management Paper II
7	Entrepreneurship& M.S.S.I. Paper I	7	Entrepreneurship& M.S.S.I. Paper II
8	International Marketing Paper I	8	International Marketing Paper II
9	Merchant Banking Paper I	9	Merchant Banking Paper II
10	Direct & Indirect Taxation Paper I	10	Direct & Indirect Taxation Paper II
11	Labour Welfare & Practice Paper I	11	Labour Welfare & Practice Paper II
12	Purchasing & Store keeping Paper I	12	Purchasing & Store keeping Paper II
13	Inventory Management & Cost Reduction Paper I	13	Inventory Management & Cost Reduction Paper II
14	Insurance Paper I	14	Insurance Paper II
15	Banking Law & Practice Paper I	15	Banking Law & Practice Paper II
16	Regional Planning Paper I	16	Regional Planning Paper II
17	Rural Marketing Paper I	17	Rural Marketing Paper II
18	Elements of Operational Research Paper I	18	Elements of Operational Research Paper II
19	Psychology of Human Behaviour at work Paper I	19	Psychology of Human Behaviour at work Paper II
Note: Course selected in Semester V will continue in Semester VI			

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. Programme
First Year
Semester I and II

Under Choice Based Credit, Grading
and Semester System

(To be implemented from Academic Year- 2016-2017)

Faculty of Commerce

B.Com. Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B. Com.

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	*Elective Courses (EC)*		*1*	*Elective Courses (EC)*	
1A	*Discipline Specific Elective(DSE) Courses*		*1A*	*Discipline Specific Elective(DSE) Courses*	
1	Accountancy and Financial Management I	03	1	Accountancy and Financial Management II	03
1B	*Discipline Related Elective(DRE) Courses*		*1B*	*Discipline Related Elective(DRE) Courses*	
2	Commerce I	03	2	Commerce II	03
3	Business Economics I	03	3	Business Economics II	03
2	*Ability Enhancement Courses (AEC)*		*2*	*Ability Enhancement Courses (AEC)*	
2A	*Ability Enhancement Compulsory Courses (AECC)*		*2A*	*Ability Enhancement Compulsory Courses (AECC)*	
4	Business Communication I	03	4	Business Communication II	03
5	Environmental Studies I	03	5	Environmental Studies II	03
2B	**Skill Enhancement Courses (SEC)*		*2B*	***Skill Enhancement Courses (SEC)*	
6	Any one course from the following list of the courses	02	6	Any one course from the following list of the courses	02
3	*Core Courses (CC)*		*3*	*Core Courses (CC)*	
7	Mathematical and Statistical Techniques I	03	7	Mathematical and Statistical Techniques II	03
	Total Credits	20		Total Credits	20

**List of Skill Enhancement Courses (SEC) for Semester I (Any One)*		***List of Skill Enhancement Courses (SEC) for Semester II (Any One)*	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

B.Com. Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	*Elective Courses (EC)*	
1A	*Discipline Specific Elective(DSE) Courses*	
1	Accountancy and Financial Management I	03
1B	*Discipline Related Elective(DRE) Courses*	
2	Commerce I	03
3	Business Economics I	03
2	*Ability Enhancement Courses (AEC)*	
2A	*Ability Enhancement Compulsory Courses (AECC)*	
4	Business Communication I	03
5	Environmental Studies I	03
2B	**Skill Enhancement Courses (SEC)*	
6	Any one course from the following list of the courses	02
3	*Core Courses (CC)*	
7	Mathematical and Statistical Techniques I	03
	Total Credits	20

**List of Skill Enhancement Courses (SEC) for Semester I (Any One)*	
1	Foundation Course - I
2	Foundation Course in NSS - I
3	Foundation Course in NCC - I
4	Foundation Course in Physical Education - I

Revised Syllabus of Courses of B.Com. Programme at Semester I
with Effect from the Academic Year 2016-2017

Elective Courses (EC)
Discipline Specific Elective (DSE) Courses

1. Accountancy and Financial Management I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Accounting standards issued by ICAI and Inventory valuation	15
2	Final Accounts	15
3	Departmental Accounts	15
4	Accounting for Hire Purchase	15
	Total	60

Sr. No.	Modules / Units
1	Accounting standards issued by ICAI and Inventory valuation
	• Accounting standards: Concepts, benefits, procedures for issue of accounting standards Various AS : AS –1: Disclosure of Accounting Policies Purpose, Areas of Policies, Disclosure of Policies, Disclosure of Change in Policies, Illustrations AS –2: Valuation of Inventories (Stock) Meaning, Definition, Applicability, Measurement of Inventory, Disclosure in Final Account, Explanation with Illustrations. AS –9: Revenue Recognition Meaning and Scope, Transactions excluded, Sale of Goods, Rendering of Services, Effects of Uncertainties, Disclosure, Illustrations. • Inventory Valuation Meaning of inventories Cost for inventory valuation Inventory systems : Periodic Inventory system and Perpetual Inventory System Valuation: Meaning and importance Methods of Stock Valuation as per AS –2 : FIFO and Weighted Average Method Computation of valuation of inventory as on balance sheet date: If inventory is taken on a date after the balance sheet or before the balance sheet
2	Final Accounts
	Expenditure: Capital, Revenue Receipts: Capital, Revenue Adjustment and Closing Entries Final accounts of Manufacturing concerns (Proprietary Firm)
3	Departmental Accounts
	Meaning Basis of Allocation of Expenses and Incomes/Receipts Inter Departmental Transfer : at Cost Price and Invoice Price Stock Reserve Departmental Trading and Profit & Loss Account and Balance Sheet
4	Accounting for Hire Purchase
	Meaning Calculation of interest Accounting for hire purchase transactions by asset purchase method based on full cash price Journal entries, ledger accounts and disclosure in balance sheet for hirer and vendor (excluding default, repossession and calculation of cash price)

Elective Courses (EC)-
Discipline Related Elective (DRE) Courses

2. Commerce I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business	12
2	Business Environment	11
3	Project Planning	12
4	Entrepreneurship	10
	Total	45

Sr. No.	Modules / Units
1	Business
	Introduction: Concept, Functions, Scope and Significance of business. Traditional and Modern Concept of business. Objectives of Business: Steps in setting business objectives, classification of business objectives, Reconciliation of Economic and Social Objectives. New Trends in Business: Impact of Liberalization, Privatization and Globalization, Strategy alternatives in the changing scenario, Restructuring and turnaround strategies
2	Business Environment
	Introduction: Concept and Importance of business environment, Inter-relationship between Business and Environment Constituents of Business Environment: Internal and External Environment, Educational Environment and its impact, International Environment – Current Trends in the World, International Trading Environment –WTO and Trading Blocs and their impact on Indian Business.
3	Project Planning
	Introduction: Business Planning Process; Concept and importance of Project Planning; Project Report; feasibility Study types and its importance Business Unit Promotion: Concept and Stages of Business Unit Promotion, Location –Factors determining location, and Role of Government in Promotion. Statutory Requirements in Promoting Business Unit: Licensing and Registration procedure, Filling returns and other documents, Other important legal provisions
4	Entrepreneurship
	Introduction: Concept and importance of entrepreneurship, factors Contributing to Growth of Entrepreneurship, Entrepreneur and Manager, Entrepreneur and Intrapreneur The Entrepreneurs: Types of Entrepreneurs, Competencies of an Entrepreneur, Entrepreneurship Training and Development centers in India. Incentives to Entrepreneurs in India. Women Entrepreneurs: Problems and Promotion.

Elective Courses (EC)-
Discipline Related Elective (DRE) Courses

3. Business Economics I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	15
3	Supply and Production Decisions	10
4	Cost of Production	10
	Total	45

Sr. No.	Modules / Units
1	Introduction
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	Demand Analysis
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts Demand estimation and forecasting: Meaning and significance - methods of demand estimation : survey and statistical methods (numerical illustrations on trend analysis and simple linear regression)
3	Supply and Production Decisions
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale and economies of scope
4	Cost of Production
	Cost concepts: Accounting cost and economic cost, implicit and explicit cost, social and private cost, historical cost and replacement cost, sunk cost and incremental cost -fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run (hypothetical numerical problems to be discussed) Extensions of cost analysis: cost reduction through experience - LAC and Learning curve - Break even analysis (with business applications)

Ability Enhancement Courses (AEC)

4. Business Communication I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	10
2	Obstacles to Communication in Business World	10
3	Business Correspondence	12
4	Language and Writing Skills	13
	Total	45

Note:
One tutorial per batch per week in addition to number of lectures stated above
(Batch size as per the University norms)

Sr. No.	Modules / Units
1	Theory of Communication
	Concept of Communication: Meaning, Definition, Process, Need, Feedback Emergence of Communication as a key concept in the Corporate and Global world Impact of technological advancements on Communication Channels and Objectives of Communication: Channels- Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine Objectives of Communication: Information, Advice, Order and Instruction, Persuasion, Motivation, Education, Warning, and Boosting the Morale of Employees (A brief introduction to these objectives to be given) Methods and Modes of Communication: Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	Obstacles to Communication in Business World
	Problems in Communication / Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers Listening: Importance of Listening Skills, Cultivating good Listening Skills –4 Introduction to Business Ethics: Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	Business Correspondence
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, Personnel Correspondence: Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation

	[Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]
Sr. No.	Modules / Units
4	Language and Writing Skills
	Commercial Terms used in Business Communication Paragraph Writing: Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] Activities § Listening Comprehension § Remedial Teaching § Speaking Skills: Presenting a News Item, Dialogue and Speeches § Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. § Reading Comprehension: Analysis of texts from the fields of Commerce and Management

Revised Syllabus of Courses of B.Com. Programme at Semester I with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

5. Environmental Studies I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Environment and Ecosystem	13
2	Natural Resources and Sustainable Development	13
3	Populations and Emerging Issues of Development	13
4	Urbanisation and Environment	13
5	Reading of Thematic Maps and Map Filling	08
	Total	60

Sr. No.	Modules / Units
1	Environment and Ecosystem
	Environment: Meaning, definition, scope and its components; concept of an ecosystem : definition, Characteristics, components and types, functioning and structure; Food Chain and Food Web- Ecological Pyramids - Man and environment relationship; Importance and scope of Environmental Studies.
2	Natural Resources and Sustainable Development
	Meaning and definitions ; Classification and types of resources, factors influencing resource; Resource conservation- meaning and methods- l and non-conventional resources, problems associated with and management of water, forest and energy resources- resource utilization and sustainable development
3	Populations and Emerging Issues of Development
	Population explosion in the world and in India and arising concerns- Demographic Transition Theory - pattern of population growth in the world and in India and associated problems - Measures taken to control population growth in India; Human population and environement- Environment and Human Health –Human Development Index –The World Happiness Index
4	Urbanisation and Environment
	Concept of Urbanisation – Problems of migration and urban environment-changing land use, crowding and stress on urban resources, degradation of air and water, loss of soil cover impact on biodiversity, Urban heat islands – Emerging Smart Cities and safe cities in India - Sustainable Cities
5	Reading of Thematic Maps and Map Filling
	Reading of Thematic Maps (4 Lectures) Located bars, Circles, Pie charts, Isopleths, Choropleth and Flow map, Pictograms - Only reading and interpretation. Map Filling: (4 Lectures) Map filling of World (Environmentally significant features) using point, line and polygon segment. Concept and Calculation of Ecological Footprint

Revised Syllabus of Courses of B.Com. Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

6. Foundation Course - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity - 1	10
3	Concept of Disparity - 2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	45

Sr. No.	Modules / Units
1	Overview of Indian Society
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	Concept of Disparity - 1
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	Concept of Disparity - 2
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	The Indian Constitution
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	Significant Aspects of Political Processes
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

Topics for Project Guidance: Growing Social Problems in India:

- *Substance abuse - impact on youth & challenges for the future*
- *HIV/AIDS - awareness, prevention, treatment and services*
- *Problems of the elderly - causes, implications and response*
- *Issue of child labour - magnitude, causes, effects and response*
- *Child abuse - effects and ways to prevent*
- *Trafficking of women - causes, effects and response*

Note:
Out of the 45 lectures allotted for 5 units for Semester I, about 15 lectures may be allotted for project guidance

Revised Syllabus of Courses of B.Com. Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

6. Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	45

Sr. No.	Modules / Units
1	Introduction to NSS
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level National Service Scheme(NSS) Regular activities Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	Concept of Society and Social Issues in India
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India Basic social issues in India Degeneration of value system, Family system, Gender issues, Regional imbalance
3	Indian Constitution and Social Justice
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development Social Justice Social Justice- the concept and its features Inclusive growth- the concept and its features
4	Human Personality and National Integration
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. National integration & Communal Harmony National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

Skill Enhancement Courses (SEC)

6. Foundation Course in NCC - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NCC, National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training, Environment Awareness and Conservation	10
4	Personality Development and Leadership	10
5	Specialized Subject: Army/ Navy/ Air	05
	Total	45

Sr. No.	Modules / Units
1	Introduction to NCC, National Integration & Awareness
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. • Genesis, Aims, Objectives of NCC & NCC Song • Organisation & Training • Incentives & Benefits • Religions, Culture, Traditions and Customs of India • National Integration: Importance and Necessity • Freedom Struggle
2	Drill: Foot Drill
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • General and Words of Command • Attention, Stand at Ease and Stand Easy, Turning and Inclining at the Halt • Sizing, Forming Up in Three Ranks and Numbering, Open and Close Order March and Dressing • Saluting at the Halt, Getting On Parade, Dismissing and Falling Out • Marching, Length of Pace and Time of Marching in Quick Time and Halt, Slow March and Halt • Turning on the March and Wheeling. • Saluting on the March. • Formation of squad and Squad Drill.
3	Adventure Training, Environment Awareness and Conservation
	Adventure Training Desired outcome: The students will overcome fear & inculcate within them the sense of adventure , sportsmanship , espirit-d-corp and develop confidence , courage , determination, diligence and quest for excellence. • Any Two such as –Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing, Scuba Diving etc Environment Awareness and Conservation Desired outcome: The student will be aware of the conservation of natural resources and protection of environment. • Natural Resources –Conservation and Management • Water Conservation and Rainwater Harvesting

Sr. No.	Modules / Units
4	Personality Development and Leadership
	Desired outcome: The student will develop an all-round personality with adequate leadership traits to deal / contribute effectively in life. • Introduction to Personality Development • Factors Influencing /Shaping Personality: Physical, Social, Physiological, Philosophical and Psychological • Self Awareness Know yourself/ Insight • Change Your Mind Set • Communication Skills: Group Discussion / Lecturettes (Public Speaking) • Leadership Traits • Types of Leadership
5	Specialized Subject: Army Or Navy Or Air
	<u>Army</u> Desired outcome: The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects A. Armed Force • Basic organisation of Armed Forces • Organisation of Army • Badges and Ranks B. Introduction to Infantry and weapons and equipments • Characteristics of 7.62mm SLR Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning C. Military history • Biographies of renowned Generals (Carriapa / Sam Manekshaw) • Indian Army War Heroes- PVCs D. Communication • Types of Communications • Characteristics of Wireless Technologies (Mobile, Wi-Fi etc.) *OR* <u>Navy</u> A. Naval orientation and service subjects • History of the Indian Navy-Pre and Post Independence, Gallantry award winners • Organization of Navy- NHQ, Commands, Fleets, Ships and shore establishments • Types of Warships and their role • Organization of Army and Air Force- Operational and Training commands • Ranks of Officers and Sailors, Equivalent Ranks in the Three Services B. Ship and Boat Modelling • Principles of Ship Modelling

Sr. No.	Modules / Units
	• Maintenance and Care of tools
	C. Search and Rescue • SAR Organization in the Indian ocean D. Swimming Floating for three minutes and Free style swimming for 50 meters *OR* <u>AIR</u> A. General Service Knowledge • Development of Aviation • History of IAF B. Principles of Flight • Introduction • Laws of Motion • Glossary of Terms. C. Airmanship • Introduction • Airfield Layout • Rules of the Air • Circuit Procedure • ATC/RT Procedures • Aviation Medicine D. Aero- Engines • Introduction to Aero-engines

Revised Syllabus of Courses of B.Com. Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

6. Foundation Course in Physical Education - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Relevant concepts in Physical Education	10
2	Components of Physical Fitness	15
3	Testing Physical Fitness	10
4	Effect of Exercise on various Body System	10
	Total	45

Sr. No.	Modules / Units
1	Introduction to Basic Relevant concepts in Physical Education
	• Dimensions and determinants of Health, Fitness & Wellness • Concept of Physical Education and its importance • Concept of Physical Fitness and its types • Concept of Physical Activity, exercise and its types & benefits
2	Components of Physical Fitness
	• Concept of components of Physical Fitness • Concept and components of HRPF • Concept and components of SRPF • Importance of Physical Education in developing physical fitness components.
3	Testing Physical Fitness
	• Tests for measuring Cardiovascular Endurance • Tests for measuring Muscular Strength& Endurance • Tests for measuring Flexibility • Tests for measuring Body Composition
4	Effect of Exercise on various Body System
	• Effect of exercises on Musculoskeletal system • Effect of exercises on Circulatory System • Effect of exercises on Respiratory System • Effect of exercises on Glandular System

Revised Syllabus of Courses of B.Com. Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

7. Mathematical and Statistical Techniques I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Shares and Mutual Funds	15
2	Permutation, Combination and Linear Programming Problems	15
3	Summarization Measures	15
4	Elementary Probability Theory	15
5	Decision Theory	15
	Total	75

Note:

One tutorial per batch per week in addition to number of lectures stated above (Batch size as per the University norms)

Sr. No.	Modules / Units
1	Shares and Mutual Funds
	• Shares: Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples. • Mutual Funds: Simple problems on calculation of Net income after considering entry load, dividend, change in Net Asset Value (N.A.V.) and exit load. Averaging of price under the Systematic Investment Plan (S.I.P.)
2	Permutation, Combination and Linear Programming Problems
	• Permutation and Combination: Factorial Notation, Fundamental principle of counting, Permutation as arrangement, Simple examples, combination as selection, Simple examples, Relation between ${}_nC_r$ and ${}_nP_r$ Examples on commercial application of permutation and combination • Linear Programming Problem: Sketching of graphs of (i) linear equation Ax + By + C= 0 (ii) linear inequalities. Mathematical Formulation of Linear Programming Problems upto 3 variables. Solution of Linear Programming Problems using graphical method up to two variables.
3	Summarization Measures
	• Measures of Central Tendencies: Definition of Average, Types of Averages: Arithmetic Mean, Median, and Mode for grouped as well as ungrouped data. Quartiles, Deciles and Percentiles. Using Ogive locate median and Quartiles. Using Histogram locate mode. Combined and Weighted mean. • Measures of Dispersions: Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.
4	Elementary Probability Theory
	• Probability Theory: Concept of random experiment/trial and possible outcomes; Sample Space and Discrete Sample Space; Events their types, Algebra of Events, Mutually Exclusive and Exhaustive Events, Complimentary events. Classical definition of Probability, Addition theorem (without proof), conditional probability. Independence of Events: $P(A \cap B) = P(A)\,P(B)$. Simple examples. • Random Variable: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.
5	Decision Theory
	Decision making situation, Decision maker, Courses of Action, States of Nature, Pay-off and Pay-off matrix; Decision making under uncertainty, Maximin, Maximax, Minimax regret and Laplace criteria; simple examples to find optimum decision. Formulation of Payoff Matrix. Decision making under Risk, Expected Monetary Value (EMV); Decision Tree; Simple Examples based on EMV. Expected Opportunity Loss (EOL), simple examples based on EOL.

B.Com. Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	*Elective Courses (EC)*	
1A	*Discipline Specific Elective(DSE) Courses*	
1	Accountancy and Financial Management II	03
1B	*Discipline Related Elective(DRE) Courses*	
2	Commerce II	03
3	Business Economics II	03
2	*Ability Enhancement Courses (AEC)*	
2A	*Ability Enhancement Compulsory Courses (AECC)*	
4	Business Communication II	03
5	Environmental Studies II	03
2B	***Skill Enhancement Courses (SEC)*	
6	Any one course from the following list of the courses	02
3	*Core Courses (CC)*	
7	Mathematical and Statistical Techniques II	03
	Total Credits	20

**List of Skill Enhancement Courses (SEC) for Semester II (Any One)*	
1	Foundation Course - II
2	Foundation Course in NSS - II
3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - II

Revised Syllabus of Courses of B.Com. Programme at Semester II
with Effect from the Academic Year 2016-2017

Elective Courses (EC)-
Discipline Specific Elective (DSE) Courses

1. Accountancy and Financial Management II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Accounting from Incomplete Records	15
2	Consignment Accounts	15
3	Branch Accounts	15
4	Fire Insurance Claim	15
	Total	60

Sr. No.	Modules / Units
1	Accounting from Incomplete Records
	Introduction Problems on preparation of final accounts of Proprietary Trading Concern (conversion method)
2	Consignment Accounts
	Accounting for consignment transactions Valuation of stock Invoicing of goods at higher price (excluding overriding commission, normal/abnormal losses)
3	Branch Accounts
	Meaning/ Classification of branch Accounting for Dependent Branch not maintaining full books: Debtors method Stock and debtors method
4	Fire Insurance Claim
	Computation of Loss of Stock by Fire Ascertainment of Claim as per the Insurance Policy Exclude: Loss of Profit and Consequential Loss

Revised Syllabus of Courses of B.Com. Programme at Semester II
with Effect from the Academic Year 2016-2017

Elective Courses (EC)-
Discipline Related Elective (DRE) Courses

2. Commerce II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Concept of Services	12
2	Retailing	12
3	Recent Trends in Service Sector	10
4	E-Commerce	11
	Total	45

Sr. No.	Modules / Units
1	Concept of Services
	Introduction: Meaning, Characteristics, Scope and Classification of Services – Importance of service sector in the Indian Marketing Mix Services: Consumer expectations, Services Mix, - Product, Place, Price, Promotion, Process of Services delivery, Physical evidence and people Service Strategies: Market research and Service development cycle, Managing demand and capacity, opportunities and challenges in service sector.
2	Retailing
	Introduction: Concept of organized and unorganized retailing , Trends in retailing, growth of organized retailing in India, Survival strategies for unorganized Retailers Retail Format: Store format, Non – Store format, Store Planning, design and layout Retail Scenario: Retail Scenario in India and Global context – Prospects and Challenges in India. Mall Management – Retail Franchising. FDI in Retailing, Careers in Retailing
3	Recent Trends in Service Sector
	ITES Sector: Concept and scope of BPO, KPO, LPO and ERP. Banking and Insurance Sector: ATM, Debit & Credit Cards, Internet Banking – Opening of Insurance sector for private players, FDI and its impact on Banking and Insurance Sector in India Logistics: Net working –Importance –Challenges
4	E-Commerce
	Introduction: Meaning, Features, Functions and Scope of E-Commerce- Importance and Limitations of E-Commerce Types of E-Commerce: Basic ideas and Major activities of B2C, B2B, C2C. Present status of E-Commerce in India: Transition to E-Commerce in India, E-Transition Challenges for Indian Corporates; on-line Marketing Research.

Elective Courses (EC)-
Discipline Related Elective (DRE) Courses

3. Business Economics II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Market structure: Perfect competition and Monopoly	10
2	Pricing and Output Decisions under Imperfect Competition	15
3	Pricing Practices	10
4	Evaluating Capital Projects	10
	Total	45

Sr. No.	Modules / Units
1	Market structure: Perfect competition and Monopoly
	Perfect competition and Monopoly models as two extreme cases - profit maximisation and the competitive firm ś supply curve - Short run and long run equilibrium of a firm and of industry - monopoly - Sources of monopoly power –short run and long- run equilibrium of a firm under Monopoly
2	Pricing and Output Decisions under Imperfect Competition
	Monopolistic competition: competitive and monopolistic elements of monopolistic competition - equilibrium of a firm under monopolistic competition, monopolistic competition verses perfect competition- excess capacity and inefficiency - debate over role of advertising (topics to be taught using case studies from real life examples) Oligopolistic markets: key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models (with practical examples)
3	Pricing Practices
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing (case studies on how pricing methods are used in business world)
4	Evaluating Capital Projects
	Meaning and importance of capital budgeting- steps in capital budgeting - +Techniques of Investment appraisal: Payback Period Method, Net Present Value Method, and Internal Rate of Return Method (with numerical examples)

Revised Syllabus of Courses of B.Com. Programme at Semester II with Effect from the Academic Year 2016-2017

Ability Enhancement Courses (AEC)

4. Business Communication II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	10
2	Group Communication	15
3	Business Correspondence	10
4	Language and Writing Skills	10
	Total	45

Note:

One tutorial per batch per week in addition to number of lectures stated above (Batch size as per the University norms)

Sr. No.	Modules / Units
1	Presentation Skills
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	Group Communication
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit Meetings: Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions Conference: Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele –Conferencing Public Relations: Meaning, Functions of PR Department, External and Internal Measures of PR
3	Business Correspondence
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) Only following to be taught in detail:- Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	Language and Writing Skills
	Reports: Parts, Types, Feasibility Reports, Investigative Reports Summarisation: Identification of main and supporting/sub points Presenting these in a cohesive manner

Tutorial Activities:

Presentations, Group Discussion, Mock Interviews, Mock Meetings / Conferences, Book Reviews/Summarization, Reading Comprehension: Analysis of texts from the field of Literature

[Suggested Books for Book Reviews: Books from the fields of Management, Finance, and Literature Like – Sun Tzu :The Art of War, Eliyahu M. Goldratt : The Goal , Eliyahu M. Goldratt: It s' Not Luck , Spencer Johnson: Who Moved My Cheese, Stephen Lundin, Ph.D, Harry Paul, John Christen: Fish, Chetan Bhagat One Night At A Call Center, Chetan Bhagat My Three Mistakes , Arindam Choudhary: Count Your Chickens Before They Hatch ,Stephen

Covey :Seven Habits of Successful People, George Orwell: Animal Farm, Dr. Abdul Kalam: Wings of Fire]

[N.B.: The above list is only indicative and not prescriptive.]

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Ability Enhancement Courses (AEC)

5. Environmental Studies II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Solid Waste Management for Sustainable Society	13
2	Agriculture and Industrial Development	13
3	Tourism and Environment	13
4	Environmental Movements and Management	13
5	Map Filling	08
	Total	60

Sr. No.	Modules / Units
1	Solid Waste Management for Sustainable Society
	Classification of solid wastes –Types and Sources of Solid Waste ; Effects of Solid Waste Pollution- Health hazards, Environmental Impacts; Solid Waste Management –solid waste management in Mumbai- Schemes and initiatives run by MCGM –role of citizens in waste management in Mumbai
2	Agriculture and Industrial Development
	Environmental Problems Associated with Agriculture: Loss of Productivity, Land Degradation ,desertification - Uneven Food Production – Hunger, Malnutrition and Food Security –Sustainable Agricultural practices Environmental Problems Associated with Industries – pollution -Global warming, Ozone Layer Depletion , Acid rain, - Sustainable Industrial practices – Green Business and Green Consumerism, Corporate Social Responsibility
3	Tourism and Environment
	Tourism: Meaning, Nature, Scope and importance –Typology of tourism-classification; Tourism potentials in India and challenges before India; New Tourism Policy of India; Consequences of tourism : Positive and Negative Impacts on Economy, Culture and environment- Ecotourism
4	Environmental Movements and Management
	Environmental movements in India: Save Narmada Movement, Chipko Movement, Appiko Movement, Save Western Ghat and Save Jaitapur; Environmental Management: Concept, need and relevance; Concept of ISO 14000 and 16000; Concept of Carbon Bank and Carbon Credit.EIA - Environment Protection Acts – Concept and components of Geospatial Technology- Applications of GST in Environmental Management.
5	Map Filling
	Map filling of Konkan and Mumbai (Environmentally significant features and GST centers) using point, line and polygon segment. Concept and Calculation of Environmental Performance Index (EPI)

Revised Syllabus of Courses of B.Com. Programme at Semester II
with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

6. Foundation Course - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	45

Sr. No	Modules / Units
1	Globalisation and Indian Society
	Understanding the concepts of liberalization, privatization and globalization; Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	Human Rights
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights; Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	Ecology
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation – causes and impact on human life; Sustainable development – concept and components; poverty and environment
4	Understanding Stress and Conflict
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	Managing Stress and Conflict in Contemporary Society
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self – actualisation; Different methods of responding to conflicts in society; Conflict – resolution and efforts towards building peace and harmony in society

Revised Syllabus of Courses of B.Com. Programme at Semester II with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

6. Foundation Course in NSS - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Socio-economic Survey and Special Camp	10
2	Orientation of the College Unit and Communication Skills	15
3	Rapport with Community and Programme Planning	10
4	Government Organisations /Non-Government Organisations	10
	Total	45

Sr. No.	Modules / Units
1	Socio-economic Survey and Special Camp
	Socio economic survey Socio-economic survey- its meaning and need, Process of Socio-economic survey- design of questionnaire; data collection, data analysis and report writing Special camping activity Concept of camp- Identification of community problems- Importance of group living- Team building- Adoption of village- Planning for camp- pre camping, during the course of camp and post camping activities
2	Orientation of the College Unit and Communication Skills
	Training and orientation of the program unit in the college Leadership training – formation of need based programmmes- Concept of campus to community(C to C) activities Communication skills and Documentation Communication skills- the concept, Verbal, Non-Verbal communication The documentation- Activity Report Writing –basics of NSS accounting –Annual Report –Press note and preparation
3	Rapport with Community and Programme Planning
	Working with individual group and community Ice breaking- interaction games –conflict resolution Program planning Programme planning- the concept and its features, requirements for successful implementation of program- program flow charting- feedback
4	Government Organisations / Non-Government Organisations
	Structure of Government Organisations and Non-Government Organisations Government organisations (GO)- its meaning -Legal set up, functioning, Sources of funding Non-Government organisations (NGO)- its meaning -Legal set up, functioning, Sources of funding National Service Scheme(NSS)- Government organisations (GO) and Non-Government organisations (NGO) Government schemes for community development Schemes os Government welfare departments for community development- provisions & examples

Skill Enhancement Courses (SEC)

6. Foundation Course in NCC - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	05
2	Health and Hygiene	10
3	Drill with Arms	10
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	10
	Total	45

Sr. No.	Modules / Units
1	Disaster Management, Social Awareness and Community Development
	Disaster Management: Desired outcome: The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Civil Defence Organisation and Its Duties/ NDMA • Types of Emergencies/ Natural Disaster • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. • Ávan ʾmodel of NCC Social Awareness and Community Development: Desired outcome: The student shall have an understanding about social service and its need, about NGOs and shall participate in community action programmes for betterment of the community. • Basics of Social Service, Weaker Sections of Our Society and Their Needs • Social/ Rural Development Project: MNREGA, SGSY, NSAP etc. • Contribution of Youth towards Social Welfare • Civic Responsibilities • Causes & Prevention of HIV/AIDS; Role of Youth
2	Health and Hygiene
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Structure and Functioning of the Human Body • Hygiene and Sanitation (Personal and Food Hygiene) • Infectious & Contagious Diseases & Their Prevention
3	Drill with Arms
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Attention, Stand at Ease and Stand Easy • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • Ground / Take Up Arms • Present From the Order and Vice-versa • General Salute, Salami Shastra
4	Weapon Training
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • Characteristics of a Rifle / Rifle Ammunition and its Fire Power • Stripping, Assembling, Care and Cleaning and Sight Setting of .22 rifle • Stripping, Assembling, Care and Cleaning of 7.62mm SLR • Loading, Cocking and Unloading • The lying position, Holding and Aiming- I • Trigger control and firing a shot

	• Range procedure and safety precautions • Short range firing, Aiming- II -Alteration of sight
Sr. No.	Modules / Units
5	Specialized Subject: Army Or Navy Or Air
	Army Desired outcome: The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects A. Map reading • Introduction to types of Maps and Conventional signs • Scales and Grid system • Topographical forms and technical terms • Relief, contours and Gradients • Cardinal points and Types of North • Types of bearings and use of Service Protractor • Prismatic compass and its use and GPS B. Field Craft and Battle Craft • Introduction • Judging distance • Description of ground • Recognition, Description and Indication of landmarks and targets *OR* Navy A. Naval Communication • Introduction to Naval Modern Communication, Purpose and Principles § Introduction of Naval communication § Duties of various communication sub-departments • Semaphore § Introduction of position of letters and prosigns § Reading of messages § Transmission of messages B. Seamanship • Anchor work § Parts of Anchor and Cable, their identification • Rigging § Types of ropes and breaking strength- stowing, maintenance and securing of ropes § Practical Bends and Hitches: Reef Knot, Half hitch, Clove Hitch, Rolling Hitch, Timber Hitch, Bow Line, Round Turn and Two half hitch and Bow line on the Bight and its basic elements and uses. § Introduction to Shackles, Hooks, Blocks and Derricks, Coiling Down and Splicing of rope C. Boat work • Parts of Boat and Parts of an Oar • Instruction on boat Pulling- Pulling orders • Steering of boat under oars, Practical instruction on Boat Pulling,

	Precautions while pulling

Sr. No.	Modules / Units
	OR Air A. Air frames • Aircraft Controls • Landing Gear B. Instruments • Basic Flight Instruments C. Aircraft Particulars • Aircraft Particulars (Type specific) D. Aero modelling • History of Aero modelling • Materials used in Aero modelling • Type of Aero models • Flying/ Building of Aero models

Skill Enhancement Courses (SEC)

6. Foundation Course in Physical Education - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Development of Fitness	10
2	Health, Fitness and Diseases	15
3	Yoga Education	10
4	Daily Schedule of Achieving Quality of Life and Wellness	10
	Total	60

Sr. No.	Modules / Units
1	Development of Fitness
	• Benefits of physical fitness and exercise and principles of physical fitness • Calculation of fitness index level 1-4 • Waist-hip ratio Target Heart Rate, BMI and types and principles of exercise (FITT) • Methods of training –continues, Interval, circuit, Fartlek and Plyometric
2	Health, Fitness and Diseases
	• Definition of obesity and its management • Communicable diseases, their preventive and therapeutic aspectS • Factors responsible for communicable diseases • Preventive and therapeutic aspect of Communicable and non- communicable diseases
3	Yoga Education
	• Meaning and history of yoga • Ashtang yoga and types of yoga • Types of Suryanamaskar and Technique of Pranayam • Benefits of Yoga
4	Daily Schedule of Achieving Quality of Life and Wellness
	• Daily schedule based upon one ś attitude, gender, age &occupation. • Basic –module: - Time split for rest, sleep, diet, activity & recreation. • Principles to achieve quality of life:- positive attitude, daily regular exercise, control over food habits & healthy hygienic practices.

Revised Syllabus of Courses of B.Com. Programme at Semester II with Effect from the Academic Year 2016-2017

Core Courses (CC)

7. Mathematical and Statistical Techniques II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Functions, Derivatives and Their Applications	15
2	Interest and Annuity	15
3	Bivariate Linear Correlation and Regression	15
4	Time series and Index Numbers	15
5	Elementary Probability Distributions	15
	Total	75

Note:

One tutorial per batch per week in addition to number of lectures stated above (Batch size as per the University norms)

Sr. No.	Modules / Units
1	Functions, Derivatives and Their Applications
	Concept of real functions: Constant function, linear function, xn, ex, ax, log x. Demand, Supply, Total Revenue, Average Revenue, Total cost, Average cost and Profit function. Equilibrium Point, Break-even point. Derivative of functions: § Derivative as rate measure, Derivative of xn, ex, ax, log x. § Rules of derivatives: Scalar multiplication, sum, difference, product, quotient (Statements only), Simple problems. Second order derivatives. § Applications: Marginal Cost, Marginal Revenue, Elasticity of Demand. Maxima and Minima for functions in Economics and Commerce. (Examination Questions on this unit should be application oriented only.)
2	Interest and Annuity
	Interest: Simple Interest, Compound Interest (Nominal & Effective Rate of Interest), Calculations involving upto 4 time periods. Annuity: Annuity Immediate and its Present value, Future value. Equated Monthly Installments (EMI) using reducing balance method & amortization of loans. Stated Annual Rate & Affective Annual Rate Perpetuity and its present value. Simple problems involving up to 4 time periods.
3	Bivariate Linear Correlation and Regression
	Correlation Analysis: Meaning, Types of Correlation, Determination of Correlation: Scatter diagram, Karl Pearson's method of Correlation Coefficient (excluding Bivariate Frequency Distribution Table) and Spearman's Rank Correlation Coefficient. Regression Analysis: Meaning, Concept of Regression equations, Slope of the Regression Line and its interpretation. Regression Coefficients (excluding Bivariate Frequency Distribution Table), Relationship between Coefficient of Correlation and Regression Coefficients , Finding the equations of Regression lines by method of Least Squares.
4	Time series and Index Numbers
	Time series: Concepts and components of a time series. Representation of trend by Freehand Curve Method, Estimation of Trend using Moving Average Method and Least Squares Method (Linear Trend only). Estimation of Seasonal Component using Simple Arithmetic Mean for Additive Model only (For Trend free data only). Concept of Forecasting using Least Squares Method. Index Numbers: Concept and usage of Index numbers, Types of Index numbers, Aggregate and Relative Index Numbers, Lasperye's, Paasche's, Dorbisch-Bowley's, Marshall-Edgeworth and Fisher's ideal index numbers, Test of Consistency: Time Reversal Test and Factor Reversal Test. Chain Base Index Nos. Shifting of Base year. Cost of Living Index Numbers, Concept of Real Income, Concept of Wholesale

	Price Index Number. (Examples on missing values should not be taken)
5	Elementary Probability Distributions
	Probability Distributions: § Discrete Probability Distribution: Binomial, Poisson (Properties and applications only, no derivations are expected) § Continuous Probability distribution: Normal Distribution. (Properties and applications only, no derivations are expected)

Tutorial:

Two tutorials to be conducted on each unit i.e. 10 tutorials per semester. At the end of each semester one Tutorial assignment of 10 marks should be given.

Revised Syllabus of Courses of B.Com. Programme at
Semester I and II
with effect from the Academic Year 2016-2017

Reference Books

Reference Books
Accountancy and Financial Management
• *Introduction to Accountancy by T. S. Grewal, S. Chand and Company (P) Ltd., New Delhi Advance Accounts by Shukla & Grewal, S. Chand and Company (P) Ltd., New Delhi* • *Advanced Accountancy by R. L Gupta and M Radhaswamy, S. Chand and Company (P) Ltd., New Delhi* • *Modern Accountancy by Mukherjee and Hanif, Tata Mc. Grow Hill & Co. Ltd., Mumbai Financial Accounting by Lesile Chandwichk, Pentice Hall of India Adin Bakley (P) Ltd.* • *Financial Accounting for Management by Dr. Dinesh Harsalekar, Multi-Tech. Publishing Co. Ltd., Mumbai.* • *Financial Accounting by P. C. Tulsian, Pearson Publications, New Delhi Accounting Principles by Anthony, R.N. and Reece J.S., Richard Irwin Inc.* • *Financial Accounting by Monga, J.R. Ahuja, Girish Ahujaand Shehgal Ashok, Mayur Paper Back* • *Compendium of Statement & Standard of Accounting, ICAI.* • *Indian Accounting Standards, Ashish Bhattacharya, Tata Mc. Grow Hill & Co. Ltd., Mumbai Financial Accounting by Williams , Tata Mc. Grow Hill & Co. Ltd., Mumbai* • *Company Accounting Standards by Shrinivasan Anand, Taxman. Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi. Introduction to Financial Accounting by Horngren, Pearson Publications.* • *Financial Accounting by M. Mukherjee.M. Hanif. Tata McGraw Hill Education Private Ltd; New Delhi*
Commerce
• *Business Organisation Management Maheshwari, Rajendra P ,Mahajan, J.P.,International Book House* • *Business Organisation, Maheshwari, Rajendra P, Mahajan, J.P., International Book House* • *Introduction To Commerce, Vikram, Amit, Atlantic Pub* • *A Course Book On Business Environment, Cherunilam,Francis, Himalaya Pub* • *Business Environment, Cherunilam,Francis, Himalaya Pub* • *Essentials Of Business Environment, Aswathappa,K., Himalaya Pub* • *Essentials Of Business Environment, Aswathappa, Himalaya Pub* • *Strategic Management, Kapoor, Veekkas, Taxmann* • *Strategic Management, David,Fred R., Phi Leraning* • *Strategic Management, Bhutani, Kapil, Mark Pub.* • *Strategic Management, Bhutani, Kapil, Mark Pub.* • *Entrepreneurship, Hisrich, Robert D, Mc Graw Hill* • *Entrepreneurship Development, Sharma, K.C., Reegal Book Depot* • *Service Marketing, Temani, V.K., Prism Pub* • *Service Marketing, Temani, V.K., Prism Pub* • *Management Of Service Sector, Bhatia, B S, V P Pub* • *Introduction To E –Commerce, Dhawan, Nidhi, International Book House* • *Introduction To Retailing, Lusch,Robert F., Dunne,Patrick M., Carver,James R., Cengage Learning* • *Retailing Management, Levy Michael., Weitz Barton A, Tata Mcgraw Hill*

Reference Books

Business Economics

- *Mehta, P.L.: Managerial Economics –Analysis, Problem and Cases (S. Chand& Sons, N. Delhi, 2000)*
- *Hirchey .M., Managerial Economics, Thomson South western (2003)*
- *Salvatore, D.: Managerial Economics in a global economy (Thomson South Western Singapore, 2001)*
- *Frank Robert.H, Bernanke. Ben S., Principles of Economics (Tata McGraw Hill (ed.3)*
- *Gregory Mankiw., Principles of Economics, Thomson South western (2002 reprint)*
- *Samuelson & Nordhas.: Economics (Tata McGraw Hills, New Delhi, 2002)*
- *Pal Sumitra, Managerial Economics cases and concepts (Macmillan, New Delhi,2004)*

Business Communication

- *Agarwal, Anju D(1989) A Practical Handbook for Consumers, IBH.*
- *Alien, R.K.(1970) Organisational Management through Communication.*
- *Ashley,A(1992) A Handbook Of Commercial Correspondence, Oxford University Press.*
- *Aswalthapa, K (1991)Organisational Behaviour, Himalayan Publication, Mumbai.*
- *Atreya N and Guha (1994) Effective Credit Management, MMC School of Management, Mumbai.*
- *Bahl,J.C. and Nagamia,S.M. (1974) Modern Business Correspondence and Minute Writing.*
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- *Basu,C.R.(1998) Business Organisation and Management, T.M.H.New Delhi.*
- *Benjamin, James (1993) Business and Professional Communication Concepts and Practices, Harper Collins College Publishers, New York.*
- *Bhargava and Bhargava91971) Company Notices, Meetings and Regulations*
- *Black, Sam (1972) Practical Public Relations, E.L.B.S. London.*
- *Bovee Courtland,L and Thrill, John V(1989) Business Communication, Today McGraw Hill, New York, Ta xman Publication.*
- *Burton, G and Thakur, (1995) Management Today- Principles and Practices. T.M.H.,New Delhi.*
- *Darrow, Richard, Forrstal, Dan and Coolman, Aubrey (1967) Public Relations Handbook, The Dartwell Co., Chicago.*
- *Dayal, Ishwar(9810) Managing Large Organizations: A Comparative Study.*
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- *Fisher Dalmar, (1999), Communication in Organisation, Jaico Pub House, Mumbai, Delhi.*
- *Frailley, L.E. (1982) Handbook of Business Letters, Revised Edn. Prentice Hall Inc.*
- *French, Astrid (1993) Interpersonal Skills. Sterling Publishers, New delhi.*
- *27 Fritzsche, David J (2005) Business Ethics: A Global and Managerial Perspective McGraw Hill*
- *Garlside, L.E. (1980) Modern Business Correspondence, McDonald and Evans Ltd. Plymouth.*
- *Ghanekar,A(1996) Communication Skills for Effective Management. Everest Publishing House, Pune.*
- *Graves, Harold F. (1965) Report Writing, Prentice Hall, New Jersey.*
- *Gupta, Anand Das (2010) Ethics, Business and Society: Managing Responsibly Response Books 32.Gupta, Dipankar (2006) Ethics Incorporated: Top Priority and Bottom Line Response Books*
- *Krevolin, Nathan (1983) Communication Systems and Procedures for Modern Office, Prentice Hall, New Jersey.*
- *Lesikar, Raymond V and Petit, John D.(1994) Business Communication: Theory and Application , Richard D. Irwin Inc. Ilinois.*

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- *Ludlow,Ron.(1995) The Essence of Effective Communication, Prentice , New Delhi.*
- *36.M. Ashraf, Rizvi (2006) Effective Technical Communication Tata McGraw Hill*
- *Martson, John E. 1963) The Nature of Public Relations, McGraw Hill, New Delhi.*
- *Majumdar,P.K.(1992) Commentary on the Consumer protection Act, Prentice, New Delhi.*
- *McQuail, Denis (1975), Communication, Longman.*
- *Merrihue, William (1960) Managing by Communication, McGraw Hill, New York. 41.Mishra Rajiv K (2006) Code of Conduct for Managers Rupa Company*
- *Monippalli, M.M. (1997),The Craft of Business Letter Writing, T.M.H. New Delhi.*
- *Montagu,A and Matson , Floyd(1979) The Human Connection, McGraw Hill,New York.*
- *Murphy, Herta and Hilde Brandt, Herbert W (1984) Effective Business Communication, McGraw Hill, New York.*
- *Parry, John (1968) The Psychology of Human Communication.*
- *Parson, C.J. and Hughes (1970) Written Communication for Business Students, Great Britain.*
- *Peterson, Robert A and Ferrell, O.C (2005) Business Ethics: New Challenges for Business Schools and Corporate Leaders Prentice Hall of India Pvt., Ltd*
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- *Shekhar, R.C (1997) Ethical Choices in Business Response Books*
- *Stephenson, James (1988) Principles and Practice of Commercial Correspondence, Pilman and Sons Ltd. London.*
- *53.. Shurter, Robert L. (1971) Written Communication in Business, McGraw Hill, Tokyo*

Environmental Studies

- *Singh, Savindra, 2011 : Environmental Geography, Prayag Pustak Bhavan,Allahabad, India*
- *Gautam Alka, 2009 : Environmental Geography, Sharda Pustak Bhavan, Allahabad,India*
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- *Allaby M. 2002 : Basics of Environmental Sciences, Routledge, London*
- *Detwyler T.R., 1971: Man s'Impact on Environment, McGraw - Hill, New York*
- *Rao K.L. 1975 : India s'Water Wealth, Orient Longman Ltd. New Delhi*
- *Ahirrao W.R. & others, Paryavaran Vijnan (Marathi), Nirali Prakashan, Pune*

Foundation Course

- *Social and Economic Problems in India, Naseem Azad, R Gupta Pub (2011)*
- *Indian Society and Culture, Vinita Padey, Rawat Pub (2016)*
- *Social Problems in India, Ram Ahuja, Rawat Pub (2014)*
- *Faces of Feminine in Ancient , medivial and Modern India, Mandakranta Bose Oxford University Press*
- *National Humana rights commission- disability Manual*
- *Rural, Urban Migration : Trends, challenges & Strategies, S Rajagopalan, ICFAI- 2012*
- *Regional Inequilities in India Bhat L SSSRD- New Delhi*
- *Urbanisation in India: Challenges, Opportunities & the way forward, I J Ahluwalia, Ravi Kanbur, P K Mohanty, SAGE Pub (2014)*
- *The Constitution of India, P M Bakshi 2011*
- *The Problems of Linguistic States in India, Krishna Kodesia Sterling Pub*
- *Politics in India: structure, Process and Policy Subrata Mitra, Rouutlege Pub*
- *Politics in India, Rajani Kothari, Orient Blackswan*
- *Problems of Communilism in india, Ravindra Kumar Mittal Pub*
- *Combating communalism in India: Key to National Integration, Kawal Kishor Bhardwaj, Mittal Pub*

Reference Books

Foundation Course in NSS

- *National Service Scheme Manual (Revised) 2006, Government of India, Ministry of Youth Affairs and Sports, New Delhi.*
- *University of Mumbai National Service Scheme Manual 2009.*
- *Avhan Chancellor's Brigade - NSS Wing, Training camp on Disaster Preparedness Guidelines, March 2012*
- *Rashtriya Seva Yojana Sankalpana - Prof. Dr. Sankay Chakane, Dr. Pramod\Pabrekar, Diamond Publication, Pune*
- *National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya,*
- *Annual report of National Service Scheme (NSS) published by Dept. of Higher and Technical Education, Mantralaya,*
- *NSS Cell, Dept. of Higher and Technical Education, Mantralaya, UTKARSHA- Socio and cultural guidelines*
- *Case material as a Training Aid for Field Workers, Gurmeet Hans.*
- *Social service opportunities in hospitals, Kapil K. Krishnan, TISS*
- *New Trends in NSS, Research papers published by University of Pune*
- *ANOOGUNJ Research Journal, published by NSS Unit C. K. Thakur college*
- *Training Manual for Field Work published by RGNIYD, Chreeperumbudur*
- *Prof. Ghatole R.N. Rural Social Science and Community Development.*
- *Purushottam Sheth, Dr. Shailaja Mane, National Service Scheme*
- *Joint programme of National Service Scheme, University of Mumbai & DISHA - DEEPSHIKHA Projects, Nair Hospital, 2011-12*
- *National Service Scheme in India: A Case study of Karnataka, M. B. Dishad, Trust Publications, 2001*
- *http://www.thebetterindia.com/140/national-service-scheme-nss/*
- *http://en.wikipedia.org/wiki/national-service-scheme 19=http://nss.nic.in/adminstruct*
- *http://nss.nic.in/propexpan*
- *http://nss.nic. in*
- *http://socialworknss.org/about.html*

Foundation Course in NCC

- *Cadet s' Hand book –Common subject..all wings, BY DG NCC, New Delhi.*
- *Cadet s' Hand book –Specialised Subjects, Army, Navy, Air-force, BY DG NCC, New Delhi.*
- *NCC OTA Precise, BY DG NCC, New Delhi.*
- *"AVAN" Model of Disaster Mang., Vinayak Dalvie, Proceedings of Int. Conf. on Urban Plan. and Env Strat & Challenges, Elphinstone College, Jan 2007.*
- *Humanistic Tradition of India, N.L.Gupta, Mohit Publication, New Delhi*
- *Social psychology, Baron & Byrne, Pearson Publication, 12th Edition self awareness know yourself / insight (110) Group & Individuals (374) Group discussion*
- *Chanakya s' 7 Secrets of Leadership, Radhakrishanan Pillai and D.Shivnandhan, Jaico*
- *Social Psychology: Understanding Human Interaction, Baron, Robert A., (302/BAR/BYR), 7th Edition*
- *Seven Habits of Highly Effective People., Covey , Stephen*
- *The Habit of Winning., Iyer , Prakash, Penguin , India ; 2011*
- *The Goal, Goldratt , Eliyahu, The Northriver press ; 1994*
- *Freedom Struggle, Chandra Bipin, National Book Trust 1972*
- *Freedom of Religion and The Indian Judiciary, Bachal V.M. , Shubhada Saraswat, (362P)*
- *India 1996- A Reference Annual Govt. of India*
- *Saha Soneri Pane, Vinayak D. Savarkar*
- *Environmental Biology and Toxicology, P.D. Sharma., Rastogi Publication*
- *Environmental Science, S.C. Santra, New Central Book Agency*

Reference Books

- *National Cadet Corps (India), Lambert M. Surhone, Mariam T. Tennoe, Susan F. Henssonow, Betascript Publishing, 2011*
- *National Cadet Corps, Youth in Action (Google eBook), National Cadet Corps (India), Lancer Publishers, 2003*
- *Youth in Step: History of the National Cadet Corps, V. Longer, Lancer international, 1983 Original from the University of Michigan*
- *National Cadet Corps of India, Man Mohan Sharma, Vision Books, 1980 Original from the University of Michigan*
- *The National Cadet Corps Act, 1948, as Modify Up to the 1st July 1963, India, Government of India Press, 1963 (Military Law)*
- *Cadet Corps in India: Its Evolution and Impact, Satis Chandra Maikap, Darbari Udyog, 1979 Original from the University of California*
- *National Cadet Corps: 100 Years of Distinction, National Cadet Corps (Singapore), NCC*
- *The NCC, Singapore, National Cadet Corps Council, National Cadet Corps Council*
- *Grooming Tomorrow's' Leaders: National Cadet Corps, 1917-2006, R.S. Chhettri, Lancer Publishers, 2006*
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- *Discovery of India, Jawaharlal Nehru*
- *Health and Hygiene, Manoj. J.S., Agra University Publication*
- *Yoga for Healing, Venkateswaran P.S., Bombay:- Jaico Publishing House 1989*
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- *Sustainable Development (An Alternative Paradigm), Satpathy , N., Karnavati Publications , Ahmedabad*
- *Global Partners for Sustainable Development, Pachauri R.K & Srivastava L., Tata Energy Research Institute, New Delhi ; 1994, 1998*
- *Ecology and the Politics of survival : Conflict over Natural Resources in India, Shiva , Vandana, Sage Publications , California , 1991*

Foundation Course in Physical Education

- *Lippian Cott Williams and Wilkins 2006.*
- *American College of Sports Medicine, ACSM s', Guidelines for Exercise Testing and Priscription. (2013) Ninth Edition, Lippian Cott Williams and Wilkins.*
- *American College of Sports Medicine, ACSM s' Resource Manual for Guidelines for Exercise Testing and Priscription. (2006) 5th Ed., Lippian Cott Williams and Wilkins, 2006.*
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- *Dheer, S.D.(1991). Introduction to Health Education. New Delhi : Friends Publication.*
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- *Dr. Gharote M. L; Guideline for Yogic Practices –2nd Ed., The Lonavala Yoga Institute (India), Lonavala- 2007*

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- *Nimbalkar. Sadashiv, Yoga for Health and Peace.- 6th Ed., Yoga Vidya Niketan, Mumbai., 2004.*
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Mathematical and Statistical Techniques

- *Mathematics for Economics and Finance Methods and Modelling by Martin Anthony and Norman Biggs, Cambridge University Press, Cambridge low - priced edition, 2000, Chapters 1, 2, 4, 6 to 9 & 10.*
- *Applied Calculus: By Stephen Waner and Steven Constenoble, Brooks/Cole Thomson Learning, second edition, Chapter 1 to 5.*
- *Business Mathematics By D. C. Sancheti and V. K. Kapoor, Sultan Chand & Sons, 2006, Chapter 1, 5, 7, 9 &10.*
- *Mathematics for Business Economics: By J. D. Gupta, P. K. Gupta and Man Mohan, Tata Mc - Graw Hill Publishing Co. Ltd., 1987, Chapters 9 to 11 & 16.*
- *Quantitative Methods - Part - I By S. Saha and S. Mukerji, New Central Book Agency, 1996, Chapters 7 & 12.*
- *Mathematical Basis of Life Insurance By S.P. Dixit, C.S. Modi and R.V. Joshi, Insurance Institute of India, Chapters 2: units 2.6, 2.9, 2.20 & 2.21.*
- *Securities Laws & Regulation of Financial Market : Intermediate Course Paper 8, Institute of Company Secretaries of India, Chapter 11.*
- *Investments By J.C. Francis & R.W. Taylor, Schaum's Outlines, Tata Mc - Graw Hill Edition 2000, Chapters 2,4 & section 25.1.*
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- *Operations Research by Schaum Series*
- *Fundamentals of Statistics - D. N. Elhance.*
- *Statistical Methods - S.G. Gupta (S. Chand & Co.*
- *Statistics for Management - Lovin R. Rubin D.S. (Prentice Hall of India)*
- *Statistics - Theory, Method & Applications D.S.Sancheti & V. K. Kapoor.*
- *Modern Business Statistics - (Revised} - B. Pearles & C. Sullivan -Prentice Hall of India.*
- *Business Mathematics & Statistics: B Aggarwal, Ane Book Pvt. Limited*
- *Business Mathematics: D C Sancheti & V K Kapoor, Sultan Chand & Sons*
- *Business Mathematics: A P Verma, Asian Books Pvt. :Limited.*

Question Paper Pattern

(Practical Courses)

Maximum Marks: 100

Questions to be set: 06

Duration: 03 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 12 and to be answered any 10 B) Sub Questions to be asked 12 and to be answered any 10 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	20 Marks
Q-2	Full Length Practical Question	15 Marks
	OR	
Q-2	Full Length Practical Question	15 Marks
Q-3	Full Length Practical Question	15 Marks
	OR	
Q-3	Full Length Practical Question	15 Marks
Q-4	Full Length Practical Question	15 Marks
	OR	
Q-4	Full Length Practical Question	15 Marks
Q-5	Full Length Practical Question	15 Marks
	OR	
Q-5	Full Length Practical Question	15 Marks
Q-6	A) Theory questions	10 Marks
	B) Theory questions	10 Marks
	OR	
Q-6	Short Notes To be asked 06 To be answered 04	20 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 100

Questions to be set: 06

Duration: 03 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 12 and to be answered any 10 B) Sub Questions to be asked 12 and to be answered any 10 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	20 Marks
Q-2	Full Length Question	15 Marks
	OR	
Q-2	Full Length Question	15 Marks
Q-3	Full Length Question	15 Marks
	OR	
Q-3	Full Length Question	15 Marks
Q-4	Full Length Question	15 Marks
	OR	
Q-4	Full Length Question	15 Marks
Q-5	Full Length Question	15 Marks
	OR	
Q-5	Full Length Question	15 Marks
Q-6	A) Theory questions	10 Marks
	B) Theory questions	10 Marks
	OR	
Q-6	Short Notes To be asked 06 To be answered 04	20 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. (Financial Markets)
Programme at
Third Year
Semester V and VI

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Financial Markets

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

T.Y.B.Com. (Financial Markets)

(To be implemented from Academic Year 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Financial Derivatives	**04**	5	Risk Management	**04**
6	Business Ethics and Corporate Governance	**04**	6	Project Work	**04**
	Total Credits	**20**		**Total Credits**	**20**

- ✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ Study Area*

****List of Elective Courses for Semester V (Any Four)***		*****List of Elective Courses for Semester VI (Any Four)***	
01	Marketing in financial Services	01	Venture Capital and Private Equity
02	Technical analysis	02	Mutual Fund Management
03	Corporate Accounting	03	Organisational Behaviour
04	Equity Research	04	Strategic Corporate Finance
05	Direct Tax- Income Tax	05	Indirect Tax- GST
06	Business Valuation	06	Corporate Restructuring
Note: Course selected in Semester V will continue in Semester VI			

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester V

No. of Courses	Semester V	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	Financial Derivatives	**04**
6	Business Ethics and Corporate Governance	**04**
	Total Credits	**20**

****List of Elective Courses for Semester V (Any Four)***	
01	Marketing in financial Services
02	Technical analysis
03	Corporate Accounting
04	Equity Research
05	Direct Tax- Income Tax
06	Business Valuation

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

1. Marketing in Financial Services

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Foundation of Services Marketing	15
02	Services Market Segmentation	15
03	Issues in Marketing of Services	15
04	Customer Satisfaction & Service Quality in Service Marketing	15
	Total	**60**

Sr. No.	Modules / Units
1	**Foundation of Services Marketing**
	Foundation of services marketing – Introduction – The services concept – Service Industry – Nature of Service, Characteristics of Services, Classification of Services – Importance of Services Marketing – The Growth in Services – Global and Indian Scenario, Retail Financial Services: Investment Services – Insurance Services, Credit Services – Dimensions and drivers, Institutional Financial Service, Distinctive Characteristics of Services _ Four I's of Services – Intangibility, Inconsistency, Inseparability and Inventory, Managing Service Encounters.
2	**Services Market Segmentation**
	Services Market Segmentation – Positioning and Differentiation of Services, Promotion and Communication – Designing and Managing Service Processes, Constructing and Service Environment – Managing People for Service Advantage – Service Quality and Productivity – Customer Relationship Management Customer Loyalty.
3	**Issues in Marketing of Services**
	Issues in Marketing of Services – Extended Services Marketing Mix : Going Beyond the 4 Ps. (7Ps of Services Marketing). Service Delivery Process – Service Blueprints - Service Mapping – Managing Employees for service orientation. Distribution Strategies of Services – Challenges in Distribution of Services. Personal Selling – Advertising and Sales Promotion in Service Industry.
4	**Issues in Marketing of Services**
	Customer Satisfaction & Service Quality in Service Marketing – Service Encounter – Role of HR & Internal Marketing – Monitoring and Measuring customer satisfaction, GAP Model – Handling complaints effectively – Service Failure – Recovery, Use of Internet in Service Marketing, Role of IT in marketing Financial Services, Ethics in Marketing, New trends in marketing, Marketing in 21st Century, Marketing through social networking channels

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Technical Analysis

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Technical Analysis	15
02	Major Indicators and Oscillators	15
03	Major Theories in Technical Analysis	15
04	Dow Theory and Eliot Wave Theory Risk Management, Trading Psychology and Trading Strategies	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Technical Analysis**
	Technical analysis, Basic assumptions, Strengths and Weakness, Charts, Candlestick charts analysis with one two and three candles like hammer, hanging man, shooting star, bearish and bullish harami; Pattern Study - Support and resistance, Head and shoulders, Double top and double bottom and Gap theory.
2	**Major Indicators and Oscillators**
	Stochastic, RSI, Williams %R, MFI, Bollinger bands, Moving Averages, MACD
3	**Major Theories in Technical Analysis**
	Dow Theory and Eliot Wave Theory
4	**Risk Management, Trading Psychology and Trading Strategies**
	Risk Management – Need, techniques, uses of stop loss, qualities of successful traders, golden rules of traders, do's and don'ts in trading, Rules to stop losing money, Choosing the right market to trade, Importance of discipline in trading; Day trading, Advantages of day trading, Risks associated with trading, Strategies for day trading, Momentum trading strategies.

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Corporate Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Redemption of Preference Shares and Debentures	15
02	Ascertainment and treatment of Profit Prior to Incorporation	15
03	Amalgamation of Companies	15
04	Capital Reduction and Internal Reconstruction	15
	Total	**60**

Sr. No.	Modules / Units
1	**Redemption of Preference shares and redemption of debentures**
	Redemption of Preference Shares • Company Law / Legal Provisions for redemption • Sources of redemption including divisible profits and proceeds of fresh issue of shares) Premium on redemption from security premium and profits of company • Capital Redemption Reserve Account - creation and use Redemption of Debentures (Including purchase or buy back of own debentures) • By payment from sources including out of capital and/ or out of profits • Debenture redemption reserve and debenture redemption sinking fund excluding insurance policy • By conversion into new class of shares or debentures with options including at par, premium and discount • Purchase/ buy back of own debentures for immediate cancellation or holding including ex and cum interest for purchase/ sale price (excluding brokerage thereon)
2	**Ascertainment and treatment of profit prior to incorporation**
	Principles for ascertainment Preparation of separate, combined and columnar profit and loss a/c including different basis of allocation of expenses / incomes
3	**Amalgamation of Companies (w.r.t. AS 14) (Excluding Intercompany Holdings)**
	In the nature of merger and purchase with corresponding accounting treatments of pooling of interests and purchase methods respectively Computation and meaning of purchase consideration Problems based on purchase method of accounting only
4	**Capital Reduction and Internal Reconstruction**
	Need for reconstruction and Company Law provisions Distinction between internal and external reconstructions Methods including alteration of share capital, variation of share holder rights, sub division, consolidation, surrender and reissue/cancellation, reduction of share capital, with relevant legal provisions and accounting treatments for same

Revised Syllabus of Courses of B.Com. (Financial Markets)
Programme at Semester V
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

4. Equity Research

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Research and Research Methodology	15
02	Equity Research – An Overview	15
03	Fundamentals of Research	15
04	Company Analysis	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Research and Research Methodology**
	Introduction and meaning of research, Objectives of research, Features and Importance of research in Financial Markets, Objectives and Types of research. Formulation of research problem. Meaning of Introduction, Need, and Good research design. Introduction to Data Collection and types of Data
2	**Equity Research – An Overview**
	A) Introduction – Meaning, Goals of equity research, Elements of equity research, Process of equity research, Types of equity research, Classification of stocks, Market participants, Role of equity research in capital market and Different approaches to equity research. B) Introduction to Research Analyst Profession – Role of research analyst, Responsibilities of research analyst, Basic principles of interaction with Clients/ Companies, Qualities of Research Analyst.
3	**Fundamentals of Research**
	A) Fundamentals of Research – Key points considered before investing, Research on business and stocks, Overview of Fundamental analysis, Technical analysis and Behavioural finance. B) Economy Analysis – Principles of macro and micro economics, key economic variables for carrying fundamental analysis, sources of information/data for carrying economic analysis C) Industry Analysis – Theories for analysis for industry performance – Michael Porter's Five Force Model for Industry Analysis, PESTLE Analysis, BCG Analysis, SCP Analysis. Key industry drivers and sources of information for industry analysis.
4	**Company Analysis**
	A) Qualitative Dimensions – Understanding business and business models, Company's SWOT Analysis, Management Quality and its governance system, Pricing power and sustainability of power, Success factors of the company, Compliance orientation of company and sources of information. B) Quantitative Dimensions – History of Business V/s Future of Business, Reading of financial statements, Peer comparison, dividend and earning history of the company and Role of corporate actions of the company.

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

5. Direct Taxation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Definitions and Residential Status	15
02	Heads of Income – I	15
03	Deductions under Chapter VI A	15
04	Computation of Taxable Income of Individuals.	15
	Total	**60**

Sr. No.	Modules / Units
1	**Definitions and Residential Status**
	Basic Terms (Sec. 2,3,4) Assesse, Assessment, Assessment Year, Annual Value, Business, Capital Assets, Income, Previous Year, Person, Transfer. Determination of Residential Status of Individual, Scope of Total Income (Sec 5) Exclusions from total income Sec 10 (Exclusions relating to specific heads to be covered with relevant heads of income)
2	**Heads of Income – I**
	Salary (Sec.15-17) Income from House Property (Sec. 22-27) Profit & Gain from Business and Profession(Sec. 28, 30,31,32, 35, 35D,36,37, 40, 40A and 43B) Capital Gain (Sec. 45, 48, 49, 50 and 54) Income from other sources (Sec.56- 59)
3	**Deductions under Chapter VI A**
	Deductions from Total Income S. 80C, 80CCC, 80D, 80DD, 80E, 80U, 80TTA
4	**Computation of Taxable Income of Individuals.**
	Computation of Total Income and Taxable Income of Individuals

Note.: *The Syllabus is restricted to study of particular sections, specifically mentioned rules and notifications only.*

1. *All modules / units include Computational problems*

2. *The Law In force on 1st April immediately preceding the commencement of Academic year will be applicable for ensuing Examinations.*

1. Elective Courses (EC)

6. Business Valuation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Basics of Valuation	15
02	Valuation Models	15
03	Valuation of Select Tangible Assets	15
04	Valuation of Select Intangible Assets	15
	Total	**60**

Sr. No.	Modules / Units
1	**Basics of Valuation**
	Introduction to valuation Value, Distinction between Price and Value Foundation of Business Valuation Purpose of business valuation Valuation Bias Uncertainties in Business Valuation Role of valuation in business acquisition, legal and tax purposes, efficient market hypothesis
2	**Valuation Models**
	Introduction to valuation models: asset based approach, Income based approach, market based approach Discounted cash flow valuation Relative valuation Free Cash Flow valuation Simple practical problems
3	**Valuation of Select Tangible Assets**
	Valuation of Fixed Assets: Related costs in relation to fixed asset valuation, self constructed fixed assets, assets acquired in exchange, fixed assets held for disposal Valuation of Shares: Basics of Company analysis and stock selection,
4	**Valuation of Select Intangible Assets**
	Valuation of Goodwill, Patents, Copyrights, Brands

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

2. Core Course (CC)

1. Financial Derivatives

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Derivatives	15
02	Futures – Introduction	15
03	Futures - Options – Introduction and Pricing Options	15
04	Trading Clearing and Settlement of Options and Futures	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Derivatives**
	• Definition – Types- Participants and Functions- Development of Exchange traded derivatives- Global derivatives markets- Exchange traded vs OTC derivatives markets- Derivatives trading in India- L.C.Gupta committee- J.C. varma committee- Requirements for a successful derivatives markets
2	**Futures – Introduction**
	• Futures: Introduction- Future terminology- Key features of futures contracts- Future vs. Forwards- Pay off for futures- Equity futures- Equity futures in India- Index futures- Stock futures- Future trading strategies-Hedging- Speculation- Arbitrage- Spread trading.
3	**Futures - Options – Introduction and Pricing Options**
	• Options: Introduction- Option terminology- Types- Options pay off- Equity options contracts in India-Index Options – Stock options- Options trading strategies- Hedging- Speculation- Arbitrage- Straddle- Strangles- Strips and Straps – Spread trading • The cost of carry models for stock and index futures- cash price and future price, arbitrage opportunity • Factors affecting options pricing- Option pricing models- Binominal pricing model- The black and Scholes model –Pricing of Index options. • Sensitivity of option premia (Delta, Gamma, Lambda, Theta, Rho)
4	**Trading Clearing and Settlement of Options and Futures**
	• Futures and Options trading system- Trader workstations- contract specification- specification for stock and index eligibility for trading charges • Clearing entities and their role- clearing mechanism –adjustment for corporate actions- open position calculation • Margining and settlement mechanism- Risk management- SPAN – Mechanics of SPAN- Overall portfolio margin requirements.

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

2. Core Course (CC)

2. Business Ethics and Corporate Governance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Business Ethics	15
02	Corporate Governance- Conceptual Framework	15
03	Corporate Governance and Shareholders Rights	15
04	Corporate Governance Forums and Legislative Framework of Corporate Governance in India	15
	Total	**60**

Sr. No.	Modules / Units
1	**Business Ethics**
	Role of Board of Directors Organisation climate and structure and ethics Addressing ethical dilemmas Code of ethics; ethics committee, ethics training, integrity pact
2	**Corporate Governance- Conceptual Framework**
	Introduction, need and scope Evolution of Corporate Governance Developments in India Elements of Good Corporate Governance
3	**Corporate Governance and Shareholders Rights**
	Rights of shareholders Challenges of exercising shareholders rights Corporate governance and Related Party Transactions Role of Investor Association in securing shareholders rights Role of institutional investors in Corporate Governance
4	**Corporate Governance Forums and Legislative Framework of Corporate Governance in India**
	National Foundation of Corporate Governance Global Corporate Governance forum Listing agreements SEBI Guidelines Companies Act

Revised Syllabus of Courses of B.Com.(Financial Markets) Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Elective Courses (EC)
1. Marketing in financial Services
• *Marketing Financial Services: Arthur Meidam: Macmillan* • *Marketing Financial Services: Christine Ennew, Trevor Watkins Mike Wright: Routledge* • *The Essence of Services Marketing.: Payne, Adrian: Prentice Hall of India Private Limited,* • *Customer Service Meaning and Measurement: La Londe, B.J. and Zinszer, P.H: National Council of Physical Distribution Management (NCPDM.)* • *Financial Services Marketing: Harrison, Tina: Pearson Education*
2. Technical analysis
• *Technical Analysis of Stock Trend; Robert D Edwards, Visiosn Book* • *Technical Analysis Explained; Martin J Pring; McGraw Hill* • *Handbook of Technical Analysis, Darell R Jobman; Probus* • *Technical Analysis of Stocks , options; William Eng, Probus* • *Technical Analysis, Jack D Schwager, John Wiley & Sons*
3. Corporate Accounting
• *Introduction to Corporate Accounting: P C Tulsian: S Chand* • *Corporate Accounting: Rajsekaran V : Pearson* • *Corporate Accounting : S N Maheshwari: Vikas Publishing House* • *Corporate Accounting M C Shukla, T S Grewal and S C Gupta: S Chand* • *Advanced Accountancy: R L Gupta : S Chand*
4. Equity Research
• *Equity Research and Valuation: Dun and Brad Street- Mc Graw Hills Professional* • *Damodaran on Valuation: Ashwath Damodaran- Wiley* • *Best Practices for Equity Research Analysts: James Valentine- Mc Graw Hill Education* • *Principles of Quantitative Equity Investing: Sugata Ray- Pearso*
5. Direct Tax- Income Tax
• *Students Guide to Income Tax Dr Vinod Singhania- Taxmann* • *Students Handbook on Taxation- T N Manoharan- Snow White* • *Income* Tax Act and Rules

Reference Books
6. Business Valuation
• *Valuation: Measuring and Managing the value of Companies: Thomas Copeland- Wiley* • *The Handbook of Advance Business Valuation: Rovert F Reilly and Robert Swhweish: Mc Graw hill* • *Business Valuation: Pitabas Mohanty- Taxmann* • *Valuation- Measuring and Managing the value of Companies : Tim Koller- Mc Kinsey & Co*
Core Course (CC)
1. Financial Derivatives
• *FINANCIAL DERIVATIVES THEORY, CONCEPTS AND PROBLEMS Gupta S.L., PHI, Delhi* • *FINANCIAL DERIVATIVES: S S S Kumar:* • *DERIVATIVES and Risk Management Basics, Cengage Learning, Delhi. Stulz M. Rene,* • *RISK MANAGEMENT & DERIVATIVES, Cengage Learning, New Delhi.* • *Fundamentals of Financial Derivatives : Prafulla Kumar Swain : Himalaya Publishing*
2. Business Ethics and Corporate Governance
• *Business Ethics- Concepts and Cases – Manuel G. Velasquez* • *Corporate Governance, Principles, policies and Practices – A.C. Fernando, Pearson Education* • *Corporate Governance – IICA, Taxmann* • *The Art of Corporate Governance – Dr. Joffy George* • *Companies Act 2013 and Rules* • *SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015*

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester VI

No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Course (CC)***	
5	Risk Management	**04**
6	Project Work	**04**
	Total Credits	**20**

*****List of Elective Courses for Semester VI (Any Four)***	
01	Venture Capital and Private Equity
02	Mutual Fund Management
03	Organisational Behaviour
04	Strategic Corporate Finance
05	Indirect Tax- GST
06	Corporate Restructuring

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018- 2019

1. Elective Courses (EC)

1. Venture Capital and Private Equity

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Conceptual understanding of Venture Capital and Private Equity	15
02	Structure and Valuation approaches	15
03	Strategies of Private Equity	15
04	Exit strategies for Private Equity	15
	Total	**60**

Sr. No.	Modules / Units
1	**Conceptual understanding of Venture Capital and Private Equity**
	• Venture Capital –Over View of Venture Capital- Definition- Features- Types – Roles • Concept of PE and its characteristics- Definition- Difference between PE,VC and Hedge Funds- Nature of PE Firm- Players in the PE market– Benefit of PE Finance • PE Fund –Legal structure and terms- Private Equity Investments and Financing- Private Equity Multiples and Prices- Private Equity Funds and Private Equity Firms- Investment Feature and Consideration
2	**Structure and Valuation approaches**
	• Structure and Regulation of Venture Capital and Private Equity- Business Cycle of PE –Structure of VC/PE firms- Limited Liability Partnerships- Routes of VC/PE investments in India- Regulatory Aspects of VC/PE investments • Valuation approaches- Risk and Returns- Analysis of Funds- Conventional Method- Revenue Multiplier Method
3	**Strategies of Private Equity**
	• Leverage Buyout, Growth Capital, Mezzanine Capital- • Distressed Debt, other Strategies • Due Diligence- Procedure and Challenges- Due Diligence in Emerging PE Market-Investing in Developing Market- Past Performance and Strategy
4	**Exit strategies for Private Equity**
	• Modes of exits in Indian Context and Challenges involved- • IPO, Promoter Buyback ,Sale to Other PE funds, Sale to other strategic Investors, Stake Swap, M & A's, Open Market-, Secondary Market

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Mutual Fund Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Mutual Fund Organization and Management	15
02	Mutual Fund Products,	15
03	Investment and Performance Measurement	15
04	Accounting and Taxation of Mutual Funds	15
	Total	**60**

Sr. No.	Modules / Units
1	**Mutual Fund Organization and Management**
	• Introduction: Meaning of Mutual Fund, Structure in India, Sponsors, Trust, Role of AMC, NFOs , Registrars, Agents, Types of Mutual Fund schemes • Objectives of AMFI, Advantage of Mutual Funds, Systematic Investment Plan (SIP), Systematic Transfer Plan (STP), Systematic Withdrawal Plan (SWP)
2	**Mutual Fund Products,**
	• Mutual Fund Products and Features: Equity funds: Definition, Features of Equity Funds, Index Fund, Large Cap Funds, Mid Cap Funds, Sectoral Funds, Types of Equity Schemes, Arbitrage funds, Multi-cap Funds, Quant funds, P / E Ratio funds, International Equities Fund, Growth Schemes. • Gold Exchange Trade Funds (ETFs): Introduction, Features, Working of ETFs, Market Making with ETFs, Creation Units, Portfolio Deposit and Cash Component • Debt Fund: Features, Interest Rate Risk, Credit Risk, Pricing of Debt Instrument Schemes, Fixed Maturity Plans, Capital Protection Funds, Gilt Funds, Balanced Funds, MIPs ,Child Benefit Plans. • Liquid funds: Features, Floating rate scheme, Portfolio of liquids funds.
3	**Investment and Performance Measurement**
	• Fund Performance, Measuring Return, Measuring Risk, • Risk adjusted return, Comparing Fund Performance with a reference, various standardized performance systems, • Limitations of Performance measurement and evaluation.
4	**Accounting and Taxation of Mutual Funds**
	• Accounting: Net Asset Value (NAV)-Meaning-Computation- Factors affecting NAV-Pricing of Units- Fees and Expenses- Investment Management and Advisory Fees –Initial Expenses- Recurring Expenses- Total expenses- Accounting policies. • Valuation-: Valuation of thinly traded securities- Valuation of Non trade securities-Valuation and disclosure of illiquid securities. • Taxation: Dividends- Capital Gains- Tax Rebate- Restrictions on Dividends Stripping.

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Organisational Behaviour

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Organisation Behaviour	15
02	Understanding Others: Interpersonal relationships	15
03	Group Behaviour and Team Behaviour	15
04	Stress Management and Change	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Organisation Behaviour**
	• Organisational Behaviour- Organisational Behaviour Multidiscipline- Different model of Organisational Behaviour- Individual behaviour is studied through Perception- Personality - Values- Attitudes- Job satisfaction- Motivation- Learning • Understanding self studied through- Perception and Personality • Understanding self studied through- Values and Attitudes
2	**Understanding Others: Interpersonal relationships**
	• Conflict Management –Nature of Conflict- Level of Conflict- Source of Conflict- Effects of Conflict- Process of Conflict- Stages of Conflict- Conflict Handling Orientations • Power and Organisational Politics-Sources of Power-Organisational Politics-Influence and Political Power
3	**Group Behaviour and Team Behaviour**
	• Group Behaviour, Informal Groups – Group Dynamics- Types of Groups- Nature and effects of Informal groups-Benefits of Informal groups-Formal groups – Monitoring informal organisation- Identifying and Rewarding Informal leader-Key Roles of Informal leader –Are there Multiple informal leaders? Formal Groups- Potential Outcomes of Informal Group Processes • Team and Team Building- Modern organisation- Outcomes of Modern Organisation- Team work – Task team- Difference Between Groups and Teams-Life cycle of Team –Major Factors for Effective Teams- Team Building- Need for Team building- Team Building Process- Skills Useful in Team Building
4	**Stress Management and Change**
	• Stress Management and Counselling- How it Comes About –How it Affects Various Elements of Job Performance- Extreme Product of Stress- Stress and Job Performance-Approaches to Stress Management-Characteristic of Counselling-Types of Counselling • Change and its Effects- Nature of Change – Effect of Change – Response to Change – Resistance to change – Reasons for Resistance to Change-Transformational Leadership and Change-What are Elements of Transformational Leadership- Three stage model of changes Process

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

4. Strategic Corporate Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Strategic Corporate Finance	15
02	Fund raising	15
03	Company Valuation	15
04	Credit Risk Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Strategic Corporate Finance**
	• Introduction to Strategic Corporate Finance: Strategy Vs. Planning, Significance of Strategy in Financial Decisions, Different Types of Financial Strategy for Shareholders, Wealth Maximization, Overall Corporate Value Addition and Economics Value Addition. • Strategic Cost Management: Traditional Costing Vs. Strategic Costing, Relevant costs Vs Irrelevant costs, Different Types of Strategic costing and their relevance- Traditional Costing Vs Activity Based Costing, Target Costing, Life Cycle Costing, Quality Costing, Zero Based Budgeting, Strategic Cost Reduction Techniques and value chain analysis.
2	**Fund raising**
	• Fundraising: Identification of different sources of capital, determination of capital structure and factors affecting the capital structure, cost of capital and cost saving strategy, production of a business plan, and financial forecasts to enable potential funders to assess the proposition. • Alternate Sources of Financing- Different Approaches to and moels of Infrastructure Projects Financing- Public Private Partnership (PPP) and its relevance, • Dividend Vs Share Repurchase Policy, Problem of too much cash, Issue of Stock Liquidity and Illiquidity.
3	**Company Valuation**
	• Company Valuation: An Overview of Valuation, Valuation Principles and Practices more, the impact of “what if” scenarios, the key financial and commercial factors affecting the business, Value enhancement tools &techniques, the link between valuation and corporate finance. • Management Buyouts: Establishing feasibility of the buy-out, Negotiating the main terms of the transaction with the vendor including price and structure, developing the business plan funders, negotiations with potential funders so that the most appropriate funding offers are selected. • Management Buy-ins: Management Buy-in/Buy-outs, Vendor-initiated buy-outs/buy-ins. • Due Diligence: finance due diligence for both purchasers and financial institutions
4	**Credit Risk Management**
	• Credit analysis, Default risk: Quantitative methodologies • Expected and unexpected loss, Credit VaR, Counterparty risk • Risk management choices, such as process control efforts, financial, physical, and operational hedging, value based management

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

5. Indirect Tax- GST

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Indirect Taxation and GST	15
02	Concept of Supply	15
03	Registration and Computation of GST	15
04	Filing of Returns	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Indirect Taxation and GST**
	Basics for Taxation - Direct Taxes and Indirect Taxes – Difference, Advantages and Disadvantages, Sources and Authority of Taxes in India (Art 246 of the Indian Constitution) **Introduction to GST** – Genesis of GST in India, Power to tax GST (Constitutional Provisions), Extent and Commencement, Meaning and Definition of GST, Benefits of GST, Conceptual Framework – CGST, IGST,SGST,UTGST, Imports of goods or services or both, Export of goods or services or both, Taxes subsumed and not subsumed under GST. **Definitions** – Goods (2(52) of CGST Act), Services (2(102) of CGST Act), Money (2(75) of CGST Act), Securities (2(101) of SCRA Act,1956), India(2(56) of CGST Act), Persons (2(84) of CGST Act),Taxable Person (2(107) of CGST Act), Business (2(17) of CGST Act), Consideration(2(31) of CGST Act), E- Commerce Operator (2(45) of CGST Act), Supplier(2(105) of CGST Act),Recipient(2(93) of CGST Act) **Levy and Collection of GST** – Levy and Collection of CGST, IGST, SGST,UTGST (Sec 9 of CGST Act), Composition Scheme under GST (Sec 10 of CGST Act), Power to Grant Exemption (Sec 11 of CGST Act)GST Rate Schedule for Goods and Services.
2	**Concept of Supply**
	Taxable Event Supply– Meaning and Scope of Supply (Section 7 Subsection 1, 2 and 3 of Act) Schedule I, Schedule II, Schedule III, Composite and Mixed Supplies (Sec 8 of CGST Act) **Place of Supply** – Location of Supplier of Goods and Services, Place of Supply of Goods (Sec 10, 11,12 and 13 of IGST Act), Special Provision for Payment of Tax by a Supplier of Online Information Database Access Retrieval. **Time of Supply**- Time of Supply (Sec 31 of CGST Act), Issue of Invoice by the Supplier (Sec 31 (1) and Sec 31(2) of CGST Act), Continuous Supply of Goods and Services, Goods Sent on Approval (Sec 31(7) of CGST Act) **Value of Supply** – Determination of Value of Supply (Sec 15 of CGST Act and CGST Rules 2017), Input Tax Credit (Sec 2(62) of CGST Act) Capital Goods (Sec 2(19) of CGST Act), Input Sec 2(59) of CGST Act), Input Service (Sec 2(60) of CGST Act). Eligibility and Conditions for taking Input Tax Credit (Sec 16 of CGST Act)
3	**Registration and Computation of GST**
	Registration – Persons liable for Registration (Sec 22 of the Act), Persons not liable for Registration, Procedure for Registration (Sec 25 of the Act), Deemed Registration(Sec 26 of the Act), Special Provisions (Sec 27 of the Act), Amendment, Cancellation and Revocation of Registration(Sec 28,Sec29 and Sec 31 of the Act) **Computation of GST–**Computation of GST under Inter State & Intra State Supplies **Payment of Tax-** Payment of Tax, Interest and other Amounts(Sec 49 of the Act), Interest on delayed Payment (Sec 50 of the Act), TDS (Sec 51 of the Act), TCS (Sec 52 of the Act)
4	**Filing of Returns**
	Documentation- Tax Invoices (Sec 31 and 32 of the Act), Credit and Debit notes(Sec 34 of the Act), Electronic Way Bill **Returns –**Types of Returns and Provisions relating to filing of Returns (Sec 37 to Sec 48 of the Act)

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

6. Corporate Restructuring

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction and Concepts	15
02	Merger and Amalgamation, Corporate Demerger and Reverse Merger	15
03	Funding of Merger and Takeover and Financial Restructuring	15
04	Post-Merger Reorganization	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction and Concepts**
	Meaning of Corporate Restructuring • Need, Scope and Modes of Restructuring • Historical Background • Emerging Trends • Planning, Formulation and Execution of Various Corporate Restructuring Strategies - Mergers, Acquisitions, Takeovers, Disinvestments and Strategic Alliances, Demerger and Hiving off • Expanding Role of Professionals
2	**Merger and Amalgamation, Corporate Demerger and Reverse Merger**
	• Introduction to Merger and Amalgamation, Corporate Demerger and Reverse Merger • Legal, Procedural, Economic, Accounting, Taxation and Financial Aspects of Mergers and Amalgamations including Stamp Duty and Allied Matters • Interest of Small Investors • Merger Aspects under Competition Law • Cross Border Acquisition and Merger • Concept of Demerger; Modes of Demerger - by Agreement, under Scheme of Arrangement • Demerger and Voluntary Winding Up • Legal and Procedural Aspects; Tax Aspects and Reliefs • Reverse Mergers – Procedural Aspects and Tax Implications • Meaning and Concept of Takeover • Types of Takeovers; Legal Aspects – SEBI Takeover Regulations • Disclosure and Open Offer Requirements • Bail Out Takeovers and Takeover of Sick Units • Takeover Defenses • Cross Border Takeovers
3	**Funding of Merger and Takeover and Financial Restructuring**
	• Financial Alternatives; Merits and Demerits • Funding through various Types of Financial Instruments including Equity and Preference Shares, Debentures, Securities with Differential Rights, Swaps, Stock Options; ECBs, Funding through Financial Institutions and Banks • Rehabilitation Finance • Management Buyouts/Leveraged Buyouts • Reduction of Capital • Reorganization of Share Capital • Buy-Back of Shares – Concept and Necessity • Procedure for Buy-Back of Shares by Listed and Unlisted Companies
4	**Post-Merger Reorganization**
	Factors involved in Post - Merger Reorganization • Integration of Businesses and Operations • Assessing Accomplishment of Post-Merger Objectives; Measuring Post Merger Efficiency

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

2. Core Course (CC)

1. Risk Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Risk Management	15
02	Evaluation of Risk	15
03	Foreign Exchange Risk	15
04	Foreign Exchange Risk	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Risk Management**
	The Concept of Risk, Identification of Risk faced by Organization, Risk and Uncertainty, Strategic and Operational Risks, Dynamic Nature of Risks, Business Risk, Financial Risk faced by Organization, Objectives of Risks Management, Process of Risk Management
2	**Evaluation of Risk**
	Evaluation of Organization's ability to bear them, Risk Measurement, Sources and Impact of Common Business Risk, Market, Credit , Liquidity, Technological, Legal, Environmental, Reputation, Country Risk Identify and assess the impact upon the stakeholder involved in Business Risk, Nature and Importance of Financial Risk, Evaluation of Financial Risk, Evaluation of Alternative Risk Management Tools, Role of Risk Manager and Risk Committee in identifying and managing risk
3	**Foreign Exchange Risk**
	Forex Market, Identifying and Analyzing Forex Risk, Managing Forex Risk
4	**Exchange Rate Risk**
	Interest Rate Market and Mathematics Identifying and Analyzing Interest Rate Risk Measuring Interest Rate Risk

Revised Syllabus of Courses of B.Com.(Financial Markets) Programme at Semester VI with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Elective Courses (EC)
1. Venture Capital and Private Equity
• *The Masters of Private Equity and Venture Capital: Robert Finkel: McGraw-Hill Education* • *Guide to Private Equity : CA Neha Bhuvania: Taxmann* • *Venture Capital, Private Equity, and the Financing of Entrepreneurship: Josh Lerner , Ann Leamon , Felda Hardymon : Wiley* • *The Business of Venture Capital: Mahendra Ransinghani: Wiley Finance* • *Venture Capital Financing in India: J C Verma :Response Books*
2. Mutual Fund Management
• *Indian Mutual Funds Handbook : Sundar Sankaran: Vision Books* • *Morningstar Guide to Mutual Funds: 5-Star Strategies for Success : Christine Benz.: Wiley* • *Working of Mutual Fund Organisations in India: P Mohana Rao: Kanishka Publications* • *Mutual Funds in India: Amitabh Gupta: Anmol Publications* • *Bogle on Mutual Funds: New Perspectives for The Intelligent Investor: Jogn C Bogle: Wiley*
3. Organisational Behaviour
• *Organisational Behaviour: Ashwathappa K : Himalaya Publishing* • *Organisational Behaviour: Jit S Chandran : Vikas Publishing House* • *Organisational Behaviour: Fred Luthans: Mc Graw Hill* • *Organisational Behaviour : Robbings, Stephen: Pearson* • *Organisational Behaviour: P C Pardeshi : Everest* • *Organisational Behaviour: L M Prasad: S Chand*
4. Strategic Corporate Finance
• *Strategic Corporate Finance: Tony Davies,Tony Boczko,Jean Chen : McGraw-Hill Higher Education* • *Strategic Corporate Finance : Pratap G Subramanyam: Snow White Publication* • *Strategic Corporate Finance : Jayant Varma : Vision Books* • *Strategic Corporate Finance : Samuel Weaver: Cengage Learning* • *Credit Risk Management": Andrew Fight : Butterworth*
5. Indirect Tax- GST
• *GST Bare Act 2017* • *GST Law & Practice - V.S Datey (6th Edition)* • *GST Laws – National Academy of Customs, Indirect Tax*

Reference Books
6. Corporate Restructuring
• *Mergers, Acquisition and Corporate Restructuring: Prasad G Godbole : Vikas Publishing* • *Handbook on Mergers, amalgamation and take overs : ICSI* • *Mergers/Amalgamations, Takeovers, Joint Ventures, LLPs and Corporate Restructure: K. R. Sampath : Snow White* • *Introduction to Mergers and Acquisitions: Kate Creighton, William J. Gole*
Core Course (CC)
1. Risk Management
• *The Essentials of Risk Management: Michel Crouhy, Dan Galai,, Robert Mark :MC Graw Hill Education* • *A Practical Guide to Risk Management : Thomas S Koleman: Research Foundation of CFA Institute* • *Risk Management – Concepts and Guidance: Carl Pritchard:CRC Press* • *Risk Management: Prof C K Roy:Vayu Education*

University of Mumbai

B.Com. (Financial Markets) Programme
Guidelines for Project Work
at
Third Year
Semester VI

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Financial Markets

Introduction

Inclusion of project work in the course curriculum of the B.Com. (Financial Markets) programme is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research analyse and scientific temperament challenging the potential of learner as regards to his/ her eager to enquire and ability to interpret particular aspect of the study. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

- There are two modes of preparation of project work
  1. Project work based on research methodology in the study area
  2. Project work based on internship in the study area

Guidelines for preparation of Project Work

1. General guidelines for preparation of project work based on Research Methodology

- The project topic may be undertaken in any area of Elective Courses.
- Each of the learner has to undertake a Project individually under the supervision of a teacher-guide.
- The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.
- University/college shall allot a guiding teacher for guidance to the students based on her / his specialization.
- The project report shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be 80 to 100 pages

Format

1st page (Main Page)

Title of the problem of the Project

A Project Submitted to

University of Mumbai for partial completion of the degree of

Bachelor in Commerce (Financial Markets)

Under the Faculty of Commerce

By

Name of the Learner

Under the Guidance of

Name of the Guiding Teacher

Name and address of the College

Month and Year

2nd Page
This page to be repeated on 2nd page (i.e. inside after main page)

On separate page

Index

Chapter No. 1	Title of the Chapter	Page No.
(sub point 1.1, 1.1.1, ... And so on)		
Chapter No. 2	Title of the Chapter	
Chapter No. 3	Title of the Chapter	
Chapter No. 4	Title of the Chapter	
Chapter No. 5	Title of the Chapter	

List of tables, if any, with page numbers.

List of Graphs, if any, with page numbers.

List of Appendix, if any, with page numbers.

Abbreviations used:

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work

(Model Structure of the Project Work)

- **Chapter No. 1: Introduction**

  In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.

- **Chapter No. 2: Research Methodology**

  This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.

- **Chapter No. 3: Literature Review**

  This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue.

- **Chapter No. 4: Data Analysis, Interpretation and Presentation**

  This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of information's, presentation of graphs etc. can be provided with interpretation by the learner.

- **Chapter No. 5: Conclusions and Suggestions**

  In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

- **Bibliography**
- **Appendix**

On separate page

Name and address of the college

Certificate

This is to certify that Ms/Mr _____has worked and duly completed her/his Project Work for the degree of Bachelor in Commerce (Financial Markets) under the Faculty of Commerce in the subject of _____ and her/his project is entitled, "_____*Title of the Project*_____" under my supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University.

It is her/ his own work and facts reported by her/his personal findings and investigations.

Seal of the College

Name and Signature of
Guiding Teacher

Date of submission:

On separate page

Declaration by learner

I the undersigned Miss / Mr. _____*Name of the learner*_____here by, declare that the work embodied in this project work titled "_____ _____*Title of the Project*_____", forms my own contribution to the research work carried out under the guidance of _____*Name of the guiding teacher*_____ is a result of my own research work and has not been previously submitted to any other University for any other Degree/ Diploma to this or any other University.

Wherever reference has been made to previous works of others, it has been clearly indicated as such and included in the bibliography.

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by

Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I take this opportunity to thank the **University of Mumbai** for giving me chance to do this project.

I would like to thank my **Principal, _____**for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our **Coordinator_____**, for her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide _____ whose guidance and care made the project successful.

I would like to thank my **College Library**, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially **my Parents and Peers** who supported me throughout my project.

2. Guidelines for Internship based project work

- Minimum 20 days/ 100 hours of Internship with an Organisation/ NGO/ Charitable Organisation/ Private firm.
- The theme of the internship should be based on any study area of the elective courses
- Experience Certificate is Mandatory
- A project report has to be brief in content and must include the following aspects:
  - **Executive Summary:**

    A bird's eye view of your entire presentation has to be precisely offered under this category.
  - **Introduction on the Company:**

    A Concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
  - **Statement and Objectives:**

    The mission and vision of the organization need to be stated enshrining its broad strategies.
  - **Your Role in the Organisation during the internship:**

    The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.
  - **Challenges:**

    The challenges confronted while churning out theoretical knowledge into practical world.
  - **Conclusion:**

    A brief overview of your experience and suggestions to bridge the gap between theory and practice.
- The project report based on internship shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be of minimum 50 pages

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
• **Evaluation of Project Report (Bound Copy)**	**60 Marks**
▪ Introduction and other areas covered	20 Marks
▪ Research Methodology, Presentation, Analysis and interpretation of data	30 Marks
▪ Conclusion & Recommendations	10 Marks
• **Conduct of Viva-voce**	**40 Marks**
▪ In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
▪ Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
▪ Overall Impression (including Communication Skill)	10 Marks

Note:

- ***The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of project shall conduct the viva-voce examination as per the evaluation pattern***

Passing Standard

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester V and VI
with effect from the Academic Year 2018-2019

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: 25 %

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.

  (Detail question paper pattern has been given separately)

❖ **Passing Standard**

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses of
B.Com. (Investment Management)
Programme at
Third Year
Semester V and VI

Under Choice Based Credit, Grading and Semester *System*

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Banking & Finance

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

T.Y.B.Com. (Investment Management)

(To be implemented from Academic Year 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 &4	*Any four courses from the following list of the courses	**12**	1,2,3 &4	**Any four courses from the following list of the courses	**12**
2	***Core Course (CC)***		***2***	***Core Course (CC)***	
5	International Finance - I	**04**	5	International Finance - II	**04**
3	***Ability Enhancement Course(AEC)***		***3***	***Ability Enhancement Course(AEC)***	
6	Research Methodology	**04**	6	Project Work	**04**
	Total Credits	**20**		**Total Credits**	**20**

- ✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 04 credits each. A project work may be undertaken in any area of Elective Courses/ Study Area*

****List of Elective Courses for Semester V (Any Four)***		*****List of Elective Courses for Semester VI (Any Four)***	
01	Operations in Equity Market	01	Commodity Markets and Derivatives
02	Corporate Accounting	02	Auditing
03	Business Ethics	03	Corporate Governance
04	Risk Management	04	Project Management
05	Behavioural Finance	05	Venture Capital
06	Merchant Banking - I	06	Merchant Banking - II
Note: Course selected in Semester V will continue in Semester VI			

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester V

No. of Courses	Semester V	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	International Finance - I	**04**
3	***Ability Enhancement Course(AEC)***	
6	Research Methodology	**04**
	Total Credits	**20**

List of Elective Courses for Semester V (Any Four)	
01	Operations in Equity Market
02	Corporate Accounting
03	Business Ethics
04	Risk Management
05	Behavioural Finance
06	Merchant Banking - I

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester V
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

1. Operations in Equity Market

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	An Overview of Indian Equity Market	15
02	Primary and Secondary Markets	15
03	Valuation of Equities	15
04	Trading Systems and Strategies	15
	Total	**60**

Sr. No.	Modules / Units
1	**An Overview of the Indian Equity Market**
	Meaning and definition of Equity Shares - Growth of Corporate Sector and simultaneous growth in number of equity shareholders-Separation of Ownership and Management in the Company- Development of Equity Culture in India and Current Position. Security Market- An overview, Market Terminology and Investment Procedure in Primary and Secondary Market.
2	**Primary and Secondary Markets**
	Primary Market -IPO- Methods Followed - Book building- offer for sale- Role of Merchant Bankers in Fixing the Price - Red Herring Prospectus- ASBA - Green Shoe Option- Sweat Equity- ESOP- Right Issue of Shares- ADR- GDR- IDR Secondary Market - Definition and Functions - Evolution and Growth - NSE- BSE- SME Exchanges and overseas Stock Exchanges - Recent developments- Merger of SEBI with FOMC - Stock market indices.
3	**Valuation of Equities**
	Factors affecting Share Prices – Balance Sheet Valuation- Dividend Discount Model- Price Earning Model- Fundamental Analysis - Macroeconomic Factors- Market Related Factors Role of Brokers- stock market quotations- procedure for buying and selling- BOLT online trading- NEAT - Clearing and settlement - Order matching.
4	**Trading Systems and Strategies**
	Trading System in Stock Exchange: Introduction, NEAT & BOLT, Screen Based Trading System (SBTS), Market Phases, Order Management, Trade Management, Market Window Operations and Auction. Trading Strategies: Long v/s Short and Brief Introduction to Hedging, Daily Settlement and Market Margins.

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester V
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Corporate Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Corporate Accounting	15
02	Valuation of Shares	15
03	Company Final Accounts	20
04	Investment Accounting	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Corporate Accounting**
	Meaning of Company, Requirement of Accounting for Companies, Procedures of Accounting for Companies, Importance of Corporate Accounting, Use of Accounting Standards in Corporate Accounting, Issue of Shares, Issue of Debentures, Issue of Bonds, Recent Trends in Corporate Accounting.
2	**Valuation of Shares**
	Meaning of Shares, Types of Shares, Shares as a means of Investment, Importance of Shares, Valuation of Shares in case of Merger and Acquisition of Shares, Intrinsic value of Shares, Yield value of Shares, Fair Value of Shares
3	**Company Final Accounts**
	Relevant provisions of Companies Act related to Preparation of Final Accounts (excluding cash flow statement) Preparation of Financial Statements as per Companies Act. (excluding cash flow statement) AS 1 in relation to Final Accounts of Companies (disclosure of accounting policies) Adjustment for – 1. Closing Stock 2. Depreciation 3. Outstanding expenses and income 4. Prepaid expenses and Pre received income 5. Proposed Dividend and Unclaimed Dividend 6. Provision for Tax and Advance Tax 7. Bill of exchange (Endorsement, Honour, Dishonour) 8. Capital Expenditure included in Revenue expenditure and vice versa eg- purchase of furniture included in purchases 9. Unrecorded Sales and Purchases 10. Good sold on sale or return basis 11. Managerial remuneration on Net Profit before tax 12. Transfer to Reserves 13. Bad debt and Provision for bad debts 14. Calls in Arrears 15. Loss by fire (Partly and fully insured goods) 16. Goods distributed as free samples. 17. Any other adjustments as per the prevailing accounting standard.
4	**Investment Accounting**
	For Shares (variable income bearing securities) For Debentures/Preference Shares (fixed income bearing securities) Accounting for Transactions of Purchase and Sale of Investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method (Excl. brokerage). Columnar Format for Investment Account.

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester V
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

3. Business Ethics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Business Ethics	15
02	Application of Ethical Theories in Business	10
03	Organizational Ethics	10
04	Ethics and Social Responsibility	15
05	Business Ethics in Global Economy.	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Business Ethics**
	Definition, Meaning, Nature of Ethics, Meaning of Moral & Ethics. Types of Ethics, Importance of Ethics, Business Ethics -Meaning and Nature. Importance of Ethics in Business, Areas of Business Ethics, Meaning of Functional Ethics, Types of Ethics According to Functions of Business- Marketing Ethics, Foreign Trade Ethics and Ethics Relating to Copyright. Ethics relating to Free and Perfect Competitive Market.
2	**Application of Ethical Theories in Business**
	Ethical Decision Making: Decision Making (Normal Dilemmas And Problems): (I) Utilitarianism (J. Bentham And J.S. Mill), (Ii) Deontology (I. Kant) Virtue Ethics (Aristotle). Gandhain Approach In Management And Trusteeship, Importance And Relevance of Trusteeship Principle in Modern Business. Ethical Issues in Functional Areas of Business. Ethics in Advertising (Truth In Advertising). Ethical Issues in Finance,
3	**Organizational Ethics**
	Individual Ethics- Professional Ethics. Corporate Ethics- Ethical Behavior - Ten Commandments of Ethical Behavior, Control &Audit of Ethical Behavior. Finance: Fairness and Efficiency in Financial Market, Insider Trading, Green Mail, Golden Parachute. HR: Workers Rights and Duties: Work place Safeties, Sexual harassment, Whistle Blowing.
4	**Ethics and Social Responsibility**
	Meaning & Definition of CSR, History &Evolution of CSR. Concept of Charity, Corporate Philanthropy, Ethics Relating to Environment Protection, Ethics Relating to Consumer Protection- Social Responsibility &Business Ethics Arguments for and against Social Responsibility. CSR through Triple Bottom Line and Sustainable Business, -Relation Between Corporate Responsibility &Business Ethics.
5	**Business Ethics in Global Economy**
	Ethics in the context of Global Economy- Relationship between Business Ethics & Business Development- Role of Business Ethics in Building a Civilized Society.

1. Elective Courses (EC)

4. Risk Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Foundations of Risk Management	15
02	Capital Market Risk Management	15
03	Credit Market Risk Management	15
04	Risk Measurement	15
	Total	**60**

Sr. No.	Modules / Units
1	**Foundations of Risk Management**
	• Basic Risk Types • The Role of Risk Management • Enterprise Risk Management (ERM) • History of Financial Disasters and Risk Management Failures • 2007 Financial Crisis
2	**Capital Market Risk Management**
	• Equity, Currencies &Commodities Markets in India • Introduction to Derivatives • Forward, Future and Option Contracts • Hedging through Derivatives Contract • Fixed-income Securities • Fixed-income Risk management through Derivatives • Rating Agencies
3	**Credit Market Risk Management**
	• Introduction, • Information required for Evaluation of Credit Risk, • Procedure for Credit Risk Management, • Credit Lifecycle, • Loan Review Mechanism, • RBI guidelines on Credit Rating Framework in Banks, • Introduction of Basel Norms and Calculation of Capital Adequacy Ratio
4	**Risk Measurement**
	• Estimation of volatilities and correlations (application to volatility term structures) Monte Carlo simulations (application to interest rate forecasting) • Linear Value-at-Risk (application to market, credit and operational risk) • Option valuation • Risk-adjusted Return on Capital (RAROC) & beta calculation • Risk management of Derivatives (application to convertible risk) • Interest Rates and Measures of Interest Rate Sensitivity

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester V
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

4. Behavioural Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Behavioural Factors and Financial Markets	15
02	External Factors and Investor Behaviour	15
03	Behavioural Corporate Finance	15
04	Emotions and Decision	15
	Total	**60**

Sr. No.	Modules / Units
1	**Behavioural Factors and Financial Markets**
	The Efficient Markets Hypothesis – Fundamental Information and Financial Markets - Information available for Market Participants and Market Efficiency - Market Predictability –The Concept of limits of Arbitrage Model - Asset Management and Behavioural Factors - Active Portfolio Management: Return Statistics and Sources of Systematic Underperformance. - Fundamental Information, Technical Analysis, and Behavioural Factors
2	**External Factors and Investor Behaviour**
	Weather, Emotions, and Financial Markets: Sunshine, Geomagnetic Activity - Mechanisms of the External Factor influence on Risk Perception and Attitudes - Connection to Human Psychophysiology and Emotional Regulation- Misattribution as a mechanism for externals factors influence. Statistical methodology for capturing the effects of external influence onto stock market returns - Emotional content of news articles and their correlation with market dynamics - Social trends and market dynamics: music, fashion, demographics - Active portfolio management – the source of the systematic underperformance. Fundamental information and technical analysis – the case for psychological influence.
3	**Behavioural Corporate Finance**
	Behavioural factors and Corporate Decisions on Capital Structure and Dividend Policy - Capital Structure dependence on Market Timing - Timing of Good and Bad Corporate News Announcement - Mergers and Acquisitions and the Winner's Curse - M&A waves and market timing - IPO under pricing - Systematic excessive optimism and Over confidence in managers' decisions. Company Name and its Market value - Sunk costs and mental accounting. Evolutionary explanations for behavioural effects - Evidence from behavioural game theory - Systematic approach to using behavioural factors in corporate decision making
4	**Emotions and Decision**
	Experimental measurement of risk-related - Measuring Risk - Emotional mechanisms in modulating risk-taking attitude - Neurophysiology of risktaking. Personality traits and risk attitudes in different domains - Evolutionary prospective and emotions. Proximal and ultimate mechanisms framework – Making decisions with "play" and real money - Modulating altruistic behaviour by utilizing the essentials of the specific proximal mechanisms - Emotions and rationality - Antonio Damasio and somatic markers

1. Elective Courses (EC)

6. Merchant Banking - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Merchant Banking	15
02	Capital Funds	15
03	Issue Management Process	15
04	Issue Management & Due Diligence	15
	Total	**60**

Sr. No.	Modules / Units
1	**Merchant Banking**
	Merchant Banking and Financial Services: Introduction, Concept of Merchant Banking, Financial system in India and Development of Merchant Banks and Regulations in India. Underwriting and Brokerage - Different roles played by Underwriters and Brokers in Issue Management and their responsibilities.
2	**Capital Funds**
	Raising Capital from International Markets - Needs of Indian companies for raising Funds from Foreign Markets, Usage of Euro issue, Evaluation of various types of Depository Receipts - American Depository Receipts, Global Depository Receipts, FCCBs and FCEBs.
3	**Issue Management Process**
	The process of issue management and merchant banker's role in it, The appointment of SEBI registered intermediaries and other intermediaries, The process of filing of offer document by the issuer with SEBI and the ROC with the help of the lead Merchant Banker, List of the documents to be submitted before opening of the issue, Copy of agreement between the Issuer and Merchant Banker, Certificate of compliance stating compliance of conditions, Due diligence certificate while registering DRHP/ Red Herring Prospectus/ prospectus with the ROC/ final post issue report, The type of In-Principle Approval from recognized stock exchanges for initial public issues as well as in the case for rights and further public offerings, the allotment, refund and payment of interest.
4	**Issue Management & Due Diligence**
	The general obligations of Intermediaries with respect to Public Issues and Rights Issue, The pricing in preferential issue, The pricing and restrictions on allotment of Qualified Institutional Placement, The pre-issue advertisement for rights issue, Utilization of funds raised through rights issue and the manner of disclosures in the offer document, The procedure for Institutional Placement Programme w.r.t Offer Document Pricing and Allocation/Allotment Restrictions, Minimum number of allotees, Restrictions on size of the offer, Period of subscription and display of demand, Transferability of eligible securities, The procedure for issue of Indian Depository Receipts (IDRs) w.r.t Eligibility Conditions for issue of IDR, Minimum Subscription Filing of Draft Prospectus, Due diligence Certificate, Payment of Fees and Issue of advertisements for IDR, Post Issue Reports, Undersubscribed Issue Finalisation of basis of allotment, The importance of due diligence, The role of external parties in the due diligence process and List of due diligence documents.

2. Core Course (CC)

1. International Finance - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Global Financial Environment	15
02	International Money and Equity Markets	15
03	Euro Currency Markets and International Bond Market	15
04	Obstacles to International Investment	15
	Total	**60**

Sr. No.	Modules / Units
1	**Global Financial Environment**
	Introduction to International Finance- The Challenge of International Finance- The Finance Function in Global Context-Global Financial Markets-Cost of Capital-Financial Structure-Intra company Transfers-Capital Budgeting(only theoretical overview)-International Financial Management and Imperfections in Financial Markets- Growing International Integration- Diversification Benefits of Global Investment- International Mergers and Acquisitions- Definition and Classification-Why do Firms Engage in Cross Border Mergers and Acquisitions-Changes in Policy and Regulatory Environment- Trends and Characteristics of Cross-Border M&As
2	**International Money and Equity Markets**
	Introduction and Role of the International Money Market-Selected Instruments of International Money Market-Returns on the Money Market Instruments Major stocks markets of the world-Emerging stock markets-International Equity Trading – Multiple Listing-International Equity Markets Credit Rating Agencies and Their Role-Depository Receipts- GDR-Characteristics-Mechanism of Issue-Participants involved-ADR- Types and Characteristics-concept of IDR
3	**Euro Currency Markets and International Bond Market**
	Introduction to Eurocurrency Markets-Reasons for Growth of Eurocurrency Markets-Euro Dollar Markets- Operations of Euro Markets-Functions of Euromarkets International bond market- Participants- Risk Associated with Investing in Bond Markets -Domestic Bond-Foreign Bonds-Euro Currency Bond-Types of euro currency bonds- Issue Procedure of Euro Currency Bonds-Foreign Currency Convertible and Foreign Currency Exchangeable Bonds- Participatory notes
4	**Obstacles to International Investment**
	Information Barriers-Foreign Exchange Risk-Political Risks -Market Risks-Taxation-Other Regulatory Barriers

Revised Syllabus of Courses of B.Com. (Banking and Insurance) Programme at Semester V with effect from the Academic Year 2018-2019

3. Ability Enhancement Course (AEC)

1. Research Methodology

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Research	10
2	Data Collection and Processing	15
3	Data Analysis and Interpretation	15
4	Advanced Statistical Techniques	15
5	Research Report	05
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Research**
	• Meaning, Objectives and Importance of Research • Types of Research • Research Process. • Characteristics of Good Research • Hypothesis-Meaning, Nature, Significance, Types and Sources. • Research Design– Meaning, Definition, Need and Importance, Steps, Scope and Essentials of a Good Research Design. • Sampling– a) Meaning of Sample and Sampling, b) Methods of Sampling i) Non-Probability Sampling– Convenient, Judgment, Quota, Snow ball ii) Probability– Simple Random, Stratified, Cluster, Multi Stage.
2	**Data Collection and Processing**
	• Types of Data and Sources-Primary and Secondary Data Sources • Methods of Collection of Primary Data a. Observation- i)structured and unstructured, ii) disguised and undisguised, iii)mechanical observations (use of gadgets) b. Experimental i)Field ii) Laboratory c. Interview – i) Personal Interview ii) focused group, iii) in- depth interviews Method d. Survey– Telephonic survey, Mail, E-mail, Internet survey, Social media, and Media listening. e. Survey instrument– i) Questionnaire designing. a. Types of questions–i) structured/close ended and ii) unstructured/ open ended, iii) Dichotomous, iv) Multiple Choice Questions. b. Scaling techniques-i) Likert scale, ii) Semantic Differential scale.
3	**Data Analysis and Interpretation**
	• Processing of Data– Meaning & Essentials of i) Editing ii) Coding iii) Tabulation • Analysis of Data-Meaning, Purpose, Types. • Interpretation of Data-Essentials, Importance, Significance and Descriptive Analysis • Testing of hypothesis– One Sample T- Test, ANOVA, F- test, Chi Square and Paired Sample Test
4	**Advanced Statistical Techniques**
	Introduction, Characteristics and Application of • Correlation and Regression Analysis • Factor Analysis • Cluster Analysis • Discriminant Analysis • Multidimensional Scaling
5	**Research Report**
	• Report writing – i) Meaning, Importance, Structure, Types, Process and Essentials of a Good Report.

Reference Books

Reference Books
Elective Courses (EC)
1. Operations in Equity Market
• *Financial Market and Services – E.Gordon and K.Natarajan- Himalaya Publishing House* • *Financial Market and Financial Securities in India- Benson Kunjukunju and S.Mohanan – New Country Publication* • *Indian Financial System- Evolution & Present Structure-Nitin Bnasin-New country Publication* • *Financial Market Operations- B.L.Mathur-Wide Vision* • *Capital Market Management- V.A.Avdhani –Himamlaya Publishing House* • *Capital Market and Financial Services- Anil Agashe –EverstPublishng House*
2. Corporate Accounting
• *Ashish K. Bhattacharyya – "Financial Accounting for Business Managers", Prentice Hall of India Pvt. Ltd.* • *Shashi K. Gupta – "Contemporary Issues in Accounting", Kalyani Publishers.* • *R. Narayanaswamy – "Financial Accounting", Prentice Hall of India, New Delhi* • *Ashok Sehgal – "Fundamentals of Financial Accounting", Taxmann's Publishers* • *Financial Accounting Reporting – Barry Elliot and Jamie Elliot – Prentice Hall (14th Edition)*
3. Business Ethics
• *Business Ethics, Crane& Matten* • *The Management and ethics omnibus- Chakraborty, Its only Business,Mitra,* • *Values and Ethics for Organizations, Chakraborty, OUP/OIP* • *Perspectives in Business Ethics, Hartman, Chatterjee*
4. Risk Management
• *Quantitative Risk Management : A Practical Guide to Financial Risk- Thomas S. Coleman* • *Investment Theory and Risk Management: Steve Peterson* • *Risk Management : M/s Macmillan India Limited* • *Theory & Practice of Treasury Risk Management: M/s Taxman Publications Ltd.* • *Corporate Value of ERM : Sim Segal* • *Risk Management : Insurance and Derivatives Dr G Kotreshwar-Himalaya Publishing House*
5. Behavioural Finance
• *Behavioral Finance: Psychology, Decision-Making, and Markets", by Ackert and Deaves.* • *Understanding Behavioral Finance by Ackert* • *The Psychology of Investing by John R. Nofsinger, Pearson Prentice Hall, (4th Edition)* • *What Investors Really Want - Learn the lessons of behavioral Finance, McGraw-Hill* • *Handbook of Behavioral Finance – Brian R. Bruce* • *Behavioral finance - Wiley Finance - Joachim Goldberg, Rüdiger von Nitzsch* • *Plous, Scott, 1993, The Psychology of Judgment and Decision Making, Ch 10-15* • *Shleifer, Andrei, 2000, Are Financial Markets Efficient, Chapter 1 in Inefficient Markets, Oxford University Press.*

Reference Books

Reference Books
• *Ackert, L., and R. Deaves, 2010, Behavioral Finance: Psychology, Decision-Making and Markets, South-Western Cengage Learning, Mason, Ohio.* • *Nofsinger, J. R., 2001, Investment Madness, Prentice Hall.* • *Mitchell, O. S., and S. P. Utkus, eds., 2004. Pension Design and Structure: New Lessons from Behavioral Finance (Oxford University Press, New York, New York).* • *Shleifer, Andrei (2000): Inefficient Markets: An Introduction to Behavioral Finance, Oxford University Press, Oxford.*
6. Merchant Banking - I
• *Merchant Banking and Financial Services – Dr. S Guruswamy Fourth Edition, Delhi Publishing House.* • *Merchant Banking Principles & Practices – H. R Machiraju New Age International Ltd* • *Merchant Banking – NISM 2015 Edition*
Core Course (CC)
1. International Finance - I
• *Apte P.G. International Finance – A Business Perspective, New Delhi, TATA McGraw Hill , McGraw Hill Education; 2 edition .* • *Bhalla .V.K. international Financial Management- S.Chand Publishing.* • *International Financial Management,Thummuluri Siddaiah,Pearson Education India, 2009.*
Ability Enhancement Course (AEC)
2. Research Methodology
• *Exploratory and Confirmatory Factor Analysis- Understanding Concepts and Applications(2004) – Bruce Thompson First Edition* • *Interpreting Economic and Social Data – A Foundation of Descriptive Statistics (2009) - Othmar W. Winkler - Springer* • *Regression Modelling Strategies (2015) – Frank E Harrell, Jr Springer Series in Statistics* • *Research Methodology (2014) – Deepak Chawla and Neena Sondhi, Vikas Publishing House.*

B.Com. (Investment Management) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year 2018-2019)

Semester VI

No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***	
5	International Finance - II	**04**
3	***Ability enhancement Course***	
6	Project Work	**04**
	Total Credits	**20**

*****List of Elective Courses for Semester VI (Any Four)***	
01	Commodity Markets and Derivatives
02	Auditing
03	Corporate Governance
04	Project Management
05	Venture Capital
06	Merchant Banking - II

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester VI
with effect from the Academic Year 2018- 2019

1. Elective Courses (EC)

1. Commodity Markets and Derivatives

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Commodity Markets	15
02	Commodity Exchanges	15
03	Commodity Derivatives	15
04	Pricing and Trading in Commodity Derivatives	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Commodity Market**
	Emergence of Commodity Market -Dynamics of Global Commodity Markets. Commodity Market in India- Commodity Exchanges in India-Role of Information in Commodity Markets-Linkages between Equity Markets and Commodity Markets - Commodity Markets - Logistics and Warehousing.
2	**Commodity Exchanges**
	Function & Role-Trading & Clearing Methods -Commodity Futures -Commodity Specific Exchanges Vs Multi Commodity Exchanges- Strengthening Commodity Markets in India- Role of Government - Role of Commodity Exchanges - Other Institutions -Training & development of Dealers. Regulatory Framework: Forward Market Commission- Rules Governing Commodity Derivatives Exchange, Rules Governing Intermediaries, Investor Grievances, Arbitration Rules.-Essential commodities Act- VAT-Forward Contract Regulation Act.
3	**Commodity Derivatives**
	Definition, Types of Derivatives, Products, Participants and Functions, Exchange Traded vs. OTC Derivatives -How Commodity Derivatives differ from Financial Derivatives - Warehousing, Quantity of Underlying Assets, Global Commodity Exchanges, Commodity Exchanges in India, Commodities permitted for Trading, KABRA committee Report, Commodity Specific Issues - Cropping and Growth Patterns, Global Domestic Demand -Supply Dynamics, Price Trends and Factors that Influence Prices.
4	**Pricing and Trading in Commodity Derivatives**
	Investment assets vs. Consumption assets-The Cost of Carry Model - Pricing Futures Contracts on Investment Commodities-Pricing futures Contracts on Consumption Commodities-The Futures Basics- Concept of Hedging, Speculation, Arbitrage Basic concepts such as Margins, Circuit filters - Delivery Norms – Contracts Specifications, Trading System, and Entities in the Trading System, Trader Workstation, Order types and conditions, Exposure limits, Commodities to be Traded: Types of Commodities: Bullion (silver and Gold), Agricultural Commodities. Clearing, Settlement and Risk Management.

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester VI with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

2. Auditing

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Auditing	15
02	Audit Planning, Procedures and Documentation	15
03	Auditing Techniques and Internal Audit Introduction	15
04	New Areas of Auditing and Professional Ethics	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Auditing**
	Basics – Financial Statements, Users of Information, Definition of Auditing, Objectives of Auditing – Primary and Secondary, Expression of opinion, Detection of Frauds and Errors, Inherent limitations of Audit. Difference between Accounting and Auditing, Investigation and Auditing. **Errors & Frauds** – Definitions, Reasons and Circumstances, Types of Error – Commission, Omission, Compensating error. Types of frauds, Risk of fraud and Error in Audit, Auditors Duties and Responsibilities in case of fraud. **Principles of Audit** – Integrity, Objectivity, Independence, Skills, Competence, Work performed by others, Documentation, Planning, Audi Evidence, Accounting System and Internal Control, Audit Conclusions and Reporting. **Types of Audit** – Meaning, Advantages, Disadvantages of Balance sheet Audit, Interim Audit, Continuous Audit, Concurrent Audit and Annual Audit.
2	**Audit Planning, Procedures and Documentation**
	Audit Planning – Meaning, Objectives, Factors to be considered, Sources of obtaining information, Discussion with Client, Overall Audit Approach. **Audit Program** – Meaning, Factors, Advantages and Disadvantages, Overcoming Disadvantages, Methods of Work , Instruction before commencing Work, Overall Audit Approach. **Audit Working Papers** - Meaning, importance, Factors determining Form and Contents, Main Functions / Importance, Features, Contents of Permanent Audit File, Temporary Audit File, Ownership, Custody, Access of Other Parties to Audit Working Papers, Auditors Lien on Working Papers, Auditors Lien on Client's Books **Audit Notebook** – Meaning, Structure, Contents, General Information, Current Information, Importance.
3	**Auditing Techniques and Internal Audit Introduction**
	Test Check - Test Checking Vs Routing Checking, Test Check meaning, features, factors to be considered, when Test Checks can be used, advantages disadvantages precautions. **Audit Sampling** - Audit Sampling, Meaning, Purpose, Factors in determining Sample Size -Sampling Risk, Tolerable Error and Expected Error, Methods of Selecting, Sample Items, Evaluation of Sample Results, Auditors Liability in Conducting Audit Based on Sample **Internal Control** - Meaning and Purpose, Review of Internal Control, Advantages, Auditors Duties, Review of Internal Control, Inherent Limitations of Internal Control, internal Control Samples for Sales and Debtors, Purchases and Creditors, Wages and Salaries. Internal Checks Vs Internal Control, Internal Checks Vs Test Checks **Internal Audit** - Meaning, Basic Principles of Establishing Internal Audit, Objectives, Evaluation of Internal Audit by Statutory Auditor, Usefulness of Internal Audit, Internal Audit Vs External Audit,, Internal Checks Vs Internal Audit

Sr. No.	Modules / Units
4	**New Areas of Auditing and Professional Ethics**
	New Areas of Auditing Introduction to Cost Audit, Human Resource Audit, Management Audit, Operational Audit, Forecast Audit, Social Audit, Tax Audit, Forensic Audit and Environmental (Green) Audit, Audit Committee. Audit in an EDP Environment- Introduction, General Approach to EDP based Audit and Special Techniques for Auditing in an EDP Environment. **Professional Ethics and Misconduct** Introduction, Meaning of Professional Ethics Meaning of Professional Misconduct, Schedules to the Chartered Accountants Act, 1949 Relating to Professional Misconduct, Enquiry into Charges of Misconduct of Chartered Accountants.

1. Elective Courses (EC)

3. Corporate Governance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Introduction to Corporate Governance	15
02	Genesis of Corporate Governance in India	10
03	Evolution of Corporate Governance	10
04	Implementation of Corporate Governance	15
05	Corporate Governance and Issues Related to Scams	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Corporate Governance**
	Definition & Conceptual Framework of Corporate Governance, Business Ethics - an important dimension to Corporate Governance, Fair and Unfair Business Practices. Theoretical Basis of Corporate Governance, Mechanism- Corporate Governance Systems, Indian Model of Governance, Good Corporate Governance, Obligations Towards Society and Stake holders. Theories underlying Corporate Governance (Stake holder's theory and Stewardship theory, Agency theory, Separation of Ownership and Control, Corporate Governance Mechanism: Process, Indian Model, OECD, and Emphasis on Corporate Governance, (Transparency Accountability and Empowerment).
2	**Genesis of Corporate Governance in India**
	Introduction, Principles – Arthashastra and Good Governance in Ancient India, Protection of Interest of Customer and Investors, Historical Perspective of Corporate Governance and Issues in Corporate Governance. Values: Meaning, Types, Teaching from Scriptures Like Gita, Quran, Bible value systems in Business.
3	**Evolution of Corporate Governance**
	The Cadbury Committee-Code of best principles –Indian Experience of Corporate Governance – The C II Code- SEBI initiative ,The Kumar Mangalam Birla Committee Report, Corporate Governance in Globalized Economy – MNCs/TNCs and Business Ethics. Relationship between Business Ethics-Corporate Governance and Ethical Leadership; Kohlberg's Six Stages of Moral Development
4	**Implementation of Corporate Governance**
	Role of Board of Directors and Board Structure, Role of the Non- executive Director, Role of Auditors, SEBI Growth of Corporate Governance. Role of Government, Corporate Governance in India. Accounting Standards and Accounting disclosures. Finance Reporting and Corporate Governance, Non Accounting Regulations in Corporate Governance, Corporate Governance & CSR, Family Owned BusinessBackground, family businesses in India , Need for Professionalization and Transparency in Family Business.
5	**Corporate Governance and Issues Related to Scams**
	Corruption: Meaning, Causes, Effects. Frauds and scams in Banks, Insurance Companies, Financial Institutions, Measures to Overcome Fraud and Corruption Zero Tolerance of Corruption. MRTP Act and MRTP commission. Competition Act, Ethical Approach in IPR with respect to Designs, Patents and copyrights, Ethics and IT. Case study, future of corporate Governance.

1. Elective Courses (EC)

4.Project Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Basics of Project Management	15
02	Project Selection and Evaluation	15
03	Project Management Techniques	15
04	Project Quality Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Basics of Project Management**
	Introduction, Need for Project Management, Project Management Knowledge Areas and Processes, The Project Life Cycle, The Project Manager (PM), Phases of Project Management Life Cycle, Project Management Processes, Impact of Delays in Project Completions, Essentials of Project Management Philosophy, Project Management Principles.
2	**Project Selection and Evaluation**
	Project Identification and Selection: Introduction, Project Identification Process, Project Initiation, Pre-Feasibility Study, Feasibility Studies, Project Break-even point. Project Planning: Introduction, Project Planning, Need of Project Planning, Project Life Cycle, Roles, Responsibility and Team Work, Project Planning Process, Work Breakdown Structure (WBS). Organisational Structure and Organisational Issues: Introduction, Concept of Organisational Structure, Roles and Responsibilities of Project Leader, Relationship between Project Manager and Line Manager, Leadership Styles for Project Managers, Conflict Resolution, Team Management and Diversity Management, Change Management.
3	**Project Management Techniques**
	PERT and CPM: Introduction, Development of Project Network, Time Estimation, Determination of the Critical Path, PERT Model, Measures of Variability, CPM Model, Network Cost System. Resources Considerations in Projects: Introduction, Resource Allocation, Scheduling, Project Cost Estimate and Budgets, Cost Forecasts Project Risk Management: Introduction, Risk, Risk Management, Role of Risk Management in Overall Project Management, Steps in Risk Management, Risk Identification, Risk Analysis, Reducing Risks.
4	**Project Quality Management**
	Project Quality Management and Value Engineering: Introduction, Quality, Quality Concepts, Value Engineering Project Management Information System: Introduction, Project Management Information System (PMIS), Planning of PMIS, Design of PMIS. Project Management Software: Introduction, Advantages of Using Project Management Software, Common Features Available in Most of the Project Management Software.

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester VI
with effect from the Academic Year 2018-2019

1. Elective Courses (EC)

5. Venture Capital

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Conceptual Understanding of Venture Capital and Private Equity	15
02	Structure and Valuation Approaches	15
03	Strategies of Private Equity	15
04	Exit strategies for Private Equity	15
	Total	**60**

Sr. No.	Modules / Units
1	**Conceptual Understanding of Venture Capital and Private Equity**
	Venture Capital –Over View of Venture Capital- Definition- Features- Types –Roles Concept of PE and its characteristics- Definition- Difference between PE,VC and Hedge Funds- Nature of PE Firm- Players in the PE market– Benefit of PE Finance PE Fund –Legal structure and terms- Private Equity Investments and Financing- Private Equity Funds and Private Equity Firms- Investment Feature and Consideration
2	**Structure and Valuation Approaches**
	Structure and Regulation of Venture Capital and Private Equity- Business Cycle of PE –Structure of VC/PE firms- Limited Liability Partnerships- Routes of VC/PE investments in India- Regulatory Aspects of VC/PE investments Valuation approaches- Risk and Returns- Analysis of Funds- Conventional Method- Revenue Multiplier Method
3	**Strategies of Private Equity**
	• Leverage Buyout- • Growth Capital- • Mezzanine Capital- • Distressed Investments- • Other Strategies: Real Estates; Infrastructure; Energy & Power ; Merchant Banking; Funds of Fund Due Diligence- Procedure and Challenges- Due Diligence in Emerging PE Market-Investing in Developing Market- Past Performance and Strategy
4	**Exit strategies for Private Equity**
	Modes of exits in Indian Context and Challenges involved- • IPO- • Buyback • Sale to Other PE funds • Sale to other Strategic Investors • Stake Swap- • M & A's • Open Market- Secondary Market

1. Elective Courses (EC)

6. Merchant Banking - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Factoring	15
02	Securitization	15
03	Mergers, Acquisitions & Takeovers	15
04	Disinvestment and Buyback of Equity Shares	15
	Total	**60**

Sr. No.	Modules / Units
1	**Factoring**
	Factoring: Concept, Nature and Scope of Factoring, Forms of Factoring , Factoring vis-à-vis Bills Discounting , Factoring vis-àvis Credit Insurance, Factoring vis-à-vis Forfeiting, Evaluation of a factor , Evaluation of factoring, Status of Factoring in India.
2	**Securitization**
	Securitization / Mortgages: Meaning, Nature and Scope of Securitization, Securitization as a Funding Mechanism, Securitization of Residential Real Estate and Mortgages -Features, Types and Provisions. Security Brokerage: Meaning of Brokerage, Types of Brokers, Difference between Broker and Jobber, SEBI Regulations relating to brokerage business in India.
3	**Mergers, Acquisitions & Takeovers**
	Difference between Mergers, Acquisitions and Takeover, The Role of Merchant Banker in M&A and Takeovers, SEBI (Substantial Acquisition of Shares and Takeovers) Regulations, 2011 w.r.t Substantial acquisition of shares or voting rights, Voluntary Offer- Offer Size, Offer Price, Payment Mode, Exemptions and Process of Open Offer.
4	**Disinvestment and Buyback of Equity Shares**
	The Role of Merchant Banker in Disinvestment Process, Role and Obligations of Merchant Banker in Buyback of Equity Shares, Role of Merchant Banker in Delisting of Shares, Role of Merchant Banker in Issue and Listing of Debt Securities and The Role of Merchant Banker in ESOP.

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester VI
with effect from the Academic Year 2018-2019

2. Core Course (CC)

1. International Finance - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
01	Fundamentals of International Finance	15
02	Foreign Exchange Markets	15
03	Currency Futures	15
04	Currency Options and Swaps	15
	Total	**60**

Sr. No.	Modules / Units
1	**Fundamentals of International Finance**
	Meaning and Scope of International Finance-Balance of Payment- Components-Deficit in Balance of Payment-Concept of Currency Convertibility International Monetary System- Gold Standard-Features-Bretton Wood System-Background and Features-Reasons for its Failure-Smithsonian Agreement-SDRs-European Monetary system Current Exchange Rate Systems – Fixed and Flexible Exchange rate- Merits Demerits- Types of Fixed Exchange Rate- Hard Pegs and Soft Pegs- Types of Flexible Exchange Rate- Managed and Free Float.
2	**Foreign Exchange Markets**
	Introduction- Market and Market Participants- Structure of Forex Markets-The Mechanics of Currency Trading-Types of Transactions and Settlement Dates-Exchange Rate Quotations and Arbitrage(Geographical, Triangular and Interest Rate)- Short Date and Broken Date Forward Contracts- Borrowing and Investment Decisions-Determinants of Exchange Rate – Purchasing Power and Interest rate Parity Foreign Exchange Management in India- Retail and Whole Sale Component of Indian Foreign Exchange Market- Role of FEDAI- FEMA and Regulatory framework-Dealing Room Operations
3	**Currency Futures**
	Introduction: Currency Futures-Future Contract-Futures Forward Contract-Currency Futures Quotes-How to Read Currency Futures Quotes-Market Operations-Clearing House and Clearing Margins- Hedging with Currency Futures and Contracts
4	**Currency Options and Swaps**
	Introduction-Options-Market Structure-Currency Option Quotes-Currency Option Pricing-Fischer Black's Option Pricing Model-Currency Call Options-Currency Put Options-Hedging Currency Positions with Foreign Currency Options

Revised Syllabus of Courses of B.Com.(Investment Management) Programme at Semester VI with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Elective Courses (EC)
1. Commodity Markets and Derivatives
• *Commodities Market Module, Workbook from NSE* • *Chatnani, (2010), Commodity Markets, 1st edition, Tata McGraw Hill.* • *Kleinman, George, (2001), Commodity Futures & Options, 2nd (revised, illustrated edition), Prentice Hall.* • *Stephens, John. (2001), Managing Commodity Risk, John Wiley & Sons. o Indian Institute of Banking & Finance, (2007),* • *Commodity Derivatives, Macmillan India*
2. Auditing
• *CA Surbhi Bansal – Audit and Assurance* • *Taxmann – Auditing* • *Dr.SMeenakumari – Fundamentals of Auditing* • *BaldevSachdeva&Jagwant Singh Pardeep Kumar – Auditing theory & Practice.* • *Woolf, Emile,Auditing Today* • *Basu, Sanjib Kumar, Fundamentals of Auditing, Pearson*
3. Corporate Governance
• *A. C. Fernando, Corporate Governance Principles, Policies and Practices;Pearson* • *Marc Goeren, International Corporate Governance; Black Wells.* • *Cristian A. Mallin, Corporate Governance*
4. Project Management
• *Project Management – Marion Haynes Crisp 9th Edition* • *5 phase Project Management – Joesph Weiss and Robert Wysocki* • *Software Project Management – Mike Cotterel and Bob Hughes* • *Introduction to Project Management and Quality Assurance – Darrel Ince, Mc Graw Hill*
5. Venture Capital
• *The Masters of Private Equity and Venture Capital: Robert Finkel: McGraw-Hill Education* • *Guide to Private Equity : CA Neha Bhuvania: Taxmann* • *Venture Capital, Private Equity, and the Financing of Entrepreneurship: Josh Lerner , Ann Leamon , Felda Hardymon : Wiley* • *The Business of Venture Capital: Mahendra Ransinghani: Wiley Finance* • *Venture Capital Financing in India: J C Verma :Response Books*

Reference Books

Reference Books
6. Merchant Banking - II
• *Merchant Banking and Financial Services – Dr. S Guruswamy Fourth Edition, Delhi Publishing House.* • *Merchant Banking Principles & Practices – H. R Machiraju New Age International Ltd* • *Merchant Banking – NISM 2015 Edition*
Core Course (CC)
1. International Finance - II
• *Apte P.G. International Finance – A Business Perspective, New Delhi, TATA McGraw Hill , McGraw Hill Education; 2 edition .* • *Bhalla .V.K. international Financial Management- S.Chand Publishing.* • *International Financial Management,Thummuluri Siddaiah,Pearson Education India, 2009.*

University of Mumbai

B.Com. (Investment Management) Programme
Guidelines for Project Work
at
Third Year
Semester VI

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year 2018-2019)

Board of Studies-in-Banking and Finance

Introduction

Inclusion of project work in the course curriculum of the B.Com. (Investment Management) programme is one of the ambitious aspects in the programme structure. The main objective of inclusion of project work is to inculcate the element of research analyse and scientific temperament challenging the potential of learner as regards to his/ her eager to enquire and ability to interpret particular aspect of the study. It is expected that the guiding teacher should undertake the counselling sessions and make the awareness among the learners about the methodology of formulation, preparation and evaluation pattern of the project work.

- There are two modes of preparation of project work
  1. Project work based on research methodology in the study area
  2. Project work based on internship in the study area

Guidelines for preparation of Project Work

1. General guidelines for preparation of project work based on Research Methodology

- The project topic may be undertaken in any area of Elective Courses.
- Each of the learner has to undertake a Project individually under the supervision of a teacher-guide.
- The learner shall decide the topic and title which should be specific, clear and with definite scope in consultation with the teacher-guide concerned.
- University/college shall allot a guiding teacher for guidance to the students based on her / his specialization.
- The project report shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be 80 to 100 pages

Format

1st page (Main Page)

Title of the problem of the Project

A Project Submitted to

University of Mumbai for partial completion of the degree of

Bachelor in Commerce (Investment Management)

Under the Faculty of Commerce

By

Name of the Learner

Under the Guidance of

Name of the Guiding Teacher

Name and address of the College

Month and Year

2nd Page
This page to be repeated on 2nd page (i.e. inside after main page)

On separate page

Index

Chapter No. 1	Title of the Chapter	Page No.
(sub point 1.1, 1.1.1, ... And so on)		
Chapter No. 2	Title of the Chapter	
Chapter No. 3	Title of the Chapter	
Chapter No. 4	Title of the Chapter	
Chapter No. 5	Title of the Chapter	

List of tables, if any, with page numbers.

List of Graphs, if any, with page numbers.

List of Appendix, if any, with page numbers.

Abbreviations used:

Structure to be followed to maintain the uniformity in formulation and presentation of Project Work

(Model Structure of the Project Work)

- **Chapter No. 1: Introduction**

  In this chapter Selection and relevance of the problem, historical background of the problem, brief profile of the study area, definition/s of related aspects, characteristics, different concepts pertaining to the problem etc can be incorporated by the learner.

- **Chapter No. 2: Research Methodology**

  This chapter will include Objectives, Hypothesis, Scope of the study, limitations of the study, significance of the study, Selection of the problem, Sample size, Data collection, Tabulation of data, Techniques and tools to be used, etc can be incorporated by the learner.

- **Chapter No. 3: Literature Review**

  This chapter will provide information about studies done on the respective issue. This would specify how the study undertaken is relevant and contribute for value addition in information/ knowledge/ application of study area which ultimately helps the learner to undertake further study on same issue.

- **Chapter No. 4: Data Analysis, Interpretation and Presentation**

  This chapter is the core part of the study. The analysis pertaining to collected data will be done by the learner. The application of selected tools or techniques will be used to arrive at findings. In this, table of information's, presentation of graphs etc. can be provided with interpretation by the learner.

- **Chapter No. 5: Conclusions and Suggestions**

  In this chapter of project work, findings of work will be covered and suggestion will be enlisted to validate the objectives and hypotheses.

Note: If required more chapters of data analysis can be added.

- **Bibliography**
- **Appendix**

On separate page

Name and address of the college

Certificate

This is to certify that Ms/Mr _____has worked and duly completed her/his Project Work for the degree of Bachelor in Commerce (Investment Management) under the Faculty of Commerce in the subject of _____ and her/his project is entitled, "_____*Title of the Project*_____" under my supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University.

It is her/ his own work and facts reported by her/his personal findings and investigations.

Seal of the College

Name and Signature of
Guiding Teacher

Date of submission:

On separate page

Declaration by learner

I the undersigned Miss / Mr. _____*Name of the learner*_____here by, declare that the work embodied in this project work titled "_____ _____*Title of the Project*_____", forms my own contribution to the research work carried out under the guidance of _____*Name of the guiding teacher*_____ is a result of my own research work and has not been previously submitted to any other University for any other Degree/ Diploma to this or any other University.

Wherever reference has been made to previous works of others, it has been clearly indicated as such and included in the bibliography.

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by

Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I take this opportunity to thank the **University of Mumbai** for giving me chance to do this project.

I would like to thank my **Principal, _____**for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our **Coordinator_____**, for her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide _____ whose guidance and care made the project successful.

I would like to thank my **College Library**, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially **my Parents and Peers** who supported me throughout my project.

2. Guidelines for Internship based project work

- Minimum 20 days/ 100 hours of Internship with an Organisation/ NGO/ Charitable Organisation/ Private firm.
- The theme of the internship should be based on any study area of the elective courses
- Experience Certificate is Mandatory
- A project report has to be brief in content and must include the following aspects:
  - **Executive Summary:**

    A bird's eye view of your entire presentation has to be precisely offered under this category.
  - **Introduction on the Company:**

    A Concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
  - **Statement and Objectives:**

    The mission and vision of the organization need to be stated enshrining its broad strategies.
  - **Your Role in the Organisation during the internship:**

    The key aspects handled, the department under which you were deployed and brief summary report duly acknowledged by the reporting head.
  - **Challenges:**

    The challenges confronted while churning out theoretical knowledge into practical world.
  - **Conclusion:**

    A brief overview of your experience and suggestions to bridge the gap between theory and practice.
- The project report based on internship shall be prepared as per the broad guidelines given below:
  - Font type: Times New Roman
  - Font size: 12-For content, 14-for Title
  - Line Space : 1.5-for content and 1-for in table work
  - Paper Size: A4
  - Margin : in Left-1.5, Up-Down-Right-1
  - The Project Report shall be bounded.
  - The project report should be of minimum 50 pages

Evaluation pattern of the project work

The Project Report shall be evaluated in two stages viz.	
• **Evaluation of Project Report (Bound Copy)**	**60 Marks**
▪ Introduction and other areas covered	20 Marks
▪ Research Methodology, Presentation, Analysis and interpretation of data	30 Marks
▪ Conclusion& Recommendations	10 Marks
• **Conduct of Viva-voce**	**40 Marks**
▪ In the course of Viva-voce, the questions may be asked such as importance / relevance of the study, objective of the study, methodology of the study/ mode of Enquiry (question responses)	10 Marks
▪ Ability to explain the analysis, findings, concluding observations, recommendation, limitations of the Study	20 Marks
▪ Overall Impression (including Communication Skill)	10 Marks

Note:

- ***The guiding teacher along with the external evaluator appointed by the University/ College for the evaluation of project shall conduct the viva-voce examination as per the evaluation pattern***

Passing Standard

- Minimum of Grade E in the project component
- In case of failing in the project work, the same project can be revised for ATKT examination.
- Absence of student for viva voce: If any student fails to appear for the viva voce on the date and time fixed by the department such student shall appear for the viva voce on the date and time fixed by the Department, such student shall appear for the viva voce only along with students of the next batch.

Revised Syllabus of Courses of B.Com. (Investment Management) Programme at Semester V and VI
with effect from the Academic Year 2018-2019

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: **25 %**

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.

  (Detail question paper pattern has been given separately)

❖ **Passing Standard**

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

University of Mumbai

No. AAMS(UG)/88 of 2021-22

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology is invited to this office circular No. UG/18 of 2016-17, dated 27th June, 2016 relating to the revised syllabus as per the (CBSGS) of F.Y.B.Sc. (Computer Science) (Sem. I & II).

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in Computer Science at its meeting held on 21st June , 2021 and subsequently passed by the Board of Deans at its meeting held on 28th June, 2021 vide item No. 6.38 (R) have been accepted by the Academic Council at its meeting held on 29th June, 2021 vide item No.6.38 (R) and that in accordance therewith, the revised syllabus as per the (CBSGS) for the F.Y.B.Sc. Computer Science (Sem. I & II) has been brought into force with effect from the academic year 2021-22 accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. B.N.Gaikwad)
I/c REGISTRAR

MUMBAI – 400 032
30th September, 2021

To

The Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology.

A.C/6.38(R) 29/06/2021

****

No. AAMS(UG)/88 -A of 2021-22 MUMBAI-400 032 30th September, 2021

Copy forwarded with Compliments for information to:-

1) The Dean, Faculty of Science & Technology,
2) The Chairman, Ad-hoc Board of Studies in Computer Science,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. B.N.Gaikwad)
I/c REGISTRAR

Copy to :-

1. **The Deputy Registrar, Academic Authorities Meetings and Services (AAMS),**
2. **The Deputy Registrar, College Affiliations & Development Department (CAD),**
3. **The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM),**
4. **The Deputy Registrar, Research Administration & Promotion Cell (RAPC),**
5. **The Deputy Registrar, Executive Authorities Section (EA),**
6. **The Deputy Registrar, PRO, Fort, (Publication Section),**
7. **The Deputy Registrar, (Special Cell),**
8. **The Deputy Registrar, Fort/ Vidyanagari Administration Department (FAD) (VAD), Record Section,**
9. **The Director, Institute of Distance and Open Learning (IDOL Admin), Vidyanagari,**

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. **P.A to Hon'ble Vice-Chancellor,**
2. **P.A Pro-Vice-Chancellor,**
3. **P.A to Registrar,**
4. **All Deans of all Faculties,**
5. **P.A to Finance & Account Officers, (F.& A.O),**
6. **P.A to Director, Board of Examinations and Evaluation,**
7. **P.A to Director, Innovation, Incubation and Linkages,**
8. **P.A to Director, Board of Lifelong Learning and Extension (BLLE),**
9. **The Director, Dept. of Information and Communication Technology (DICT) (CCF & UCC), Vidyanagari,**
10. **The Director of Board of Student Development,**
11. **The Director, Department of Students Walfare (DSD),**
12. **All Deputy Registrar, Examination House,**
13. **The Deputy Registrars, Finance & Accounts Section,**
14. **The Assistant Registrar, Administrative sub-Campus Thane,**
15. **The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan,**
16. **The Assistant Registrar, Ratnagiri sub-centre, Ratnagiri,**
17. **The Assistant Registrar, Constituent Colleges Unit,**
18. **BUCTU,**
19. **The Receptionist,**
20. **The Telephone Operator,**
21. **The Secretary MUASA**

for information.

AC – 29/06/2021
Item No: 6.38

UNIVERSITY OF MUMBAI

Syllabus
For the
Program: F.Y.B.Sc. Sem -I &II CBCS
Course: Computer Science

(Choice Based and Credit System with effect from the academic year 2021-22)

AC – 29/06/2021

Item No: 6.38

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1.	Title of the Course	**F.Y.B.Sc. Sem. I & II (Computer Science)**
2.	Eligibility for Admission	Ordinance no. O.5719 Circular no. UG/284 of 2007 dated 16th June 2007
3.	Passing Marks	40%
4.	Ordinances / Regulations (if, any)	As applicable for all B.Sc. Courses
5.	Number of years / Semesters	Three years – Six Semesters
6.	Level	~~P.G.~~/ U.G. /~~Diploma / Certificate~~ (Strike out which is not applicable)
7.	Pattern	~~Yearly /~~ Semester, Choice Based (Strike out which is not applicable)
8.	Status	~~New~~ /Revised
9.	To be implemented from Academic year	From the Academic Year **2021 – 2022**

Date: 28/06/2021

Dr. Jagdish Bakal
BoS Chairperson in Computer Science

Dr. Anuradha Majumdar
Dean, Science and Technology

Preamble

The rise of Information and Communication Technology (ICT) has profoundly affected modern society. Increasing applications of computers in almost all areas of human endeavor has led to vibrant industries with concurrent rapid change in technology.

As the computing field advances at a rapid pace, the students must possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves. Specific languages and technology platforms change over time. Thus students must continue to learn and adapt their skills throughout their careers. To develop this ability, students will be exposed to multiple programming languages, tools, paradigms and technologies as well as the fundamental underlying principles throughout this programme.

The programme offers required courses such as programming languages, data structures, computer architecture and organization, algorithms, database systems, operating systems, and software engineering; as well as specialized courses in artificial intelligence, computer-based communication networks, distributed computing, information security, graphics, human-computer interaction, multimedia, scientific computing, web technology, and other current topics in computer science.

The core philosophy of this programme is to –

- Form strong foundations of Computer Science
- Nurture programming, analytical & design skills for the real world problems.
- Introduce emerging trends to the students in gradual way.
- Groom the students for the challenges of ICT industry

The students these days not only aspire for a career in the industry but also look for research opportunities. The main aim of this programme is to deliver a modern curriculum that will equip graduates with strong theoretical and practical backgrounds to enable them to excel in the workplace and to be lifelong learners. Not only does it prepare the students for a career in Software industry, it also motivates them towards further studies and research opportunities. Graduating students, can thus take up postgraduate programmes in CS leading to research as well as R&D, can be employable at IT industries, or can adopt a business management career.

In the first year i.e. for semester I & II, basic foundation of important skills required for software development is laid. The syllabus proposes to have four core subjects of Computer science and two core courses of Mathematics-Statistics. All core subjects are proposed to have theory as well as practical tracks. While the Computer Science courses will form fundamental skills for solving computational problems, the Mathematics & Statistics course will inculcate research-oriented acumen. Ability Enhancement Courses on Soft Skill Development will ensure an overall and holistic development of the students. The syllabus design for further semesters encompasses more advanced and specialized courses of Computer Science.

We sincerely believe that any student taking this programme will get very strong foundation and exposure to basics, advanced and emerging trends of the subject. We hope that the students‟ community and teachers‟ fraternity will appreciate the treatment given to the courses in the syllabus.

We wholeheartedly thank all experts who shared their valuable feedbacks and suggestions in order to improvise the contents; we have sincerely attempted to incorporate each of them. We further thank Chairperson and members of Board of Studies for their confidence in us.

Special thanks to Department of Computer Science and colleagues from various colleges, who volunteered or have indirectly, helped designing certain specialized courses and the syllabus as a whole.

Programme Structure for B.Sc. Computer Science

Programme Duration	06 Semesters *spread across 3 years*
Total Credits required for successful completion of the Course	120
Credits required from the Core Courses	76
Credits required for the Ability Enhancement Courses	04
Credits required for Skills Enhancement Courses	32
Credits for General Elective Courses	08
Minimum Attendance per Semester	75%

Progamme Objectives

The objectives of the 3 year B.Sc. Computer Science programme are as follows:

- To develop an understanding and knowledge of the basic theory of Computer Science with good foundation on theory, systems and applications.
- To fosternecessary skills and analytical abilities for developing computer based solutions of real-life problems.
- To provide training in emergent computing technologies which lead to innovative solutions for industry and academia.
- To develop the necessary study skills and knowledge to pursue further post-graduate study in computer science or other related fields.
- To develop the professional skillset required for a career in an information technology oriented business or industry.
- To enable students to work independently and collaboratively, communicate effectively, and become responsible, competent, confident, insightful, and creative users of computing technology

Progamme Learning Outcomes

At the end of three year Bachelor of Computer Science the students will be able:

- To formulate, to model, to design solutions, procedure and to use software tools to solve real world problems.
- To design and develop computer programs/computer -based systems in the areas such as networking, web design, security, cloud computing, IoT, data science and other emerging technologies.
- To familiarize with the modern-day trends in industry and research based settings and thereby innovate novel solutions to existing problems.
- To apply concepts, principles, and theories relating to computer science to new situations.
- To use current techniques, skills, and tools necessary for computing practice
- To apply standard Software Engineering practices and strategies in real-time software project development
- To pursue higher studies of specialization and to take up technical employment.
- To work independently or collaboratively as an effective tame member on a substantial software project.
- To communicate and present their work effectively and coherently.
- To display ethical code of conduct in usage of Internet and Cyber systems.
- To engage in independent and life-long learning in the background of rapid changing IT industry.

Academic year 2021-2022

Semester – I				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USCS101	Core Subject	Digital Systems & Architecture	2	3
USCSP101	Core Subject Practical	Digital Systems & Architecture – Practical	1	3
USCS102	Core Subject	Introduction to Programming with Python	2	3
USCSP102	Core Subject Practical	Introduction to Programming with Python – Practical	1	3
USCS103	Core Subject	LINUX Operating System	2	3
USCSP103	Core Subject Practical	LINUX Operating System – Practical	1	3
USCS104	Core Subject	Open Source Technologies	2	3
USCSP104	Core Subject Practical	Open Source Technologies – Practical	1	3
USCS105	Core Subject	Discrete Mathematics	2	3
USCSP105	Core Subject Practical	Discrete Mathematics – Practical	1	3
USCS106	Core Subject	Descriptive Statistics	2	3
USCSP106	Core Subject Practical	Descriptive Statistics – Practical	1	3
USCS107	Ability Enhancement Course	Soft Skills	2	3

F.Y.B.Sc. Computer Science Syllabus

Choice Based Credit System (CBCS)

with effect from

Academic year 2021-2022

Semester – II				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USCS201	Core Subject	Design & Analysis of Algorithms	2	3
USCSP201	Core Subject Practical	Design & Analysis of Algorithms – Practical	1	3
USCS202	Core Subject	Advanced Python Programming	2	3
USCSP202	Core Subject Practical	Advanced Python Programming – Practical	1	3
USCS203	Core Subject	Introduction to OOPs using C++	2	3
USCSP203	Core Subject Practical	Introduction to OOPs using C++ – Practical	1	3
USCS204	Core Subject	Database Systems	2	3
USCSP204	Core Subject Practical	Database Systems – Practical	1	3
USCS205	Core Subject	Calculus	2	3
USCSP205	Core Subject Practical	Calculus – Practical	1	3
USCS206	Core Subject	Statistical Methods	2	3
USCSP206	Core Subject Practical	Statistical Methods – Practical	1	3
USCS207	Ability Enhancement Course	E-Commerce & Digital Marketing	2	3

Semester I

Course Code	Course Title	Credits	Lectures /Week
USCS101	**Digital Systems & Architecture**	**2**	**3**

About the Course:
This course introduces the principles of computer organization and the basic architecture concepts.The course emphasizes performance and cost analysis, instruction set design, pipelining, memory technology, memory hierarchy, virtual memory management, and I/O systems.

Course Objectives:

- To have an understanding of Digital systems and operation of a digital computer.
- To learn different architectures & organizations of memory systems, processor organization and control unit.
- To understand the working principles of multiprocessor and parallel organization"s as advanced computer architectures

Learning Outcomes:
After successful completion of this course, students would be able to

- To learn about how computer systems work and underlying principles
- To understand the basics of digital electronics needed for computers
- To understand the basics of instruction set architecture for reduced and complex instruction sets
- To understand the basics of processor structure and operation
- To understand how data is transferred between the processor and I/O devices

Unit	Topics	No of Lectures
I	**Fundamentals of Digital Logic:** Boolean algebra, Logic Gates, Simplification of Logic Circuits: Algebraic Simplification, Karnaugh Maps. Combinational Circuits: Adders, Mux, De-Mux, Sequential Circuits: Flip-Flops (SR, JK & D), Counters: synchronous and asynchronous Counter **Computer System:** Comparison of Computer Organization & Architecture, Computer Components and Functions, Interconnection Structures. Bus Interconnections, Input / Output: I/O Module, Programmed I/O, Interrupt Driven I/O, Direct Memory Access	**15**
II	**Memory System Organization:** Classification and design parameters, Memory Hierarchy, Internal Memory: RAM, SRAM and DRAM, Interleaved and Associative Memory. Cache Memory: Design Principles, Memory mappings, Replacement Algorithms, Cache performance, Cache Coherence. Virtual Memory, External Memory: Magnetic Discs, Optical Memory, Flash Memories, RAID Levels **Processor Organization:** Instruction Formats, Instruction Sets, Addressing Modes, Addressing Modes Examples with Assembly Language [8085/8086 CPU], Processor Organization, Structure and Function. Register	**15**

	Organization, Basic Microprocessor operations: Data Transfer (Register / Memory) Operations, Arithmetic & Logical Operations, Instruction Cycle, Instruction Pipelining. Introduction to RISC and CISC Architecture, Instruction Level Parallelism and Superscalar Processors: Design Issues	
III	**Control Unit:** Micro-Operations, Functional Requirements, Processor Control, Hardwired Implementation, Micro-programmed Control**.** **Fundamentals of Advanced Computer Architecture:** Parallel Architecture: Classification of Parallel Systems, Flynn‟s Taxonomy, Array Processors, Clusters, and NUMA Computers. Multiprocessor Systems: Structure & Interconnection Networks, Multi-Core Computers: Introduction, Organization and Performance.	**15**

Textbooks:

1. M. Mano, Computer System Architecture 3rd edition, Pearson
2. Carl Hamacher et al., Computer Organization and Embedded Systems, 6 ed., McGraw-Hill 2012
3. R P Jain, Modern Digital Electronics, Tata McGraw Hill Education Pvt. Ltd. , 4th Edition, 2010

Additional References:

1. William Stallings (2010), Computer Organization and Architecture- designing for performance,8th edition, Prentice Hall, New Jersy.
2. Anrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, PearsonEducation Inc,
3. John P. Hayes (1998), Computer Architecture and Organization, 3rd edition, Tata McGrawHill

Course Code	**Course Title**	**Credits**	**Lectures /Week**
USCSP101	**Digital Systems & Architecture – Practical**	**1**	**3**
1	Study and verify the truth table of various logic gates (NOT, AND, OR, NAND, NOR, EX-OR, and EX-NOR).		
2	Simplify given Boolean expression and realize it.		
3	Design and verify a half/full adder		
4	Design and verify half/full subtractor		
5	Design a 4 bit magnitude comparator using combinational circuits.		
6	Design and verify the operation of flip-flops using logic gates.		
7	Verify the operation of a counter.		
8	Verify the operation of a 4 bit shift register		
9	Design and implement expression using multiplexers / demultiplexers.		
10	Design and implement 3-bit binary ripple counter using JK flip flops.		
11	Simple microprocessor programs for data transfer operations		
12	Simple microprocessor programs for arithmetic & logical transfer operations		
Note	Practical 1 – 10 can be performed using any open source simulator (like Logisim) (Download it from https://sourceforge.net/projects/circuit/) Practical 11 – 12 can be performed on any simulation software like Jubin‟s 8085 simulator		

Course Code	Course Title	Credits	Lectures /Week
USCS102	**Introduction to Programming with Python**	**2**	**3**

About the Course:

This course is aims at introducing one of the fastest growing programming language of current time and enables learners to understand the fundamentals of programming with Python. Learners will be able to write programs to solve real-world problems, and produce quality code. It will help to develop strong skills of programming for implementing applications for emerging fields including data science and machine learning.

Course Objectives:

- To learn how to design and program Python applications.
- To explore the innards of Python Programming and understandcomponents of Python Program
- To define the structure and components of a Python program.
- To learn how to write loops and decision statements in Python
- To learn about inbuilt input/output operations and compound data types in Python

Learning Outcomes:

After successful completion of this course, students would be able to:

- Ability to store, manipulate and access data in Python
- Ability to implement basic Input / Output operations in Python
- Ability to define the structure and components of a Python program.
- Ability to learn how to write loops and decision statements in Python.
- Ability to learn how to write functions and pass arguments in Python.
- Ability to create and use Compound data types in Python

Unit	Topics	No of Lectures
I	**Overview of Python:** History & Versions, Features of Python, Execution of a Python Program, Flavours of Python, Innards of Python, Python Interpreter, Memory Management in Python, Garbage Collection in Python, Comparison of Python with C and Java, Installing Python, Writing and Executing First Python Program, Getting Help, IDLE **Data Types, Variables and Other Basic Elements:** Comments, Docstrings, Data types- Numeric Data type, Compound Data Type, Boolean Data type, Dictionary, Sets, Mapping, Basic Elements of Python, Variables **Input and Output Operations:** Input Function, Output Statements, The print() function, The print("string") function, The print(variables list) function, , The print(object) function, The print(formatted string) function, Command Line Arguments **Control Statements:** The if statement, The if … else Statement, The „if …	**15**

	elif … else" Statement, Loop Statement- while loop, for loop, Infinite loop, Nested loop, The else suite, break statement, continue statement, pass statement, assert statement, return statement	
II	**Operators:** Arithmetic operators, Assignment operators, Unary minus operator, Relational operators, Logical operators, Bitwise operators, Membership operators, Identity operators, Precedence of Operators, Associativity of Operators **Arrays:** Creating Arrays, Indexing and Slicing of Arrays, Basic Array Operations, Arrays Processing, Mathematical Operations on Array, Aliasing Arrays, Slicing and Indexing in NumPy Arrays, Basic slicing, Advanced Indexing, Dimensions of Arrays, Attributes of an Array, The ndim Attribute, The shape Attribute, The size Attribute, The itemsize Attribute **Functions:** Function definition and call, Returning Results, Returning Multiple Values from a Function, Built-in Functions, Difference between a Function and a Method, Pass Value by Object Reference, Parameters and Arguments, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Arbitrary Arguments, Recursive Functions, Anonymous or Lambda Functions, Using Lambda with the filter() Function, Using Lambda with the map() Function, Using Lambda with the reduce() Function **Modules**:Introduction to Modules in Python	**15**
III	**Strings:** Creating Strings, Functions of Strings, Working with Strings, Length of a String, Indexing and Slicing, Repeating and Concatenating Strings, Checking Membership, Comparing Strings, Removing Spaces, Finding Substrings, Counting Substrings, Immutability, Splitting and Joining Strings, Changing Case, Checking Starting and Ending of a String, Sorting Strings, Searching in the Strings, Testing Methods, Formatting Strings, Finding the Number of Characters and Words, Inserting Substrings into a String **List and Tuples:** Lists, List Functions and Methods, List Operations, List Slices, Nested Lists, Tuples, Functions in Tuple **Dictionaries:** Creating a Dictionary, Operators in Dictionary, Dictionary Methods, Using for Loop with Dictionaries, Operations on Dictionaries, Converting Lists into Dictionary, Converting Strings into Dictionary, Passing Dictionaries to Functions, Sorting the Elements of a Dictionary using Lambda, Ordered Dictionaries	**15**

Textbooks:

1. Practical Programming: An Introduction to Computer Science Using Python 3, Paul Gries , Jennifer Campbell, Jason Montojo, Pragmatic Bookshelf, 2nd Edition, 2014
2. Programming through Python, M. T Savaliya, R. K. Maurya& G M Magar, Sybgen Learning India, 2020

Additional References:

1. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018
2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017
3. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018
4. Python Programming: Using Problem Solving Approach, ReemaThareja, Oxford Univeristy Press, 2017
5. Let Us Python, Yashwant. B. Kanetkar, BPB Publication, 2019

Course Code	Course Title	Credits	Lectures /Week
USCSP102	**Introduction to Programming with Python – Practical**	**1**	**3**
1	Write a program to design and develop python program to implement various control statement using suitable examples		
2	Write program in Python to define and call functions for suitable problem.		
3	Write Python program to demonstrate different types of function arguments.		
4	Write a Python program to demonstrate the precedence and associativity of operators.		
5	Write suitable Python program to implement recursion for problems such as Fibonacci series, Factorial, Tower of Hanoi etc.		
6	Write Python program to implement and use lambda function in python		
7	Write a python program to create and manipulate arrays in Python. Also demonstrate use of slicing and indexing for accessing elements from the array.		
8	Write a program to implement list in Python for suitable problem. Demonstrate various operations on it.		
9	Write a program to implement tuple in Python for suitable problem. Demonstrate various operations on it.		
10	Write a program to implement dictionary in Python for suitable problem. Demonstrate various operations on it.		

Course Code	Course Title	Credits	Lectures /Week
USCS103	**LINUX Operating System**	**2**	**3**

About the Course:

This syllabus will help to train students in fundamental skills and build-up sustainable interest in Linux Operating System. It will improve necessary knowledge base to understand Linux Operating System and its practical implementation, it will also help to develop Linux based solutions for real life problems.

Course Objectives:

- To learn basic concepts of Linux in terms of operating system
- To learn use of various shell commands with regular expressions
- To set Linux Environment variables and learn setting file permissions to maintain Linux security implementation
- To learn various editors available in Linux OS
- To learn shell scripting.
- To learn installation of compilers and programming using C and Python languages on Linux platform

Learning Outcomes:

After successful completion of this course, students would be able to

- Work with Linux file system structure, Linux Environment
- Handle shell commands for scripting, with features of regular expressions, redirections
- Implement file security permissions
- Work with vi, sed and awk editors for shell scripting using various control structures
- Install softwares like compilers and develop programs in C and Python programming languages on Linux Platform

Unit	Topics	No of Lectures
I	**Linux operating system and Basics :** History, GNU Info and Utilities, Various Linux Distributions, The Unix/Linux architecture, Features of Unix/Linux, Starting the shell, Shell prompt, Command structure, File Systems and Directory Structure, man pages, more documentation pages **Basic Bash shell commands:** General purpose utility Commands, basic commands, Various file types, attributes and File handling Commands, Handling Ordinary Files. More file attributes **Advanced Bash shell commands:** Simple Filters, Filters using regular expressions. **The Linux environment variable:** Setting, Locating and removing environment variables like PATH etc, Default shell environment variables, Using command aliases.	**15**

II	**Understanding Linux file permission:** Linux security, Using Linux groups, Decoding file permissions, Changing security setting, Sharing files. **Linux Security:** Understanding Linux Security, uses of root, sudo command, working with passwords, Understanding ssh. **Networking:** TCP/IP Basics, TCP/IP Model, Resolving IP addresses, Applications, ping, telnet, ftp, DNS **Working withEditors:** awk, sed and Introduction to vi	**15**
III	**Basic script building:** Using multiple commands, Creating script files, Displaying messages, Using variables, Redirecting Input and Output, Pipes performing math, Exiting the script. **Using structured commands:** Working with if-then, if-then-else and nested if statements, test command, Compound condition testing, while command, until command, case command. **Script and Process control :** Handling signals, Running scripts in background mode, Running scripts without a console, Job control, Job scheduling commands: ps, nice, renice, at, batch, cron table, Running the script at boot	**15**

Textbooks:

1. "Linux Command line and Shell Scripting Bible", Richard Blum, Wiley India.
2. "Unix: Concepts and Applications", Sumitabha Das, 4th Edition, McGraw Hill.
3. "Official Ubuntu Book", Matthew Helmke& Elizabeth K. Joseph with Jose Antonio Rey and Philips Ballew, 8th Ed.

Additional References:

1. "Linux Administration: A Beginner's Guide", Fifth Edition, Wale Soyinka, Tata McGraw-Hill, 2008.
2. "Linux: Complete Reference", Richard Petersen, 6th Edition, Tata McGraw-Hill
3. "Beginning Linux Programming", Neil Mathew, 4th Edition, Wiley Publishing, 2008.

Course Code	Course Title	Credits	Lectures /Week
USCSP103	**LINUX Operating System – Practical**	**1**	**3**
1	**Installation of Ubuntu Linux operating system.** a) Booting and Installing from (USB/DVD) b) Using Ubuntu Software center / Using Synaptic c) Explore useful software packages.		
2	**Becoming an Ubuntu power user** a) Administering system and User setting b) Learning Unity keyboard c) Using the Terminal d) Working with windows programs		

3	**File System Commands:** touch, help, man, more, less, pwd, cd, mkdir, rmdir, ls, find, ls, etc **File handling Commands:** cat, cp, rm, mv, more, file, wc, od, cmp, diff, comm, chmod, chown, chgrp, gzip and gunzip, zip and unzip, tar, ln, umask,, chmod, chgrp, chown, etc
4	**General purpose utility Commands:**cal, date, echo, man, printf, passwd, script, who, uname, tty, stty, etc **Simple Filters and I/O redirection:** head, tail, cut paste, sort, grep family, tee, uniq, tr, etc. **Networking Commands:** who, whoami, ping, telnet, ftp, ssh, etc
5	**Editors:** vi, sed, awk
6	**Working and Managing with processes-** sh, ps, kill, nice, at and batch etc.
7	**Shell scripting I:** Defining variables, reading user input, exit and exit status commands, , expr, test, [], if conditional, logical operators
8	**Shell scripting II:** Conditions (for loop, until loop and while loop) arithmetic operations, examples
9	**Shell scripting III:** Redirecting Input / Output in scripts, creating your own Redirection
10	Installation of C/C++/Java/Python Compiler and creating an environment for app development. Basic programming using C and Python Languages.

Course Code	Course Title	Credits	Lectures /Week
USCS104	**Open Source Technologies**	**2**	**3**

About the Course:

Open Source Software is becoming an important resource for development, especially in developing countries. A working understanding of the economic and technical background of the Free / Open Source Software movement (FOSS) is essential for its effective use. The course takes students through the history and current status of the FOSS world, and starts them exploring it, by connecting their personal experiences with corresponding FOSS projects. Students will experience finding and using Open Source Software projects.

Course Objectives:

- Understand the difference between open-source software and commercial software.
- Understand the policies, licensing procedures and ethics of FOSS.
- Understand open-source philosophy, methodology and ecosystem.
- Awareness with Open-Source Technologies.

Learning Outcomes:

- Differentiate between Open Source and Proprietary software and Licensing.
- Recognize the applications, benefits and features of Open-Source Technologies
- Gain knowledge to start, manage open-source projects.

Unit	Topics	No of Lectures
I	**Introduction to Open-Source:** Open Source, Need and Principles of OSS, Open-Source Standards, Requirements for Software, OSS success, Free Software, Examples, Licensing, Free Vs. Proprietary Software, Free Software Vs. Open-Source Software, Public Domain. History of free software, Proprietary Vs Open-Source Licensing Model, use of Open-Source Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project. **Open-Source Principles and Methodology:** Open-Source History, Open-Source Initiatives, Open Standards Principles, Methodologies, Philosophy, Software freedom, Open-Source Software Development, Licenses, Copyright vs. Copy left, Patents, Zero marginal cost, Income-generation Opportunities, Internationalization. **Licensing:** What Is A License, How to create your own Licenses, Important FOSS Licenses (Apache, BSD, PL, LGPL), copyrights and copy lefts, Patent.	**15**
II	**Open-Source projects:** Starting and maintaining own Open-Source Project, Open-Source Hardware, Open-Source Design, Open-source Teaching, Open-source media. **Collaboration:** Community and Communication, Contributing to Open-Source Projects Introduction to GitHub, interacting with the community on GitHub, Communication and etiquette, testing open-source code, reporting	**15**

	issues, contributing code. Introduction to Wikipedia, contributing to Wikipedia or contributing to any prominent open-source project of student's choice. **Open-Source Ethics and Social Impact:** Open source vs. closed source, Open-source Government, Ethics of Open-source, Social and Financial impacts of open-source technology, Shared software, Shared source, Open Source as a Business Strategy	
III	**Understanding Open-Source Ecosystem**: Open-Source Operating Systems: GNU/Linux, Android, Free BSD, Open Solaris. Open-Source Hardware, Virtualization Technologies, Containerization Technologies: Docker, Development tools, IDEs, Debuggers, Programming languages, LAMP, Open-Source Database technologies **Case Studies:** Example Projects: Apache Web server, BSD, GNU/Linux, Android, Mozilla (Firefox), Wikipedia, Drupal, WordPress, Git, GCC, GDB, GitHub, Open Office, LibreOffice Study: Understanding the developmental models, licensing, mode of funding, commercial/non-commercial use.	**15**

Textbooks:

1. "Open-Source Technology", Kailash Vadera&Bhavyesh Gandhi, University Science Press, Laxmi Publications, 2009
2. "Open-Source Technology and Policy", Fadi P. Deek and James A. M. McHugh, Cambridge University Press, 2008.

Additional References:

1. "Perspectives on Free and Open-Source Software", Clay Shirky and Michael Cusumano, MIT press.
2. "Understanding Open Source and Free Software Licensing", Andrew M. St. Laurent, O"Reilly Media.
3. "Open Source for the Enterprise", Dan Woods, GautamGuliani, O"Reilly Media
4. Linux kernel Home: http://kernel.org4
5. Open-Source Initiative: https://opensource.org/5
6. The Linux Foundation: http://www.linuxfoundation.org/
7. The Linux Documentation Project: http://www.tldp.org/2
8. Docker Project Home: http://www.docker.com3.
9. Linux Documentation Project: http://www.tldp.org/6
10. Wikipedia: https://en.wikipedia.org/7.https://en.wikipedia.org/wiki/Wikipedia:Contributing_to_Wikipedia8
11. GitHub: https://help.github.com/9.
12. The Linux Foundation: http://www.linuxfoundation.org/

Course Code	Course Title	Credits	Lectures /Week
USCSP104	**Open Source Technologies– Practical**	**1**	**3**
1	**Open Source Operating Systems** • Learn the following open source operating system of your choice: Linux, Android, FreeBSD, Open Solaris etc. • Learn the installation. • Identify the unique features of these OS.		
2	Hands on with **LibreOffice** • Learn it from practical view-point • Give a brief presentation about it to the class		
3	Hands on with **GIMP** Photo Editing Tool • Learn it from practical view-point • Give a brief presentation about it to the class		
4	Hands on with **Shotcut** Video Editing Tool • Learn it from practical view-point • Give a brief presentation about it to the class		
5	Hands on with **Blender** Graphics and Animation Tool • Learn it from practical view-point • Give a brief presentation about it to the class		
6	Hands on with **Apache** Web Server • Learn it from practical view-point • Give a brief presentation about it to the class		
7	Hands on with **WordPress** CMS • Learn it from practical view-point • Give a brief presentation about it to the class		
8	Contributing to **Wikipedia**: • Introduction to wikipedia: operating model, license, how to contribute? • Create your user account on wikipedia • c. Identify any topic of your choice and contribute the missing information		
9	**Github** • Create and publish your own open source project: Write any simple program using your choice of programming language. • Create a repository on github and save versions of your project. You"ll learn about the staging area, committing your code, branching, and merging, • Using GitHub to Collaborate: Get practice using GitHub or other remote repositories to share your changes with others and collaborate on multi-developer projects. You'll learn how to make and review a pull request on GitHub. • d. Contribute to a Live Project: Students will publish a repository containing their reflections from the course and submit a pull request.		

10	**Virtualization:** Open Source virtualization technologies: • Install and configure the following: VirtualBox, Zen, KVM • Create and use virtual machines
11	**Containerization:** • Install and configure the following containerization technologies: docker, rocket, LXD • Create and use containers using it

Course Code	Course Title	Credits	Lectures /Week
USCS105	**Discrete Mathematics**	**2**	**3**

About the Course:
Discrete Mathematics provides an essential foundation for virtually every area of Computer Science. The problem-solving techniques honed in Discrete Mathematics are necessary for writing complicated software. Discrete mathematics also builds the gateway to advanced courses in Mathematical Sciences, Data Science, Machine Learning, Software Engineering, etc.

Course Objectives:

- The purpose of the course is to familiarize the prospective learners with mathematical structures that are fundamentally discrete.
- This course will enhance prospective learners to reason and ability to articulate mathematical problems.
- This course will introduce functions, forming and solving recurrence relations and different counting principles. These concepts will be useful to study or describe objects or problems in computer algorithms and programming languages and these concepts can be used effectively in other courses.

Learning Outcomes:
After successful completion of this course, learners would be able to:

- Define mathematical structures (relations, functions, graphs) and use them to model real life situations.
- Understand, construct and solve simple mathematical problems.
- Solve puzzles based on counting principles.
- Provide basic knowledge about models of automata theory and the corresponding formal languages.
- Develop an attitude to solve problems based on graphs and trees, which are widely used in software.

Unit	Topics	No of Lectures
I	**Functions:** Definition of function; Domain, co-domain, range of a function; Examples of standard functions such as identity and constant functions, absolute value function, logarithmic and exponential functions, flooring and ceiling functions; Injective, surjective and bijective functions; Composite and inverse functions. **Relations:** Definition and examples of relation; Properties of relations, Representation of relations using diagraphs and matrices; Equivalence relation; Partial Order relation, Hasse Diagrams, maximal, minimal, greatest, least element, Lattices.	**15**

	Recurrence Relations: Definition and Formulation of recurrence relations; Solution of a recurrence relation; Solving recurrence relations- Back tracking method, Linear homogeneous recurrence relations with constant coefficients; Homogeneous solution of linear homogeneous recurrence relation with constant coefficients; Particular solution of non-linear homogeneous recurrence relation with constant coefficients; General solution of non-linear homogeneous recurrence relation with constant coefficients; Applications- Formulate and solve recurrence relation for Fibonacci numbers, Tower of Hanoi, Intersection of lines in a plane, Sorting Algorithms.	
II	**Counting Principles:** Basic Counting Principles (Sum and Product Rule); Pigeonhole Principle (without proof) - Simple examples; Inclusion Exclusion Principle (Sieve formula) (without proof); Counting using Tree diagrams. **Permutations and Combinations:** Permutation without and with repetition; Combination without and with repetition; Binomial numbers and identities: Pascal Identity, Vandermonde‟s Identity, Pascal triangle, Binomial theorem (without proof) and applications; Multionomial numbers, Multinomial theorem (without proof) and applications. **Languages, Grammars and Machines:** Languages and Grammars – Introduction, Phase structure grammar, Types of grammar, derivation trees; Finite-State Machines with Output; Finite-State Machines with No Output; Regular Expression and Regular Language.	**15**
III	**Graphs:** Graphs and Graph Models; Graph terminologies and Special types of graphs; Definition and elementary results; Representing graphs, Linked representation of a graph; Graph Isomorphism; Connectivity in graphs – path, trail, walk; Euler and Hamilton paths; Planar graphs, Graph coloring and chromatic number. **Trees:** Definition, Tree terminologies and elementary results; Linked representation of binary trees; Ordered rooted tree, Binary trees, Complete and extended binary trees, Expression trees, Binary Search tree, Algorithms for searching and inserting in binary search trees, Algorithms for deleting in a binary search tree; Traversing binary trees	**15**

Textbooks:

1. Discrete Mathematics and Its Applications, Seventh Edition by Kenneth H. Rosen, McGraw Hill Education (India) Private Limited. (2011)
2. Discrete Mathematics: SemyourLipschutz, Marc Lipson, Schaum‟s out lines, McGraw- Hill Inc.

3rd Edition
3. Data Structures Seymour Lipschutz, Schaum's out lines, McGraw- Hill Inc. 2017
4. Norman L. Biggs, Discrete Mathematics, Revised Edition, Clarendon Press, Oxford 1989.

Additional References:

1. Elements of Discrete Mathematics: C.L. Liu, Tata McGraw- Hill Edition.
2. Concrete Mathematics (Foundation for Computer Science): Graham, Knuth, Patashnik Second Edition, Pearson Education.
3. Discrete Mathematics: SemyourLipschutz, Marc Lipson, Schaum's out lines, McGraw- Hill Inc.
4. Foundations in Discrete Mathematics: K.D. Joshi, New Age Publication, New Delhi.

Course Code	Course Title	Credits	Lectures /Week
USCSP105	**Discrete Mathematics – Practical**	**1**	**3**
1	**Functions –** a. Identify if the given mapping is a function b. Finding domain and range of a given function c. Check if the given function is injective/surjective/bijective d. Find the inverse of a given function e. Operations on functions f. Graphs of functions using any online tool		
2	**Relations –** a. Representation of relations b. Determine if the given relation satisfies equivalence relation/partial order relation c. Draw Hasse diagrams d. Find maximal, minimal, greatest, least element in a poset e. Determine if a given poset is a lattice		
3	**Recurrence Relation –** a. Solve recurrence relation using backtracking method b. Solve linear homogeneous recurrence relations with constant coefficients c. Find homogeneous, particular, general solution of a recurrence relation d. Formulate and solving recurrence relation		
4	**Counting Principles –** a. Sum and product rule b. Pigeonhole Principle c. Inclusion Exclusion Principle d. Counting using Tree diagrams		
5	**Permutations and Combinations –** a. Permutations b. Permutations with repetitions c. Combinations d. Combinations with repetitions e. Binomial numbers and Identities		

	f. Applications on Binomial theorem g. Applications on Multinomial theorem
6	**Languages and Grammars –** a. Find the language generated by given grammar b. Check if a given string belongs or not to a given language/grammar c. Operations on languages d. Identify the type of grammar
7	**Finite State Machines –** a. Check if a given string is accepted or rejected by FSM without output b. Find the output for a FSM with output c. Describe a machine (diagram/table)
8	**Regular Expression and Regular Language –** a. Describe the regular expressions represented by given language b. Describe the language represented by given regular expression
9	**Graphs –** a. Types of graph b. Properties of graph c. Representation of graph d. Graph Isomorphism e. Connectivity in graphs – path, trail, walk f. Euler and Hamilton graphs g. Planar graphs h. Graph coloring and chromatic number
10	**Trees –** a. Tree terminologies b. Types of tree c. Properties of tree d. Representation of tree e. Expression tree f. Binary Search tree g. Tree traversal

Course Code	Course Title	Credits	Lectures /Week
USCS106	**Descriptive Statistics**	**2**	**3**

About the Course:

This course is designed to provide learners with an understanding of the data and to develop an understanding of the quantitative techniques from Statistics. It also provides the knowledge of different statistical tools used for primary statistical analysis of data.

Course Objectives:

1. To develop the learners ability to deal with different types of data.
2. To enable the use of different measures of central tendency and dispersion wherever relevant.
3. To make learner aware about the techniques to check the Skewness and Kurtosis of data.
4. To make learner enable to find the correlation between different variables and further apply the regression analysis to find the exact relation between them.
5. To develop ability to analyze statistical data through R software.

Learning Outcomes:

After successful completion of this course, learners would be able to

1. Organize, manage and present data.
2. Analyze Statistical data using measures of central tendency and dispersion.
3. Analyze Statistical data using basics techniques of R.
4. Study the relationship between variables using techniques of correlation and regression.

Unit	Topics	No of Lectures
I	**Data Types and Data Presentation: Data types:** Attribute, Variable, Discrete and Continuous variable, Univariate and Bivariate distribution. Types of Characteristics, Different types of scales: nominal, ordinal, interval and ratio. **Data presentation:** Frequency distribution, Histogram, Ogive curves. **Introduction to R:** Data input, Arithmetic Operators, Vector Operations, Matrix Operations, Data Frames, Built-in Functions. Frequency Distribution, Grouped Frequency Distribution, Diagrams and Graphs, Summary statistics for raw data and grouped frequency distribution. **Measures of Central tendency:** Concept of average/central tendency, characteristics of good measure of central tendency. Arithmetic Mean (A.M.), Median, Mode - Definition, examples for ungrouped and grouped data, effect of shift of origin and change of scale, merits and demerits. Combined arithmetic mean. Partition Values: Quartiles, Deciles and Percentiles - examples for ungrouped and grouped data	**15**

II	**Measures dispersion:** Concept of dispersion, Absolute and Relative measure of dispersion, characteristics of good measure of dispersion. Range, Semi-interquartile range, Quartile deviation, Standard deviation - Definition, examples for ungrouped and grouped data, effect of shift of origin and change of scale, merits and demerits. Combined standard deviation, Variance. Coefficient of range, Coefficient of quartile deviation and Coefficient of variation (C.V.) **Moments:** Concept of Moments, Raw moments, Central moments, Relation between raw and central moments. **Measures of Skewness and Kurtosis:** Concept of Skewness and Kurtosis, measures based on moments, quartiles.	**15**
III	**Correlation:** Concept of correlation, Types and interpretation, Measure of Correlation: Scatter diagram and interpretation; Karl Pearson‟s coefficient of correlation (r): Definition, examples for ungrouped and grouped data, effect of shift of origin and change of scale, properties; Spearman‟s rank correlation coefficient: Definition, examples of with and without repetition. Concept of Multiple correlation. **Regression:** Concept of dependent (response) and independent (predictor) variables, concept of regression, Types and prediction, difference between correlation and regression, Relation between correlation and regression. Linear Regression - Definition, examples using least square method and regression coefficient, coefficient of determination, properties. Concept of Multiple regression and Logistic regression.	**15**

Textbooks:

1. Goon, A. M., Gupta, M. K. and Dasgupta, B. (1983). Fundamentals of Statistics, Vol. 1, Sixth Revised Edition, The World Press Pvt. Ltd., Calcutta.
2. Gupta, S.C. and Kapoor, V.K. (1987): Fundamentals of Mathematical Statistics, S. Chand and Sons, New Delhi

Additional References:

1. Sarma, K. V. S. (2001). Statistics Made it Simple: Do it yourself on PC. Prentce Hall of India, NewDelhi.
2. Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, NewDelhi.
3. Purohit, S. G., Gore S. D., Deshmukh S. R. (2008). Statistics Using R, Narosa Publishing House, NewDelhi.
4. Schaum‟s Outline Of Theory And Problems Of Beginning Statistics, Larry J. Stephens, Schaum‟s Outline Series Mcgraw-Hill

Course Code	Course Title	Credits	Lectures /Week
USCSP106	**Descriptive Statistics – Practical**	**1**	**3**
Problem solving and implementation using R programming			
1	**Basics of R-** a. Data input, Arithmetic Operators b. Vector Operations, Matrix Operations c. Data Frames, Built-in Functions d. Frequency Distribution, Grouped Frequency Distribution e. Diagrams and Graphs		
2	**Frequency distribution and data presentation-** a. Frequency Distribution (Univariate data/ Bivariate data) b. Diagrams c. Graphs		
3	**Measures of Central Tendency-** a. Arithmetic Mean b. Median c. Mode d. Partition Values		
4	**Measures dispersion-** a. Range and Coefficient of range b. Quartile deviation and Coefficient of quartile deviation c. Standard deviation, Variance and Coefficient of variation (C.V.)		
5	**Moments-** a. Raw moments b. Central moments		
6	**Measures of Skewness -** a. Karl Pearson‟s measure of Skewness b. Bowley‟s measure of Skewness c. Moment coefficient of Skewness		
7	**Measures of Kurtosis-** a. Moment coefficient of Kurtosis (Absolute measure) b. Moment coefficient of Kurtosis (Relative measure)		
8	**Correlation-** a. Karl Pearson‟s correlation coefficient b. Spearman‟s Rank correlation		
9	**Regression-** a. Method of least squares b. Using regression coefficients c. Properties of regression lines & regression coefficients		
10	**Summary Statistics using R-** a. Summary statistics for raw data b. Summary statistics for grouped frequency distribution c. Simple Correlation & Regression using R		

Course Code	Course Title	Credits	Lectures /Week
USCS107	**Soft Skills**	**2**	**3**

About the Course:
To help learners develop their soft skills and develop their personality along with technical skills. Focus on various communication enhancement along with academic and professional ethics.

Course Objectives:

- Understand the significance and essence of a wide range of soft skills.
- Learn how to apply soft skills in a wide range of routine social and professional settings
- Learn how to employ soft skills to improve interpersonal relationships
- Learn how to employ soft skills to enhance employability and ensure workplace and career success

Learning Outcomes:

- Learners will be able to understand the importance and types soft skills
- Learners will develop skills for Academic and Professional Presentations.
- Learners will able to understand Leadership Qualities and Ethics.
- Ability to understand the importance of stress management in their academic & professional life.

Unit	Topics	No of Lectures
I	**Introduction to Soft Skills** **Soft Skills: An Introduction –** Definition and Significance of Soft Skills; Process, Importance and Measurement of Soft Skill Development. **Personality Development:** Knowing Yourself, Positive Thinking, Johari's Window, Physical Fitness **Emotional Intelligence:** Meaning and Definition, Need for Emotional Intelligence, Intelligence Quotient versus Emotional Intelligence Quotient, Components of Emotional Intelligence, Competencies of Emotional Intelligence, Skills to Develop Emotional Intelligence **Positivity and Motivation:** Developing Positive Thinking and Attitude; Driving out Negativity; Meaning and Theories of Motivation; Enhancing Motivation Levels **Etiquette and Mannerism:** Introduction, Professional Etiquette, Technology Etiquette **Ethical Values:** Ethics and Society, Theories of Ethics, Correlation between Values and Behavior, Nurturing Ethics, Importance of Work Ethics, Problems in the Absence of Work Ethics	**15**

II	**Basic Skills in Communication:** **Components of effective communication:** Communication process and handling them, Composing effective messages, Non – Verbal Communication: its importance and nuances: Facial Expression, Posture, Gesture, Eye contact, appearance (dress code). **Communication Skills:** Spoken English, Phonetics, Accent, Intonation **Employment Communication:** Introduction, Resume, Curriculum Vitae, Scannable Resume, Developing an Impressive Resume, Formats of Resume, Job Application or Cover Letter **Job Interviews:** Introduction, Importance of Resume, Definition of Interview, Background Information, Types of Interviews, Preparatory Steps for Job Interviews, Interview Skill Tips, Changes in the Interview Process, FAQ During Interviews **Group Discussion:** Introduction, Ambience/Seating Arrangement for Group Discussion, Importance of Group Discussions, Difference between Group Discussion, Panel Discussion and Debate, Traits, Types of Group Discussions, topic based and Case based Group Discussion, Individual Traits	**15**
III	**Academic and Professional Skills:** **Professional Presentation:** Nature of Oral Presentation, planning a Presentation, Preparing the Presentation, Delivering the Presentation **Creativity at Workplace:** Introduction, Current Workplaces, Creativity, Motivation, Nurturing Hobbies at Work, The Six Thinking Hat Method. **Capacity Building: Learn, Unlearn and Relearn**: Capacity Building, Elements of Capacity Building, Zones of Learning, Ideas for Learning, Strategies for Capacity Building **Leadership and Team Building:** Leader and Leadership, Leadership Traits, Culture and Leadership, Leadership Styles and Trends, Team Building, Types of Teams. **Decision Making and Negotiation:** Introduction to Decision Making, Steps for Decision Making, Decision Making Techniques, Negotiation Fundamentals, Negotiation Styles, Major Negotiation Concepts **Stress and Time Management:** Stress, Sources of Stress, Ways to Cope with Stress	**15**

Textbooks:

1. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2017.
2. Soft Skills: An Integrated Approach to Maximize Personality, Gajendra S. Chauhan, Sangeeta Sharma, Wiley India

Additional References:

1. Personality Development and Soft Skills, Barun K. Mitra, Oxford Press
2. Business Communication, ShaliniKalia, Shailja Agrawal, Wiley India
3. Cornerstone: Developing Soft Skills, Sherfield, Pearson India

Semester II

Course Code	Course Title	Credits	Lectures /Week
USCS201	**Design & Analysis of Algorithms**	**2**	**3**

About the Course:
The course covers the concepts of - (i) calculating complexity of algorithms, (ii) the essential operations like searching, sorting, selection, pattern matching & recursion, and (iii) various algorithmic strategies like greedy, divide-n-conquer, dynamic programming, backtracking and implementations of all these on basic data structures like array, list and stack.

Course Objectives:
The objectives of this course are:

- To make students understand the basic principles of algorithm design
- To give idea to students about the theoretical background of the basic data structures
- To familiarize the students with fundamental problem-solving strategies like searching, sorting, selection, recursion and help them to evaluate efficiencies of various algorithms.
- To teach students the important algorithm design paradigms and how they can be used to solve various real world problems.

Learning Outcomes:
After successful completion of this course, students would be able to

- Students should be able to understand and evaluate efficiency of the programs that they write based on performance of the algorithms used.
- Students should be able to appreciate the use of various data structures as per need
- To select, decide and apply appropriate design principle by understanding the requirements of any real life problems

Unit	Topics	No of Lectures
I	**Introduction to algorithms** - What is algorithm, analysis of algorithm, Types of complexity, Running time analysis, How to Compare Algorithms, Rate of Growth, Types of Analysis, Asymptotic Notation, Big-O Notation, Omega-Ω Notation, Theta-Θ Notation, Asymptotic Analysis, Performance characteristics of algorithms, Estimating running time / number of steps of executions on paper, Idea of Computability **Introduction to Data Structures** - What is data structure, types, Introduction to Array(1-d & 2-d), Stack and List data structures, operations on these data structures, advantages disadvantages and applications of these data structures like solving linear equations, Polynomial Representation, Infix-to-Postfix conversion	**15**
II	**Recursion** - What is recursion, Recursion vs Iteration, recursion applications like Factorial of a number, Fibonacci series & their	**15**

	comparative analysis with respect to iterative version, Tower of hanoi problem **Basic Sorting Techniques -** Bubble, Selection and Insertion Sort & their comparative analysis **Searching Techniques -** Linear Search and its types, Binary Search and their comparative analysis **Selection Techniques** - Selection by Sorting, Partition-based Selection Algorithm, Finding the Kth Smallest Elements in Sorted Order & their comparative analysis **String Algorithms** - Pattern matching in strings, Brute Force Method & their comparative analysis	
III	**Algorithm Design Techniques -** Introduction to various types of classifications/design criteria and design techniques **Greedy Technique -** Concept, Advantages & Disadvantages, Applications, Implementation using problems like - file merging problem **Divide-n-Conquer -** Concept, Advantages & Disadvantages, Applications, Implementation using problems like - merge sort, Strassen's Matrix Multiplication **Dynamic Programming** - Concept, Advantages & Disadvantages, Applications, Implementation using problems like - Fibonacci series, Factorial of a number, Longest Common subsequence **Backtracking Programming -** Concept, Advantages & Disadvantages, Applications, Implementation using problems like N-Queen Problem	**15**

Textbooks:

1. "Data Structure and AlgorithmUsing Python", Rance D. Necaise, Wiley India Edition, 2016.
2. "Data Structures and Algorithms Made Easy", NarasimhaKarumanchi, CareerMonk Publications, 2016.
3. "Introduction to Algorithms", Thomas H. Cormen, 3rd Edition, PHI.

Additional References:

1. "Introduction to the Design and Analysis of Algorithms", Anany Levitin, Pearson, 3rd Edition, 2011.
2. "Design and Analysis of Algorithms", S. Sridhar, Oxford University Press, 2014.

Course Code	Course Title	Credits	Lectures /Week
USCSP201	**Design & Analysis of Algorithms – Practical**	**1**	**3**
1	Programs on 1-d arrays like - sum of elements of array, searching an element in array, finding minimum and maximum element in array, count the number of even and odd numbers in array. For all such programs, also find the time complexity, compare if there are multiple methods		
2	Programs on 2-d arrays like row-sum, column-sum, sum of diagonal elements, addition of two matrices , multiplication of two matrices. For all such programs, also find the time complexity, compare if there are multiple methods		
3	Program to create a list-based stack and perform various stack operations.		
4	Program to perform linear search and binary search on list of elements. Compare the algorithms by calculating time required in milliseconds using readymade libraries.		
5	Programs to sort elements of list by using various algorithms like bubble, selection sort, and insertion sort. Compare the efficiency of algorithms.		
6	Programs to select the N^{th} Max/Min element in a list by using various algorithms. Compare the efficiency of algorithms.		
7	Programs to find a pattern in a given string - general way and brute force technique. Compare the efficiency of algorithms.		
8	Programs on recursion like factorial, fibonacci, tower of hanoi. Compare algorithms to find factorial/fibonacci using iterative and recursive approaches.		
9	Program to implement file merging, coin change problems using Greedy Algorithm and to understand time complexity.		
10	Program to implement merge sort, Straseen‟s Matrix Multiplication using D-n-C Algorithm and to understand time complexity.		
11	Program to implement fibonacci series, Longest Common Subsequence using dynamic programming and to understand time complexity. Compare it with the general recursive algorithm.		
12	Program to implement N-Queen Problem, Binary String generation using Backtracking Strategy and to understand time complexity.		

Course Code	Course Title	Credits	Lectures /Week
USCS202	**Advanced Python Programming**	**2**	**3**

About the Course:

This course aims to explore and enable learners to master the skills of advanced topics in Python Programming. It helps learners develops advanced skills such as working with databases, matching patterns, implementing threads and exception handling and GUI in Python. It also highlights and why Python is a useful scripting language for all developers.

Course Objectives:

- To learn how to design object-oriented programs with Python classes.
- To learn about reading, writing and implementing other operation on files in Python.
- To implement threading concept and multithreading on Python
- To design GUI Programs and implement database interaction using Python.
- To know about use of regular expression and handling exceptions for writing robust python programs.

Learning Outcomes:

After successful completion of this course, students would be able to

- Ability to implement OOP concepts in Python including Inheritance and Polymorphism
- Ability to work with files and perform operations on it using Python.
- Ability to implement regular expression and concept of threads for developing efficient program
- Ability to implement exception handling in Python applications for error handling.
- Knowledge of working with databases, designing GUI in Python and implement networking in Python

Unit	Topics	No of Lectures
I	**Working with files:** Files, opening and closing a file, working with text files containing strings, knowing whether a file exists or not, working with binary files, the „with" statement, the seek() and tell() methods, random accessing of binary files, zipping and unzipping files, working with directories, running other programs from python program **Regular expressions:** What is a regular expression?, sequence characters in regular expressions, quantifiers in regular expressions, special characters in regular expressions, using regular expression on files, retrieving information from an html file, **Threads in python:** Difference between process and thread, types of threads, benefits of threads, creating threads, single tasking and multitasking, thread synchronization, deadlock in threads, daemon threads **Date and time in python:** Date and time now, combining date and time,	**15**

	formatting dates and times, finding durations using “time delta”, comparing two dates, sorting dates, stopping execution temporarily, knowing the time taken by a program, calendar module	
II	**Database in python:** Using SQL with python, retrieving rows from a table, inserting rows into a table, deleting rows from a table, updating rows in a table, creating database tables through python, Exception handling in databases. **Exceptions in python:** Errors in a python program, compile & run-time errors, logical error, exceptions-exception handling, types of exceptions, the except block, the assert statement, user-defined exceptions, logging the exceptions **Networking:** Protocols,server-client architecture, tcp/ip and udp communication **Graphical user interface:** Creating a GUI in python, Widget classes, Working with Fonts and Colours, working with Frames, Layout manager, Event handling	**15**
III	**OOPs in python:** Features of Object Oriented Programming system (oops)-classes and objects, encapsulation, abstraction, inheritance, polymorphism, constructors and destructors **Classes and objects:** Creating a class, the self-variable, types of variables, namespaces, types of methods, instance methods, class methods, static methods, passing members of one class to another class, inner classes **Inheritance and polymorphism:** Inheritance in python, types of inheritance- single inheritance, multilevel inheritance, hierarchical inheritance, multiple inheritance, constructors in inheritance, overriding super class constructors and methods, the super() method, method resolution order (mro), polymorphism, duck typing, operator overloading, method overloading, method overriding**,** **Abstract classes and interfaces:** Abstract class, abstract method,interfaces in python, abstract classes vs. Interfaces	**15**

Textbooks:

1. Paul Gries , Jennifer Campbell, Jason Montojo, Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 3rd Edition, 2018
2. Programming through Python, M. T Savaliya, R. K. Maurya, G M Magar, Revised Edition, Sybgen Learning India, 2020

Additional References:

1. Advanced Python Programming, Dr. Gabriele Lanaro, Quan Nguyen, SakisKasampalis, Packt Publishing, 2019
2. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018
3. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018
4. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017
5. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018

Course Code	Course Title	Credits	Lectures /Week
USCSP202	**Advanced Python Programming – Practical**	**1**	**3**
1	Write a program to Python program to implement various file operations.		
2	Write a program to Python program to demonstrate use of regular expression for suitable application.		
3	Write a Program to demonstrate concept of threading and multitasking in Python.		
4	Write a Python Program to work with databases in Python to perform operations such as a. Connecting to database b. Creating and dropping tables c. Inserting and updating into tables.		
5	Write a Python Program to demonstrate different types of exception handing.		
6	Write a GUI Program in Python to design application that demonstrates a. Different fonts and colors b. Different Layout Managers c. Event Handling		
7	Write Python Program to create application which uses date and time in Python.		
8	Write a Python program to create server-client and exchange basic information		
9	Write a program to Python program to implement concepts of OOP such as a. Types of Methods b. Inheritance c. Polymorphism		
10	Write a program to Python program to implement concepts of OOP such as a. Abstract methods and classes b. Interfaces		

Course Code	Course Title	Credits	Lectures /Week
USCS203	**Introduction to OOPs using C++**	**2**	**3**

About the Course:

The course aims to introduce a new programming paradigm called Object Oriented Programming. This will be covered using C++ programming language. C++ is a versatile programming language, which supports a variety of programming styles, including procedural, object-oriented, and functional programming. This makes C++ powerful as well as flexible. It can be used to develop software such as operating systems, databases, and compilers.

Course Objectives:

Learning Outcomes:

After successful completion of this course, students would be able to

- Work with numeric, character and textual data and arrays.
- Understand the importance of OOP approach over procedural language.
- Understand how to model classes and relationships using UML.
- Apply the concepts of OOPS like encapsulation, inheritance and polymorphism.
- Handle basic file operations.

Unit	Topics	No of Lectures
I	**Introduction to Programming Concepts:** Object oriented programming paradigm, basic concepts of object oriented programming, benefits of object oriented programming, object oriented languages, applications of object oriented programming. Tokens-keywords, identifiers, constants-integer, real, character and string constants, backslash constants, features of C++ and its basic structure, simple C++ program without class, compiling and running C++ program. **Data Types, Data Input Output and Operators:** Basic data types, variables, rules for naming variables, programming constants, the type cast operator, implicit and explicit type casting, cout and cin statements, operators, precedence of operators. **Decision Making, Loops, Arrays and Strings:** Conditional statements-if, if...else, switch loops- while, do...while, for, types of arrays and string and string manipulations **Unified Modeling Language (UML):** Introduction to UML & class diagrams. **Classes, Abstraction & Encapsulation:** Classes and objects, Dot Operator, data members, member functions, passing data to functions, scope and visibility of variables in function.	**15**

II	**Constructors and Destructors:** Default constructor, parameterized constructor, copy constructor, private constructor, destructors. **Working with objects:**Accessor - mutator methods, static data and static function, access specifiers, array of objects. **Polymorphism -** Binding-static binding & overloading, constructor overloading function overloading, operator overloading, overloading unary and binary operators. **Modelling Relationships in Class Diagrams:** Association, Aggregation-Composition and examples covering these principles	**15**
III	**Inheritance:** Defining base class and its derived class, access specifiers, types of inheritance-single, multiple, hierarchical, multilevel, hybrid inheritance, friend function and friend class, constructors in derived classes. **Modelling Relationships**: Generalization-Specialization and examples covering these principles **Run time Polymorphism -** Dynamic Binding, Function overriding, virtual function, pure virtual function, virtual base class, abstract class. **Pointers:** Introduction to pointers, * and & operators, assigning addresses to pointer variables, accessing values using pointers, pointers to objects & this pointer, pointers to derived classes **File Handling:** File Stream classes, opening and closing file-file opening modes, text file handling, binary file handling. **Applying OOP to solve real life applications:** To cover case studies like library management, order management etc. to design classes covering all relationships	**15**

Textbooks:

1. Object Oriented Programming with C++, Balagurusamy E., 8th Edition, McGraw Hill Education India.
2. UML & C++: A Practical Guide to Object Oriented Development, Lee/Tepfenhart, Pearson Education, 2nd Edition2015

Additional References:

1. Mastering C++ by Venugopal, Publisher: McGraw-Hill Education, 2017
2. Let Us C++ by KanetkarYashwant, Publisher: BPB Publications, 2020
3. Object Oriented Analysis and Design by Timothy Budd TMH, 2001

Course Code	Course Title	Credits	Lectures /Week
USCSP203	**Introduction to OOPs using C++ - Practical**	**1**	**3**
1	Program todemonstrate use of data members & member functions.		
2	Programs based on branching and looping statements using classes.		
3	Program to demonstrate one and two dimensional arrays using classes		
4	Program to use scope resolution operator. Display the various values of the same variables declared at different scope levels.		
5	Programs to demonstrate various types of constructors and destructors.		
6	Programs to demonstrate use of public, protected & private scope specifiers.		
7	Programs to demonstrate single and multilevel inheritance		
8	Programs to demonstrate multiple inheritance and hierarchical inheritance		
9	Programs to demonstrate inheritance and derived class constructors		
10	Programs to demonstrate friend function, inline function, this pointer		
11	Programs to demonstrate function overloading and overriding.		
12	Programs to demonstrate use of pointers		
13	Programs to demonstrate text and binary file handling		

Course Code	Course Title	Credits	Lectures /Week
USCS204	**Database Systems**	**2**	**3**

About the Course:

The course introduces the core principles and techniques required in the design and implementation of database systems. It includes ER Model, Normalization, Relational Model, and Relational Algebra. It also provides students with theoretical knowledge and practical skills of creating and manipulating data with an interactive query language (MySQL). It also provide student knowledge and importance of data protection.

Course Objectives:

- To make students aware fundamentals of database system.
- To give idea how ERD components helpful in database design and implementation.
- To experience the students working with database using MySQL.
- To familiarize the student with normalization, database protection and different DCL Statements.
- To make students aware about importance of protecting data from unauthorized users.
- To make students aware of granting and revoking rights of data manipulation.

Learning Outcomes:

After successful completion of this course, students would be able to

- To appreciate the importance of database design.
- Analyze database requirements and determine the entities involved in the system and their relationship to one another.
- Write simple queries to MySQL related to String, Maths and Date Functions.
- Create tables and insert/update/delete data, and query data in a relational DBMS using MySQL commands.
- Understand the normalization and its role in the database design process.
- Handle data permissions.
- Create indexes and understands the role of Indexes in optimization search.

Unit	Topics	No of Lectures
I	**Introduction to DBMS –** Database, DBMS – Definition, Overview of DBMS, Advantages of DBMS, Levels of abstraction, Data independence, DBMS Architecture **Data models** - Client/Server Architecture, Object Based Logical Model, Record Based Logical Model (relational, hierarchical, network) **Entity Relationship Model -** Entities, attributes, entity sets, relations, relationship sets, Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization, Conceptual Design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary, constraints beyond ER)	**15**

	ER to Table- Entity to Table, Relationship to tables with and without key constraints. **DDL Statements** - Creating Databases, Using Databases, datatypes, Creating Tables (with integrity constraints – primary key, default, check, not null), Altering Tables, Renaming Tables, Dropping Tables, Truncating Tables **DML Statements** – Viewing the structure of a table insert, update, delete, Select all columns, specific columns, unique records, conditional select, in clause, between clause, limit, aggregate functions (count, min, max, avg, sum), group by clause, having clause	
II	**Relational data model**– Domains, attributes, Tuples and Relations, Relational Model Notation, Characteristics of Relations, Relational Constraints - primary key, referential integrity, unique constraint, Null constraint, Check constraint **Relational Algebra** operations (selection, projection, set operations union, intersection, difference, cross product, Joins –conditional, equi join and natural joins, division) **Functions** – String Functions (concat, instr, left, right, mid, length, lcase/lower, ucase/upper, replace, strcmp, trim, ltrim, rtrim), Math Functions (abs, ceil, floor, mod, pow, sqrt, round, truncate) Date Functions (adddate, datediff, day, month, year, hour, min, sec, now, reverse) **Joining Tables** – inner join, outer join (left outer, right outer, full outer) **Subqueries** – subqueries with IN, EXISTS, subqueries restrictions, Nested subqueries, ANY/ALL clause, correlated subqueries	**15**
III	**Schema refinement and Normal forms:** Functional dependencies, first, second, third, and BCNF normal forms based on primary keys, lossless join decomposition. **Database Protection:** Security Issues, Threats to Databases, Security Mechanisms, Role of DBA, Discretionary Access Control, Backing Up and Restoring databases **Views** (creating, altering dropping, renaming and manipulating views) **DCL Statements** (creating/dropping users, privileges introduction, granting/revoking privileges, viewing privileges), Transaction control commands – Commit, Rollback **Index Structures of Files:** Introduction, Primary index, Clustering Index, Multilevel indexes	**15**

Textbooks:

1. "Fundamentals of Database System", ElmasriRamez, NavatheShamkant, Pearson Education, Seventh edition, 2017
2. "Database Management Systems", Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 2014
3. "Murach's MySQL", Joel Murach, 3rd Edition, 3rd Edition, 2019

Additional References:

1. "Database System Concepts", Abraham Silberschatz,HenryF.Korth,S.Sudarshan, McGraw Hill, 2017
2. "MySQL: The Complete Reference", VikramVaswani , McGraw Hill, 2017
3. "Learn SQL with MySQL: Retrieve and Manipulate Data Using SQL Commands with Ease", AshwinPajankar, BPB Publications, 2020

Course Code	Course Title	Credits	Lectures /Week
USCSP204	**Database Systems – Practical**	**1**	**3**
1.	Conceptual Designing using ER Diagrams (Identifying entities, attributes, keys and relationships between entities, cardinalities, generalization, specialization etc.)		
2.	Perform the following: ☐ Viewing all databases ☐ Creating a Database ☐ Viewing all Tables in a Database ☐ Creating Tables (With and Without Constraints) ☐ Inserting/Updating/Deleting Records in a Table		
3.	Perform the following: ☐ Altering a Table ☐ Dropping/Truncating/Renaming Tables ☐ Backing up / Restoring a Database		
4.	Perform the following: ☐ Simple Queries ☐ Simple Queries with Aggregate functions		
5.	Queries involving ☐ Date Functions ☐ String Functions ☐ Math Functions		
6.	Join Queries ☐ Inner Join ☐ Outer Join		

7.	Subqueries ☐ With IN clause ☐ With EXISTS clause
8.	Converting ER Model to Relational Model and apply Normalization on database. (Represent entities and relationships in Tabular form, Represent attributes as columns, identifying keys and normalization up to 3rd Normal Form).
9.	Views ☐ Creating Views (with and without check option) ☐ Dropping views ☐ Selecting from a view
10.	DCL statements ☐ Granting and revoking permissions ☐ Saving (Commit) and Undoing (rollback)
11.	Creating Indexes on data tables.

Course Code	Course Title	Credits	Lectures /Week
USCS205	**Calculus**	**2**	**3**

About the Course:
Calculus is a branch of mathematics that involves the study of rates of change. In Computer Science, Calculus is used in Machine Learning, Data Mining, Scientific Computing, Image Processing, and creating the graphics and physics engines for video games, including the 3D visuals for simulations.

Course Objectives:

- The primary objective of this course is to introduce the basic tools of Calculus which are helpful in understanding their applications to the real world problems.
- The course is designed to have a grasp of important concepts of Calculus in a scientific way.
- It covers topics from as basic as definition of functions to partial derivatives of functions in a gradual and logical way.
- The learner is expected to solve as many examples as possible to a get compete clarity and understanding of the topics covered.

Learning Outcomes:
After successful completion of this course, learners would be able to:

- Develop mathematical skills and enhance thinking power of learners.
- Understand mathematical concepts like limit, continuity, derivative, integration of functions, partial derivatives.
- Appreciate real world applications which use the learned concepts.
- Skill to formulate a problem through Mathematical modelling and simulation.

Unit	Topics	No of Lectures
I	**DERIVATIVES AND ITS APPLICATIONS:** **Review of Basic Concepts:** Functions, limit of a function, continuity of a function, derivative function. **Derivative In Graphing And Applications:** Increase, Decrease, Concavity, Relative Extreme; Graphing Polynomials, Rational Functions, Cusps and Vertical Tangents. Absolute Maxima and Minima, Applied Maximum and Minimum Problems, Newton‟s Method.	**15**
II	**INTEGRATION AND ITS APPLICATIONS:** **Integration:** An Overview of the Area Problem, Indefinite Integral, Definition of Area as a Limit; Sigma Notation, Definite Integral, Evaluating Definite Integrals by Substitution, Numerical Integration: Simpson‟s Rule. **Applications of Integration:** Area between two curves, Length of a plane curve. **Mathematical Modeling with Differential Equations**: Modeling with	**15**

	Differential Equations, Separation of Variables, Slope Fields, Euler‟s Method, First-Order Differential Equations and Applications.	
III	**PARTIAL DERIVATIVES AND ITS APPLICATIONS:** **Functions of Several Variables**: Functions of two or more variables, Limits and Continuity of functions of two or three variables. **Partial Derivatives:** Partial Derivatives, Differentiability, Differentials, and Local Linearity, Chain Rule, Implicit Differentiation, Directional Derivatives and Gradients, **Applications ofPartial Derivatives:** Tangent Planes and Normal Vectors, Maxima and Minima of Functions of Two Variables.	**15**

Textbooks:

1. Calculus: Early transcendental (10th Edition): Howard Anton, IrlBivens, Stephen Davis, John Wiley & sons, 2012.

Additional References:

1. Calculus and analytic geometry (9th edition): George B Thomas, Ross L Finney, Addison Wesley, 1995
2. Calculus: Early Transcendentals (8th Edition): James Stewart, Brooks Cole, 2015.
3. Calculus (10th Edition): Ron Larson, Bruce H. Edwards, Cengage Learning, 2013.
4. Thomas' Calculus (13th Edition): George B. Thomas, Maurice D. Weir, Joel R. Hass, Pearson, 2014.

Course Code	Course Title	Credits	Lectures /Week
USCSP205	**Calculus – Practical**	**1**	**3**
1	**Review of Basic Concepts –** a. Functions of one variable, its domain and range, Operations on functions b. Limits of functions of one variable c. Continuity of functions of one variable d. Derivatives of functions of one variable		
2	**Applications of Derivatives I –** a. Increasing and Decreasing functions b. Concavity and inflection points c. Relative Extrema d. Absolute Extrema		
3	**Applications of Derivatives II –** a. Analysis of polynomials b. Graphing rational functions c. Graphs With Vertical Tangents And Cusps d. Newton‟s method to find approximate solution of an equation		

4	**Integration –** a. Finding area using rectangle method and antiderivative method b. Indefinite and definite integrals c. Properties of integrals d. Numerical integration using Simpson‟s rule.
5	**Applications of Integration –** a. Area between two curves b. Length of a plane curve
6	**Differential Equations –** a. Solution of a first order first degree differential equation using variable separable method b. Solution of a first order linear differential equation using integrating factor c. Numerical solution of first-order equations using Euler‟s method d. Modeling using differential equation
7	**Functions of Several Variables –** a. Functions of two or more variables, its domain and range, Operations on functions, level curves b. Limits of functions of two or three variables c. Continuity of functions of two or three variables
8	**Partial Derivatives I –** a. Partial derivatives of functions, First and Second order partial derivatives, Mixed derivative theorem, Higher order partial derivatives b. Differential for functions of two or three variables c. Local linear approximation for functions of two or three variables
9	**Partial Derivatives II –** a. Chain rule for functions of two or three variables b. Implicit differentiation c. Directional derivatives and gradient
10	**Applications of Partial Derivatives–** a. Tangent Planes and Normal Vectors for functions of two or three variables b. Maxima and Minima of Functions of Two Variables
NOTE	**Above Practical's can also to be implemented using Sage Math/ Geogebra.**

Course Code	Course Title	Credits	Lectures /Week
USCS206	**Statistical Methods**	**2**	**3**

About the Course:
This course introduces the key concepts in probability, conditional probabilities and distribution theory, including probability laws, random variables, expectation and variance, functions of random variables and its probability distributions. Emphasis is placed on theoretical understanding combined with problem solving using various statistical inferential techniques.

Course Objectives:

- To make learner aware about basic probability axioms and rules and its application.
- To understand the concept of conditional probability and Independence of events.
- To make learner familiar with discrete and continuous random variables as well as standard discrete and continuous distributions.
- To learn computational skills to implement various statistical inferential approaches.

Learning Outcomes:
After successful completion of this course, learners would be able to

- Calculate probability, conditional probability and independence.
- Apply the given discrete and continuous distributions whenever necessary.
- Define null hypothesis, alternative hypothesis, level of significance, test statistic and p value.
- Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases.
- Apply non-parametric test whenever necessary.
- Conduct and interpret one-way and two-way ANOVA.

Unit	Topics	No of Lectures
I	**Probability:** Random experiment, sample space, events types and operations of events, Probability definition: classical, axiomatic, Elementary Theorems of probability (without proof). Conditional probability, „Bayes" theorem, independence, Examples on Probability. **Random Variables:** Concept and definition of a discrete random variable and continuous random variable. Probability mass function, Probability density function and cumulative distribution function of discrete and continuous random variable, Properties of cumulative distribution function.	**15**
II	**Mathematical Expectation and Variance:** Expectation of a function, Variance and S.D of a random variable, properties. **Standard Probability distributions:** Introduction, properties, examples and applications of each of the following distributions: Binomial distribution, Normal distribution, Chi-square distribution, t distribution, F distribution	**15**

III	**Hypothesis testing:** One sided, Two sided hypothesis, critical region, p-value, tests based on t, Normal and F, confidence intervals. **Analysis of Variance:** One-way, two-way analysis of variance. **Non-parametric tests:** Need of non-parametric tests, Sign test, Wilicoxon"s signed rank test, run test, Kruskal-Walis tests, Chi square test.	**15**

Textbooks:

1. Gupta, S.C. and Kapoor, V.K. (1987): Fundamentals of Mathematical Statistics, S. Chand and Sons, New Delhi
2. Goon, A. M., Gupta, M. K. and Dasgupta, B. (1983). Fundamentals of Statistics, Vol. 1, Sixth Revised Edition, The World Press Pvt. Ltd., Calcutta.

Additional References:

1. Mood, A. M. and Graybill, F. A. and Boes D.C. (1974). Introduction to the Theory of Statistics, Ed. 3, McGraw Hill Book Company.
2. Hoel P. G. (1971). Introduction to Mathematical Statistics, John Wiley and Sons, New York.
3. Hogg, R.V. and Craig R.G. (1989). Introduction to Mathematical Statistics, Ed. MacMillan Publishing Co., New York.
4. Walpole R. E., Myers R. H. and Myers S. L. (1985), Probability and Statistics for Engineers and Scientists
5. Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, New Delhi.

Course Code	**Course Title**	**Credits**	**Lectures /Week**
USCSP206	**Statistical Methods – Practical**	**1**	**3**
1	**Probability-** a. Examples based on Probability definition: classical, axiomatic b. Examples based on elementary Theorems of probability		
2	**Conditional probability and independence-** a. Examples based on Conditional probability b. Examples based on „Bayes" theorem c. Examples based on independence		
3	**Discrete random variable-** a. Probability distribution of discrete random variable b. Probability mass function		
4	**Continuous random variable-** a. Probability distribution of continuous random variable b. Probability density function		

5	**Mathematical Expectation and Variance-** a. Mean of discrete and continuous Probability distribution b. S.D. and variance of discrete and continuous Probability distribution
6	**Standard probability distributions-** a. Calculation of probability, mean and variance based on Binomial distribution b. Calculation of probability based on Normal distribution
7	**Large Sample tests based on Normal (Z) -** a. Test of significance for proportion (Single proportion Ho: P = Po) b. Test of significance for difference between two proportions (Double proportion Ho: P1 = P2) c. Test of significance for mean (Single mean Ho: $\mu = \mu 0$) d. Test of significance for difference between two means. (Double mean Ho: $\mu 1 = \mu 2$)
8	**Small sample tests based on t and F-** a. t-test for significance of single mean, population variance being unknown (Single mean Ho : $\mu = \mu 0$) b. t-test for significance of the difference between two sample means (Independent samples) c. t-test for significance of the difference between two sample means (Related samples) d. F-Test to Compare Two Variances
9	**Analysis of variance -** a. Perform One-way ANOVA b. Perform Two-way ANOVA
10	**Non-parametric tests-** a. Sign test and Wilcoxon Sign rank test b. Run test c. Kruskal-Wallis (H) test d. Chi-square test
Note: Practical no. 6, 7, 8, 9 can also to be implemented using R programming.	

Course Code	Course Title	Credits	Lectures /Week
USCS207	**E-Commerce & Digital Marketing**	**2**	**3**

About the Course:

This course introduces the fundamental concepts of e-commerce, its types, the various legal and ethical issues of e-commerce and different e-commerce applications. The course also aims to introduce basic principles and types of digital marketing and web and Google analytics

Course Objectives:

- To understand increasing significance of E-Commerce and its applications in Business and Various Sectors
- To provide an insight on Digital Marketing activities on various Social Media platforms and its emerging significance in Business
- To understand Latest Trends and Practices in E-Commerce and Digital Marketing, along with its Challenges and Opportunities for an Organization

Learning Outcomes:

After successful completion of this course, students would be able to

- Understand the core concepts of E-Commerce.
- Understand the various online payment techniques
- Understand the core concepts of digital marketing and the role of digital marketing in business.
- Apply digital marketing strategies to increase sales and growth of business
- Apply digital marketing through different channels and platforms
- Understand the significance of Web Analytics and Google Analytics and apply the same.

Unit	Topics	No of Lectures
I	**Introduction to E-Commerce and E- Business:** Definition and competing in the digital economy, Impact of E-Commerce on Business Models, Factors Driving e-commerce and e-Business Models, Economics and social impact of e-Business, opportunities and Challenges, e-Commerce vs m- Commerce, Different e-Commerce Models (B2B, B2C, C2B, C2C, B2E), e-Commerce Applications: e-Trading, e-Learning, e-Shopping, Virtual Reality & Consumer Experience, Legal and Ethical issues in e-Commerce. **Overview of Electronic Payment system**s: Types of Electronic payment schemes (Credit cards, Debit cards, Smartcards, Internet banking), E-checks, E-Cash Concepts and applications of EDI and Limitation **Introduction & origin of Digital Marketing**: Traditional v/s Digital Marketing. Digital Marketing Strategy, The P-O-E-M Framework, Segmenting & Customizing Messages, The Digital landscape, Digital Advertising Market in India. Skills required in Digital Marketing. Digital Marketing Plan.	**15**
II	**Social Media Marketing:** Meaning, Purpose, types of social media websites, Social Media Engagement, Target audience, Facebook Marketing: Business through Facebook Marketing, Creating Advertising Campaigns,	**15**

	Adverts, Facebook Marketing Tools, LinkedIn Marketing: Importance of LinkedIn Marketing, Framing LinkedIn Strategy, Lead Generation through LinkedIn, Content Strategy, Analytics and Targeting, Twitter Marketing: Framing content strategy, Twitter Advertising Campaigns, YouTube Marketing: Video optimization, Promoting on YouTube, Monetization, YouTube Analytics **Email Marketing:** Types of Emails, Mailing List, Email Marketing tools, Email Deliverability & Email Marketing automation **Mobile Marketing**: Introduction, Mobile Usage, Mobile Advertising, Mobile Marketing Types, Mobile Marketing Features, Mobile Campaign Development, Mobile Advertising Analytics **Content Marketing:** Introduction, Content marketing statistics, Types of Content, Types of Blog posts, Content Creation, Content optimization, Content Management & Distribution, Content Marketing Strategy, Content creation tools and apps, Challenges of Content Marketing.	
III	**Search Engine Optimization:** Meaning, Common SEO techniques, Understanding Search Engines, basics of Keyword search, Google rankings, Link Building, Steps to optimize website, On-page and off-page optimization **Search Engine Marketing:** Introduction to SEM, Introduction to Ad Words - Google Ad Words, Ad Words fundamentals, Ad Placement, Ad Ranks, Creating Ad Campaigns, Campaign Report Generation, Display marketing, Buying Models: Cost per Click (CPC), Cost per Milli (CPM), Cost per Lead (CPL), Cost per Acquisition (CPA). **Web Analytics:** Purpose, History, Goals & objectives, Web Analytic tools & Methods. Web Analytics Mistakes and Pitfalls. **Google Analytics:** Basics of Google Analytics, Installing Google Analytics in website, Parameters of Google Analytics, Reporting and Analysis	**15**

Textbooks:

1. "E-Commerce Strategy, Technologies and Applications", Whitley, David, Tata McGraw Hill, 2017
2. Digital Marketing, Seema Gupta, McGraw Hill Education, 2nd Edition

Additional References:

1. E-Commerce by S. Pankaj, A.P.H. Publication, New Delhi
2. Fundamentals of Digital Marketing, Punit Singh Bhatia, Pearson, 2nd Edition
3. "Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation", Damian Ryan, Calvin Jone. Kogan Page, 4th Edition

Evaluation Scheme

I. Internal Evaluation for Theory Courses – 25 Marks

(i) Mid-Term Class Test– 15Marks

- It should be conducted using any **learning management system** such as **Moodle** (Modular object-oriented dynamic learning environment)
- The test should have **15 MCQ's** which should be solved in a time duration of **30 minutes.**

(ii) Assignment/ Case study/ Presentations– 10 Marks

- Assignment / Case Study Report / Presentation can be uploaded on any **learning management system**.

II. External Examination for Theory Courses – 75 Marks

- Duration: **2.5 Hours**
- Theory question paper pattern:

	All questions are compulsory.		
Question	**Based on**	**Options**	**Marks**
Q.1	Unit I	*Any 4 out of 6*	20
Q.2	Unit II	*Any 4 out of 6*	20
Q.3	Unit III	*Any 4 out of 6*	20
Q.4	Unit I,II and III	*Any 5 out of 6*	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question maybe sub-divided into subquestions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination

- Each core subjectcarries50 Marks

  40 marks + 05 marks (journal) + 05 marks (viva)
- Duration: **2 Hours** for each practical course.
- Minimum **80% practical** from each core subjects are required to be completed.
- **Certified Journal is compulsory for appearing at the time of Practical Exam**
- The final submission and evaluation of **journal in electronic form** using a Learning Management System / Platform can be promoted by college.

UNIVERSITY OF MUMBAI

Syllabus for

Program: Bachelor of Science

Course: Computer Science

with effect from

Academic Year 2022-2023

Preamble

The revised and restructured curriculum for the Three-year integrated course is systematically designed considering the current industry needs in terms of skills sets demanded under new technological environment. It also endeavors to align the programme structure and course curriculum with student aspirations and corporate expectations. The proposed curriculum is more contextual, industry affable and suitable to cater the needs of society and nation in present day context.

The Core Subjects offers to develop strong theoretical foundations in Computer Science to build computational thinking, analytical, and problem solving skills. Principles of Operating Systems course provides an overview of computer operating systems, their functionalities, processes, and computing resource management. Linear Algebra course covers concepts crucial to many areas of computer science, such as graphics, image processing, cryptography, machine learning, computer vision, optimization, graph algorithms, quantum computation, computational biology, information retrieval and web search. Data Structures course provides an understanding of different types of data structures and how to use them per the requirements of a given application. Advanced Database Concepts course touches the touches security, recovery, and transaction aspects of database. Theory of Computation course helps to develop capabilities to design and develop formulations for computing models and identify its applications in diverse areas. Computer Networks course include topics such as application layer protocols, Internet protocols, network interfaces, local and wide area networks, wireless networks, bridging and routing, among other current topics. Software Engineering course embodies an engineering approach to the development of software. It discusses the nature of software and software projects, software development models, software process maturity, project planning, management, and estimations along with topics on software testing and quality assurance. The course on IoT Technologies will definitely open future area as Embedded Engineer, involvement in IoT projects, Robotics and many more.

Skill Enhancement courses such as Java based Application Development, Web Technologies, Android Application Development and Advanced Application Development cater to present day needs of web and mobile based platforms and applications. These courses aims to produce skilled graduates with a creative mind-set who can recognize a computational problem either in IT industry or society, and develop effective solutions.

The General Elective courses offers the students the option to explore disciplines of interest beyond the choices they make in Core and Discipline Specific Elective papers. The course on Creative Content Writing prepare students to comprehend, refine, and enhance their writing abilities and enter the industry with enhanced skill and substantial competence. The course on Green Technologies emphasizes the use of principles and practices of green services and regulatory standards for addressing the carbon issues and related concerns. The Research Methodology instills basic research skills for students who wish to pursue a research or an academic career. Management & Entrepreneurship course aims to focus on giving students the business management and innovation skills required to succeed in a startup.

We sincerely believe that any student taking this programme will get very strong foundation and exposure to basics, advanced and emerging trends of the subject.

We wholeheartedly thank all experts who shared their valuable feedbacks and suggestions in order to improvise the contents, we have sincerely attempted to incorporate each of them. We further thank Chairperson and members of Board of Studies for their confidence in us.

Special thanks to University Department of Computer Science and colleagues from various colleges, who volunteered or have indirectly helped designing certain specialized courses and the syllabus as a whole.

S.Y.B.Sc. Computer Science Syllabus

Choice Based Credit System (CBCS)

with effect from

Academic year 2022-2023

Semester – III				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USCS301	Core Subject	Principles of Operating Systems	2	3
USCSP301	Core Subject Practical	Principles of Operating Systems – Practical	1	3
USCS302	Core Subject	Linear Algebra	2	3
USCSP302	Core Subject Practical	Linear Algebra – Practical	1	3
USCS303	Core Subject	Data Structures	2	3
USCSP303	Core Subject Practical	Data Structures – Practical	1	3
USCS304	Core Subject	Advanced Database Concepts	2	3
USCSP304	Core Subject Practical	Advanced Database Concepts – Practical	1	3
USCS305	Skill Enhancement Course (SEC)	Java based Application Development	2	3
USCSP305	Skill Enhancement Course (SEC) Practical	Java based Application Development – Practical	1	3
USCS306	Skill Enhancement Course (SEC)	Web Technologies	2	3
USCSP306	Skill Enhancement Course (SEC) Practical	Web Technologies – Practical	1	3
USCS3071	Generic Elective	Creative Content Writing	2	3
USCS3072	Generic Elective	Green Technologies	2	3

** Any one Generic Elective has to be selected by the student.*

S.Y.B.Sc. Computer Science Syllabus

Choice Based Credit System (CBCS)

with effect from

Academic year 2022-2023

Semester – IV				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USCS401	Core Subject	Theory of Computation	2	3
USCSP401	Core Subject Practical	Theory of Computation – Practical	1	3
USCS402	Core Subject	Computer Networks	2	3
USCSP402	Core Subject Practical	Computer Networks – Practical	1	3
USCS403	Core Subject	Software Engineering	2	3
USCSP403	Core Subject Practical	Software Engineering – Practical	1	3
USCS404	Core Subject	IoT Technologies	2	3
USCSP404	Core Subject Practical	IoT Technologies – Practical	1	3
USCS405	Skill Enhancement Course (SEC)	Android Application Development	2	3
USCSP405	Skill Enhancement Course (SEC) Practical	Android Application Development – Practical	1	3
USCS406	Skill Enhancement Course (SEC)	Advanced Application Development	2	3
USCSP406	Skill Enhancement Course (SEC) Practical	Advanced Application Development – Practical	1	3
USCS4071	Generic Elective*	Research Methodology	2	3
USCS4072	Generic Elective*	Management & Entrepreneurship	2	3

** Any one Generic Elective has to be selected by the student.*

Semester III

Course Code	Course Title	Credits	Lectures /Week
USCS301	**Principles of Operating Systems**	**2**	**3**

About the Course: The purpose of this course is to provide an overview of computer operating systems, their functionalities, processes, and computing resource management. In particular, the course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

Course Objectives:

- To learn basic concepts and structure of operating systems
- To learn about process and synchronization in operating system level
- To learn CPU scheduling algorithms
- To learn Memory and File system management

Learning Outcomes:

After successful completion of this course, students would be able to

- Work with any type of operating system
- Handle threads, processes, process synchronization
- Implement CPU scheduling algorithms
- Understand the background role of memory management
- Design file system.

Unit	Topics	No of Lectures
I	**Introduction to Operating-Systems:** Definition of Operating System, Operating System's role, Operating-System Operations, Functions of Operating System, Computing Environments **Operating-System Structures:** Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls, Operating-System Structure **Processes:** Process Concept, Process Scheduling, Operations on Processes, Inter process Communication **Threads:** Overview, Multicore Programming, Multithreading Models	**15**
II	**Process Synchronization:** General structure of a typical process, race condition, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors	**15**

	CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms (FCFS, SJF, SRTF, Priority, RR, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling), Thread Scheduling **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock	
III	**Main Memory:** Background, Logical address space, Physical address space, MMU, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table **Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing **Mass-Storage Structure:** Overview, Disk Structure, Disk Scheduling, Disk Management **File-System Interface:** File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing **File-System Implementation:** File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management	**15**

Textbook(s):

1. Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley, 2021

Additional Reference(s):

1. Achyut S. Godbole, Atul Kahate, Operating Systems, Tata McGraw Hill, 2017
2. Naresh Chauhan, Principles of Operating Systems, Oxford Press, 2014
3. Andrew S Tanenbaum, Herbert Bos, Modern Operating Systems, 4e Fourth Edition, Pearson Education, 2016

Course Code	Course Title	Credits	Lectures /Week
USCSP301	**Principles of Operating Systems – Practical**	**1**	**3**
1	Process Communication: a. Write a program to give a solution to the producer–consumer problem using shared memory. b. Write a program to give a solution to the producer–consumer problem using message passing.		
2	Threads: a. Write a program to work with a single thread. b. Write a program to work with multi threads. c. The Fibonacci sequence is the series of numbers 0, 1, 1, 2, 3, 5. 8, ... Formally, it can be expressed as: fib0 = 0, fib1 = 1, fibn = fibn-1 + fibn-2. Write a multithreaded program that generates the Fibonacci sequence.		
3	Synchronization: a. Write a program to give a solution to the Bounded buffer problem. b. Write a program to give a solution to the readers–writers problem.		
4	Write a program that implements FCFS scheduling algorithm.		
5	Write a program that implements (with no premption) scheduling algorithm.		
6	Write a program that implements RR scheduling algorithm.		
7	Write a program that implements the banker's algorithm		
8	Write a program that implements the FIFO page-replacement algorithm.		
9	Write a program that implements the LRU page-replacement algorithm.		
10	Write a program to design a File System.		

Course Code	Course Title	Credits	Lectures /Week
USCS302	**Linear Algebra**	**2**	**3**

About the Course:
Linear algebra, a branch of mathematics, provides concepts that are crucial to many areas of computer science, such as graphics, image processing, cryptography, machine learning, computer vision, optimization, graph algorithms, quantum computation, computational biology, information retrieval and web search. The course covers topics such as fields, vectors, matrices, eigenvalues and eigenvectors

Course Objectives:

- To offer the learner the relevant Linear Algebra concepts through Computer Science applications.
- To interpret existence and analyze the solution set of a system of linear equations.
- To formulate, solve, apply, and interpret properties of linear systems.
- To learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.
- To interpret basic concepts of linear transformations, dimension, matrix representation of a linear transformation, and the change of coordinate matrix.

Learning Outcomes:
After successful completion of this course, students would be able to

- Appreciate the relevance and applications of Linear Algebra in the field of Computer Science.
- Understand the concepts through program implementation.
- Instill a computational thinking while learning linear algebra.
- Express clear understanding of the concept of a solution to a system of equations.
- Find eigenvalues and corresponding eigenvectors for a square matrix.

Unit	Topics	No of Lectures
I	**Field:** Introduction to complex numbers, complex numbers in Python, abstracting over fields, Playing with GF (2). **Vectors:** Vectors are functions, Vector addition, Scalar-vector multiplication, combining vector addition and scalar multiplication, Dictionary-based representations of vectors, Dot-product, Solving a triangular system of linear equations, Support Vector Machine – Introduction, Mechanism. **The Vector Space:** Linear combination, Span, The geometry of sets of vectors, Vector spaces, Linear systems, homogeneous and otherwise	**15**
II	**Matrix**: Matrices as vectors, Column space and row space, Matrix-vector and vector-matrix multiplication in terms of linear combinations, Matrix-vector multiplication in terms of dot-products, Null space, Computing sparse matrix-vector product, Linear functions, Matrix-matrix multiplication, Inner product and outer product, From function inverse to matrix inverse	**15**

	Basis: Coordinate systems, two greedy algorithms for finding a set of generators, Linear dependence, Basis, Unique representation, Change of basis, first look, Computational problems involving finding a basis **Dimension:** Dimension and rank, Direct sum, Dimension and linear functions, The annihilator **Gaussian elimination**: Echelon form, Gaussian elimination over GF(2), Solving a matrix-vector equation using Gaussian elimination.	
III	**Inner Product**: The inner product for vectors over the reals, Orthogonality. **Orthogonalization**: Projection orthogonal to multiple vectors, projecting orthogonal to mutually orthogonal vectors, Building an orthogonal set of generators, orthogonal complement. **Eigenvalues and Eigenvectors:** Characteristic Polynomials of degree 2 and 3, Eigenvalues and eigenvectors, Properties of eigenvalues and eigenvectors, Cayley–Hamilton Theorem, Minimal Polynomial. Coordinate representation in terms of eigenvectors, The Internet worm, Markov Chains, Google Page Rank algorithm.	**15**

Textbooks:

1. Coding the Matrix Linear Algebra through Applications to Computer Science, First Edition, Philip N. Klein, Newtonian Press 2013
2. Schaum's Outline of Linear Algebra, Sixth Edition by Seymour Lipschutz, Marc Lipson, McGraw Hill 2017

Additional References:

1. Linear Algebra and Probability for Computer Science Applications, First Edition, Ernest Davis, A K Peters/CRC Press, 2012.
2. Linear Algebra and Its Applications, Gilbert Strang, Cengage Learning, 4th Edition, 2007
3. Linear Algebra and Its Applications, David C Lay, Pearson Education India; 3rd Edition, 2002
4. Introduction to Information Retrieval, Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press, 2008.
5. Computer Networking With Internet Protocols and Technology, William Stallings, Pearson Education India, 2013.

Course Code	Course Title	Credits	Lectures /Week
USCSP302	**Linear Algebra – Practical**	**1**	**3**
1	Write a program which demonstrates the following: • Addition of two complex numbers • Displaying the conjugate of a complex number • Plotting a set of complex numbers • Creating a new plot by rotating the given number by a degree 90, 180, 270 degrees and also by scaling by a number a = 1/2, a = 1/3, a = 2 etc.		
2	Write a program to do the following: • Enter a vector u as a n-list • Enter another vector v as a n-list • Find the vector au + bv for different values of a and b • Find the dot product of u and v		
3	Vector Applications: Classify given data using support vector machines (SVM)		
4	Basic Matrix Operations: • Matrix Addition, Subtraction, Multiplication • Check if matrix is invertible. • If yes then find Inverse		
5	Write a program to convert a matrix into its row echelon form. (Order 2). Write a program to find rank of a matrix.		
6	Basic Matrix Application – I Representation of Image in Matrix Format and Image Transformations		
7	Basic Matrix Application – II Perform Image addition, multiplication and subtraction		
8	Write a program to do the following: • Enter a vector b and find the projection of b orthogonal to a given vector u. • Find the projection of b orthogonal to a set of given vectors		
9	Write a program to calculate eigenvalue and eigenvector (Order 2 and 3)		
10	Implement Google's Page rank algorithm.		

Course Code	Course Title	Credits	Lectures /Week
USCS303	**Data Structures**	**2**	**3**

About the Course:
The course focuses to give an understanding of different types of data structures that can be used to store data in memory, how to create-manipulate them and to use them in the best possible manner as per the requirements of the application.

Course Objectives:

- To introduce data abstraction and data representation in memory
- To describe, design and use of elementary data structures such as stack, queue, linked list, tree and graph
- How and why different data structures are used for different types of problems.

Learning Outcomes:
After successful completion of this course, students would be able to-

- Create different types of data structures.
- Understand which data structure to be used based on the type of the problem.
- Apply combined knowledge of algorithms and data structures to write highly effective programs in various domains.

Unit	Topics	No of Lectures
I	**Abstract Data Type:** Different Data Types, different types of data structures & their classifications, Introduction to ADT, Creating user-specific ADT **Linked Structures**: ADT for linked list, Advantages & Disadvantages, Singly Linked List-Traversing, Searching, Prepending and Removing Nodes, applications of linked list like polynomial equation **Stacks**: Stack ADT for Stack, Advantages & Disadvantages, Applications of stack like balanced delimiter, prefix to postfix notation **Queues**: Queue ADT, Advantages & Disadvantages, linked representations. Circular Queue operations, Dequeues, applications of queue like job scheduling queues	**15**
II	**Doubly Linked list:** ADT of doubly linked list, Advantages & Disadvantages, Insertion and deletion of nodes at various positions **Trees**: ADT for Tree Structure. Advantages & disadvantages, Binary Tree-Properties, Implementation and Traversals, Binary Search Tree, Balanced BST, Threaded Binary Trees, AVL Trees, Applications of Tree like Huffman Coding,	

	Priority Queues & Heaps: Priority Queue, Priority Queue ADT, Advantages and Disadvantages, Applications, Heaps, types of heaps, Heapifying the element,	
III	**Graph:** Introduction, Graph ADT, Advantages and Disadvantages, Graph Representation using adjacency matrix and adjacency list, Graph operations like insertion and deletion of nodes, Graph Traversals using BFS & DFS, Applications of Graphs like shortest path algorithms, **Hashing:** Hash Table ADT, Advantages & Disadvantages, Concept of hashing, hash table, hash functions, collision, collision avoidance techniques, Applications of hashing	

Textbooks:

1. Introduction to Algorithm, Thomas H Cormen, PHI
2. Data Structures And Algorithms Made Easy, Narasimha Karumanchi, 2021

Additional References:

1. Fundamentals of Computer Algorithms, Sartaj Sahni and Sanguthevar Rajasekaran Ellis Horowitz, Universities Press, 2018
2. Data Structures and Algorithms in Python, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, Wiley, 2016

Course Code	Course Title	Credits	Lectures /Week
USCSP303	**Data Structures – Practical**	**1**	**3**
1	Write a program to implement Abstract Data Types (ADT)		
2	Write a program to implement Singly Linked list with insertion, deletion, traversal operations		
3	Write a program to implement Doubly Linked list with insertion, deletion, traversal operations		
4	Write a program to implement Stack with insertion, deletion, traversal operations		
5	Write a program to implement Queue with insertion, deletion, traversal operations		
6	Write a program to implement Priority Queue with insertion, deletion, traversal operations		
7	Write a program to implement Binary Tree with insertion, deletion, traversal operations		
8	Write a program to implement Huffman Coding		
9	Write a program to implement Graph with insertion, deletion, traversal operations		
10	Write a program to implement Travelling Salesman Problem		
11	Write a program to create basic Hash Table for insertion, deletion, traversal operations(assume that there are no collisions)		
12	Write a program to create hash table to handle collisions using overflow chaining		

Course Code	Course Title	Credits	Lectures /Week
USCS304	**Advanced Database Concepts**	**2**	**3**

About the Course:
This course deals with the basic understanding of programming in database. It touches security, recovery, and transaction aspects of database. The course will increase the confidence among the learner while dealing with database.

Course Objectives:

- To develop understanding of concepts and techniques for data management and learn about widely used systems for implementation and usage.
- To develop understanding of Transaction management and crash recovery.
- To develop concepts of programming concepts of database.

Learning Outcomes:
After successful completion of this course, students would be able to

- Master concepts of stored procedure, functions, cursors and triggers and its use.
- Learn about using PL/SQL for data management.
- Use efficiently Collections and records.
- Understand concepts and implementations of transaction management and crash recovery.

Unit	Topics	No of Lectures
I	**Overview of PL/SQL:** Advantages of PL/SQL, Main Features of PL/SQL, Architecture of PL/SQL **Fundamentals of PL/SQL:** Character Sets, Lexical Units, Declarations, References to Identifiers, Scope and Visibility of Identifiers, Assigning Values to Variables, Expressions, Error-Reporting Functions, Data Types. **Control Statements:** Conditional Selection Statements, LOOP Statements, Sequential Control Statements, GOTO, and NULL Statements. **Sequences:** creating sequences, referencing, altering, and dropping a sequence. **Stored Procedures and Functions:** Procedures: Types and benefits of stored procedures, creating stored procedures, executing stored procedures, altering stored procedures, viewing stored procedures. Functions: Calling function and recursion function.	**15**
II	**Collections and Records:** Associative Arrays, Varrays (Variable-Size Arrays), Nested Tables, Collection Constructors, Assigning Values to Collection Variables, Multidimensional Collections, Collection	**15**

	Comparisons, Collection Methods, Collection Types Defined in Package Specifications, Record Variables, Assigning Values to Record Variables. **Error Handling:** Compile-Time Warnings, Overview of Exception Handling, Internally Defined Exceptions, Predefined Exceptions, User-Defined Exceptions, Redeclared Predefined Exceptions, Raising Exceptions Explicitly, Exception Propagation, Unhandled Exceptions. **Cursors:** Overview of Cursor, Types of cursors, Invalid cursor Exception. **Static and Dynamic SQL:** Static SQL: Description of Static SQL, Cursors Overview, Processing Query Result Sets, Cursor Variables, CURSOR Expressions, Transaction Processing and Control, Autonomous Transactions. Dynamic SQL: Native Dynamic SQL, DBMS_SQL Package, SQL Injection.	
III	**Triggers:** Overview of Triggers, implementing triggers – creating triggers, Insert, delete, and update triggers, nested triggers, viewing, deleting, and modifying triggers, and enforcing data integrity through triggers. **Packages:** Overview of a Package. Need of Packages, Package Specification, Package Body, Package Instantiation and Initialization. **Transaction Management:** ACID Properties, Serializability, Two-phase Commit Protocol, Concurrency Control, Lock Management, Lost Update Problem, Inconsistent Read Problem, Read-Write Locks, Deadlocks Handling, Two Phase Locking protocol. **Crash Recovery:** ARIES algorithm. The log-based recovery, recovery related structures like transaction and dirty page table, Write-ahead log protocol, check points, recovery from a system crash, Redo and Undo phases	**15**

Textbooks:

1. Mastering PL/SQL Through Illustrations: From Learning Fundamentals to Developing Efficient PL/SQL Blocks, Dr. B. Chandra, BPB Publication, 2020
2. Oracle Pl/Sql Training Guide., Training guide, BPB Publications, 2016
3. Raghu Ramakrishnam, Gehrke, Database Management Systems, McGraw-Hill,3rd Edition, 2014
4. Abraham Silberschatz, Henry F. Korth,S. Sudarshan , Database System Concepts, 6th Edition 2019

Additional References:

1. Ivan Bayross, "SQL, PL/SQL -The Programming language of Oracle", B.P.B. Publications 2009
2. Ramez Elmasri & Shamkant B.Navathe, Fundamentals of Database Systems, Pearson Education, 2008

Course Code	Course Title	Credits	Lectures /Week
USCSP304	**Advanced Database Concepts – Practical**	**1**	**3**
1	Writing PL/SQL Blocks with basic programming constructs by including following: a. Sequential Statements b. unconstrained loop		
2	Sequences: a. Creating simple Sequences with clauses like START WITH, INCREMENT BY, MAXVALUE, MINVALUE, CYCLE | NOCYCLE, CACHE | NOCACHE, ORDER | NOORECER. b. Creating and using Sequences for tables.		
3	Writing PL/SQL Blocks with basic programming constructs by including following: a. If...then...Else, IF...ELSIF...ELSE... END IF b. Case statement		
4	Writing PL/SQL Blocks with basic programming constructs for following Iterative Structure: a. While-loop Statements b. For-loop Statements.		
5	Writing PL/SQL Blocks with basic programming constructs by including a GoTO to jump out of a loop and NULL as a statement inside IF.		
6	Writing Procedures in PL/SQL Block a. Create an empty procedure, replace a procedure and call procedure b. Create a stored procedure and call it c. Define procedure to insert data d. A forward declaration of procedure		
7	Writing Functions in PL/SQL Block. a. Define and call a function b. Define and use function in select clause, c. Call function in dbms_output.put_line d. Recursive function e. Count Employee from a function and return value back f. Call function and store the return value to a variable		
8	Creating and working with Insert/Update/Delete Trigger using Before/After clause.		
9	Write an Implicit and explicit cursor to complete the task.		
10	Create packages and use it in SQL black to complete the task.		
11	Write a SQL block to handle exception by writing: a. Predefined Exceptions, b. User-Defined Exceptions, c. Redeclared Predefined Exceptions,		
12	Create nested tables and work with nested tables.		

Course Code	Course Title	Credits	Lectures /Week
USCS305	**Java based Application Development**	**2**	**3**

About the Course:
The objective of this course is to teach the learner how to use Object Oriented paradigm to develop code and understand the concepts of Core Java and explore advanced topic of Java programming for solving problems.

Course Objectives:

- To provide insight into java based applications using OOP concepts.
- To provide understanding of developing GUI based desktop applications in java.
- To provide knowledge of web based applications through servlet and jsp.
- To provide understanding and implementation of basic JSON

Learning Outcomes:
After successful completion of this course, students would be able to

- Design basic application in java using Graphical User Interface.
- The learner will be able to develop applications using swings
- The learner will be able to develop web based applications using servlet and jsp
- The learner will be able to connect databases with java through
- The learner will be able to perform programs using JSON objects

Unit	Topics	No of Lectures
I	**Introduction:** History, Features of Java, Java Development Kit, Java Application Programming Interface, Java Virtual Machine Java Program Structure, Java Tokens. **OOPS**: Introduction, Class, Object, Static Keywords, Constructors, this keyword, Inheritance, Inner class, Anonymous Inner class, super keyword, Polymorphism (overloading and overriding), Abstraction, Encapsulation, Abstract Classes, Interfaces **Packages:** Introduction to predefined packages, User Defined Packages, Access specifiers **Exception Handling:** Introduction, Pre-Defined Exceptions, try-catch-finally, throws, throw, User Defined Exceptions **Multithreading:** Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, wait() notify() notify all() methods	**15**
II	**Collection Framework**: Introduction, java.util Package interfaces, List, Set, Map, List interface & its classes, Set interface & its classes, Map interface & its classes.	**15**

	Introduction to JFC and Swing- Features of the Java Foundation Classes, Swing API Components, JComponent Class, Windows, Dialog Boxes, and Panels, Labels, Buttons, Check Boxes, Menus, Toolbars, Implementing Action interface, Pane, JScrollPane, Desktop pane, Scrollbars, Lists and Combo Boxes, Text-Entry Components, Colors and File Choosers, Tables and Trees, Printing with 2D API and Java Print Service API. **Event Handling:** Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes. **JDBC:** Introduction, JDBC Architecture, JDBC Drivers, JDBC Connectivity Model, java.sql package, Using Statement, PreparedStatement, CallableStatement, ResultSet, Scrollable and Updatable ResultSet, Navigating and manipulating data, ResultSetMetaData, Managing Transactions in JDBC, JDBC Exception classes, BLOB & CLOB	
III	**Servlets:** Introduction, Servlet Life Cycle, Types of Servlet, Servlet Configuration with Deployment Descriptor, Working with ServletContext and ServletConfig Object, Attributes in Servelt,, Response and Redirection using Request Dispacher and using sendRedirect Method, Filter API, Manipulating Responses using Filter API, Session Tracking: using Cookies, HTTPSession, Hidden Form Fields and URL Rewriting,Types of Servlet Event: ContextLevel and SessionLevel. **Java Server Pages (JSP)**: Introduction to JSP , Comparison with Servlet, JSP Architecture, JSP Life Cycle, JSP Scripting Elements, JSP Directives, JSP Action, JSP Implicit Objects, JSP Expression Language, JSP Standard Tag Libraries, JSP Custom Tag, JSP Session Management, JSP Exception Handling, JSP CRUD Applications **JSON:** Overview, Syntax, DataTypes, Objects, Schema, Comparison with XML, JSON with Java	**15**

Textbooks:

1. Herbert Schildt, Java The Complete Reference, Eleventh Edition, McGraw-Hill Education, 2020
2. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSP, O'reilly (SPD), 2018
3. Cay S. Horstmann, Gary Cornell, Core Java™ 2: Volume II–Advanced Features Prentice Hall PTR, 2004
4. Ivan Bayross, Web Enabled Commercial Applications Development Using Java 2, BPB Publications
5. Java XML and JSON: Document Processing for Java SE by Jeff Friesen January 2019, Apress

Additional References:

1. E. Balagurusamy, Programming with Java- A Primer, Tata McGraw-Hill Education India, 2014
2. Programming in JAVA, 2nd Ed, Sachin Malhotra & Saurabh Choudhary, Oxford Press, 2018
3. Joe Wigglesworth and Paula McMillan, Java Programming: Advanced Topics, Thomson Course Technology (SPD)
4. Eric Jendrock, Jennifer Ball, D Carson and others, The Java EE 5 Tutorial, Pearson Education
5. The Java Tutorials: http://docs.oracle.com/javase/tutorial/
6. Java Parsing Collection XML JSON: Map List XML JSON Transform by Yang Hu, 2019

Course Code	Course Title	Credits	Lectures /Week
USCSP305	**Java based Application Development – Practical**	**1**	**3**
1	a. Write a program to create a class and implement the concepts of Constructor Overloading, Method Overloading, Static methods b. Write a program to implement the concept of Inheritance and Method Overriding		
2	a. Write a program to implement the concepts of Abstract classes and methods b. Write a program to implement the concept of interfaces		
3	Write a program to define user defined exceptions and raise them as per the requirements		
4	Write a program to demonstrate the methods of: a. List interface b. Set interface c. Map interface		
5	Write a program using various swing components design Java application to accept a student's resume. (Design form)		
6	a. Write a JDBC program that displays the data of a given table b. Write a JDBC program to return the data of a specified record from a given table c. Write a JDBC program to insert / update / delete records into a given table		
7	a. Construct a simple calculator using the JAVA Swings with minimum functionality. b. Construct a GUI using JAVA Swings to accept details of a record of a given table and submit it to the database using JDBC technology on the click of a button.		
8	a. Write a Servlet that accepts a User Name from a HTML form and stores it as a cookie. Write another Servlet that returns the value of this cookie and displays it. b. Write a Servlet that displays the names and values of the cookie stored on the client. c. Write a Servlet that accepts a User Name from a HTML form and stores it as a session variable. Write another Servlet that returns the value of this session variable and displays it.		
9	a. Write a registration Servlet that accepts the data for a given table and stores it in the database. b. Write a Servlet that displays all the records of a table.		
10	a. Write a JSP that accepts a User Name from a HTML form and stores it as a cookie. Write another JSP that returns the value of this cookie and displays it. b. Write a JSP that displays the names and values of the cookie stored on the client. c. Write a JSP that accepts a User Name from a HTML form and stores it as a session variable. Write another JSP that returns the value of this session variable and displays it.		

11	a. Write a JSP code that accepts username and password from HTML file and validates the user from the database b. Write a registration JSP that accept the data for a given table and stores it in the database. c. Write a JSP that displays all the records of a table
12	. Write Java application to encoding and decoding JSON in Java.

Course Code	Course Title	Credits	Lectures /Week
USCS306	**Web Technologies**	**2**	**3**

About the Course:
The course provides an insight into emerging technologies to design and develop state of the art web applications using client-side scripting, server-side scripting, and database connectivity

Course Objectives:

- To understand the concepts of Hyper Text Markup Language and Cascading Style Sheets.
- To learn JavaScript for creating dynamic websites.
- To learn various operations performed on data among web applications using XML
- To learn Server-Side Programming using PHP

Learning Outcomes:
After successful completion of this course, students would be able to

- Design valid, well-formed, scalable, and meaningful pages using emerging technologies.
- Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites
- Develop and implement client-side and server-side scripting language programs.
- Develop and implement Database Driven Websites.
- Design and apply XML to create a markup language for data and document centric applications.

Unit	Topics	No of Lectures
I	**HTML5:** Fundamental Elements of HTML, Formatting Text in HTML, Organizing Text in HTML, Links and URLs in HTML, Tables in HTML, Images on a Web Page, Image Formats, Image Maps, Colors, FORMs in HTML, Interactive Elements, Working with Multimedia - Audio and Video File Formats, HTML elements for inserting Audio / Video on a web page **CSS:** Understanding the Syntax of CSS, CSS Selectors, Inserting CSS in an HTML Document, CSS properties to work with background of a Page, CSS properties to work with Fonts and Text Styles, CSS properties for positioning an element.	**15**
II	**JavaScript:** Using JavaScript in an HTML Document, Programming Fundamentals of JavaScript – Variables, Operators, Control Flow Statements, Popup Boxes, Functions – Defining and Invoking a Function, Defining Function arguments, defining a return Statement, Calling Functions with Timer, JavaScript Objects - String, RegExp, Math, Date, Browser Objects - Window, Navigator, History, Location, Document, Cookies, Document Object Model, Form Validation using JavaScript **XML:** Comparing XML with HTML, Advantages and Disadvantages of XML, Structure of an XML Document, XML Entity References, DTD,	**15**

	XSLT: XSLT Elements and Attributes - xsl:template, xsl:apply-templates, xsl:import, xsl:call-template, xsl:include, xsl:element, xsl:attribute, xsl:attribute-set, xsl:value-of	
III	**AJAX**: AJAX Web Application Model, How AJAX Works, XMLHttpRequest Object – Properties and Methods, handling asynchronous requests using AJAX **PHP**: Variables and Operators, Program Flow, Arrays, working with Files and Directories, working with Databases, Working with Cookies, Sessions and Headers **Introduction to jQuery**: Fundamentals, Selectors, methods to access HTML attributes, methods for traversing, manipulators, events, effects.	**15**

Textbooks:

1. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2ed, Dreamtech Press, 2016
2. Web Programming and Interactive Technologies, scriptDemics, StarEdu Solutions India, 2018
3. PHP: A Beginners Guide, Vikram Vaswani, TMH

Additional References:

1. HTML, XHTML, and CSS Bible Fifth Edition, Steven M. Schafer, WILEY, 2011
2. Learning PHP, MySQL, JavaScript, CSS & HTML5, Robin Nixon, O'Reilly, 2018
3. PHP, MySQL, JavaScript & HTML5 All-in-one for Dummies, Steve Suehring, Janet Valade Wiley, 2018

Course Code	Course Title	Credits	Lectures /Week
USCSP306	**Web Technologies – Practical**	**1**	**3**
1	Design a webpage that makes use of a. Document Structure Tags b. Various Text Formatting Tags c. List Tags d. Image and Image Maps		
2	Design a webpage that makes use of a. Table tags b. Form Tags (forms with various form elements) c. Navigation across multiple pages d. Embedded Multimedia elements		
3	Design a webpage that make use of Cascading Style Sheets with a. CSS properties to change the background of a Page b. CSS properties to change Fonts and Text Styles c. CSS properties for positioning an element		
4	Write JavaScript code for a. Performing various mathematical operations such as calculating factorial / finding Fibonacci Series / Displaying Prime Numbers in a given range / Evaluating Expressions / Calculating reverse of a number b. Validating the various Form Elements		
5	Write JavaScript code for a. Demonstrating different JavaScript Objects such as String, RegExp, Math, Date b. Demonstrating different JavaScript Objects such as Window, Navigator, History, Location, Document, c. Storing and Retrieving Cookies		
6	Create a XML file with Internal / External DTD and display it using a. CSS b. XSL		
7	Design a webpage to handle asynchronous requests using AJAX on a. Mouseover b. button click		
8	Write PHP scripts for a. Retrieving data from HTML forms b. Performing certain mathematical operations such as calculating factorial / finding Fibonacci Series / Displaying Prime Numbers in a given range / Evaluating Expressions / Calculating reverse of a number c. Working with Arrays d. Working with Files (Reading / Writing)		
9	Write PHP scripts for		

	a. Working with Databases (Storing Records / Reprieving Records and Display them) b. Storing and Retrieving Cookies c. Storing and Retrieving Sessions
10	Design a webpage with some jQuery animation effects.

Course Code	Course Title	Credits	Lectures /Week
USCS3071	**Creative Content Writing**	**2**	**3**

About the Course:
With the advent of the internet, content writing has become a very lucrative and promising career. The course is designed to equip students to comprehend, refine, and enhance their writing abilities so that they may become proficient web content developers. The course aims to prepare students to enter the industry with enhanced skill and substantial competence.

Course Objectives:

- To introduce students to the concepts of content writing.
- To connect them with various writing and editing styles and techniques.
- To help them develop their creative abilities.
- To improve the learners' employability

Learning Outcomes:
After successful completion of this course, students would be able to

- Understand the fundamentals of content creation for Blog, Website etc.
- Acquire the ability to write and edit in a variety of styles and procedures
- To develop the creative abilities.
- To acquire essential language skills for editors.

Unit	Topics	No of Lectures
I	**Basics of Content writing:** Introduction to Content Writing, Learning Tone in Writing and Its Types, Comprehending style in writing and its Types, Common Grammatical Errors. **Best Practices for Writing for the Web:** Making our story Elegant, Professional, Write with an Attitude, Keep Verbs Active, List Items, Chunk Information, Title and Subtitle, Organize for Your Audience. **Things Marketers Write:** The Ideal Length for Blog Posts, Podcast, Facebook Posts, Tweets, and Other Marketing Content.	**15**
II	**Social Media Writing:** Writing for Twitter, writing with Hashtags, Writing Social Media with Humor, writing for Facebook, writing for LinkedIn, Writing Your LinkedIn Profile, writing for Email, Writing Landing Pages, Writing Headlines, writing a Home Page, Writing the About Us Page, Writing Better Blog Posts, Writing Annual Reports. **Infographics:** Visual Communication- What Are Infographics?, The Science of Visualization, Creating Infographics- Purpose, The Art of Observation, Processing Your Ideas, Designing Your Infographics, Publishing Your Infographics.	**15**

III	**Content Tools:** Research and Knowledge Management Tools, Writing Tools, Productivity Tools, Editing Tools, A Few Great Style Guides, Non-Text Writing Tools, Blog Idea Generators, Google Authorship, Image Sources, Tools for Content Writing. **Ethical and Legal aspects of content writing:** Learn Legal English, Learn Legal Vocabulary In Legal Writing, IPR Laws, and Copywriting, Plagiarism laws in Content Writing**.**	**15**

Textbooks:

1. Content Writing Handbook, Author:Kounal Gupta, 2020, Henry Harvin.
2. Feldar, Lynda. Writing for the Web: Creating Compelling Web Content Using Words, Pictures, and Sound. New Riders, CA, USA, 2011

Additional References:

1. Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content Paperback Ann Handley Pan Macmillan India 2016
2. The Power of Infographics: Using Pictures to Communicate and Connect With Your Audiences Paperback – 15 June 2012 Mark Smiciklas
3. Law Relating to Intellectual Property Rights Book by V. K. Ahuja, 2017

Web Resources:

1. https://www.locationrebel.com/b2b-writing/
2. https://www.mindler.com/blog/how-to-become-a-content-writer-in-india/
3. https://study.com/articles/What_is_a_Content_Writer.html
4. https://www.mondaq.com/india/contracts-and-commercial-law/445620/legal-contractsagreements-drafting-and-legal-vetting
5. https://www.crazyegg.com/blog/copywriting/

Course Code	Course Title	Credits	Lectures /Week
USCS3072	**Green Technologies**	**2**	**3**

About the Course:
This course focuses on familiarizing learners with the need and relevance of Green Computing, Technology, and its practices for creating a sustainable work and production environment for the IT-enabled sector. The course emphasizes the use of principles and practices of green services and regulatory standards for addressing the carbon issues and related concerns.

Course Objectives:

- Know about Green IT Fundamentals: Business, IT, and the Environment
- Green IT Strategies and Significance of Green IT Strategies
- Green Enterprise Architecture and Green Information Systems
- Sociocultural Aspects of Green IT and Green Compliance

Learning Outcomes:
After successful completion of this course, students would be able to

- Explain drivers and dimensions of change for Green Technology
- Appreciate Virtualization; smart meters and optimization in achieving green IT
- Gain knowledge about green assets, green processes, and green enterprise architecture
- ISO 14001 and related standards for Audit for Green Compliance

Unit	Topics	No of Lectures
I	**Green IT Fundamentals:** Information Technology and Environment, Business, Environment, and Green Enterprise Characteristics, Green Vision and Strategic Points, Green Value, Green IT Opportunity, Challenges of a Carbon Economy, Environmental Intelligence, Envisioning the Green Future **Green IT Strategies**: Green strategic alignment, Green IT Drivers-Cost, Regulatory and Legal, Sociocultural and Political, Business ecosystem, New market opportunities, Green IT Business Dimensions, KPIs in Green Strategies **Environmentally Responsible Business:** Developing ERBS, Policies, Practices, and Metrics, Mobility and Environment, Green It Metrics and Measurements, Green IT Readiness and CMM, Context Sensitivity and Automation in Green IT Measures **Green Assets:** Introduction, Green Assets, Green IT Hardware, Green Data Centers and ICT Equipment, Server and Data Strategy	**15**
II	**Green Assets and emerging Trends:** Data Servers Optimization and Virtualization, Physical Data Server Organization and Cooling, Cloud Computing and Data Centers, Networking and Communications Infrastructure, End-User Devices, Smart Meters in Real-Time, Managing	**15**

	Devices for Central Green Services, Devices and Organizational Boundaries for Measurements, Mobile Devices, and Sustainability **Green Business Process Management:** Introduction, Green Reengineering, Green Process, Green BPM and standards, Green Business Analysis, Green Requirements Modelling, Green IT Governance, Green Business Process and Applications, QoS, Achieving green BPM, Green Mobile Business Process, Digital Library **Green Enterprise Architecture:** Green IT and organizational Systems, Aspects of Green Solutions Architecture, Contents and Integration with Service-Oriented Architecture, Green Supply Chain Management, Green Portals in Green Enterprise Architecture, Environmental Intelligence	
III	**Green Information Systems(GIS): Design and Development Models:** Describing GIS, GIS Requirements **Sociocultural Aspects of Green IT:** Green IT's Social Impact, Learning Organization, Green Social Stakeholders, Role-Based View of Green IT, Green User Practices, Attitude and Subjectivity in Green IT, Green IT Ethics and Code of Conduct, Privacy and Security of Green Information, Green Washing, Communications in Green Transformation Projects, Green HR and Changing Organizational Structures, Green-Collar Workers: Roles and Skill Sets, Green Virtual Communities **Green Compliance: Protocols, Standards, and Audits:** Protocols and Standards, ISO 14000-2004 Standard, Various initiatives by stakeholders, Green Audits and types, Audit and use of Carbon emission management software **Emerging Carbon Issues:** Technologies and Future: Future Carbon Landscape, Green ICT and Technology Trends, Cloud Computing, Nanotechnology, Quantum computing, Renewable energies, eco-design, Collaborative environmental intelligence	**15**

Textbooks:

1. Green IT Strategies and Applications Using Environmental Intelligence, Bhuvan Unhelkar, CRC Press, 2016
2. Green Information and Communication Systems for a Sustainable Future, Rajshree Srivastava, Sandeep Kautish, Rajeev Tiwari. CRC Press, 2020

Additional References:

1. Emerging Green Technologies, Matthew N. O. Sadiku, Taylor and Francis (CRC Press), 2022
2. Sustainability Awareness and Green Information Technologies, Tomayess Issa, Springer, 2021
3. Environmental Sustainability Role of Green Technologies, P. Thangavel, and G. Sridevi, Springer, 2016

Semester IV

Course Code	Course Title	Credits	Lectures /Week
USCS401	**Theory of Computation**	**2**	**3**

About the Course:
The course provides a comprehensive insight into theory of computation by understanding grammar, languages and other elements of modern language design. It also helps to develop capabilities to design and develop formulations for computing models and identify its applications in diverse areas.

Course Objectives:

- To give an overview of the theoretical foundations of computer science from the perspective
- of formal languages
- To illustrate finite state machines to solve problems in computing
- To explain the hierarchy of problems arising in the computer sciences.
- To familiarize Regular grammars, context frees grammar.

Learning Outcomes:
After successful completion of this course, students would be able to

- Understand Grammar and Languages
- Learn about Automata theory and its application in Language Design
- Learn about Turing Machines and Pushdown Automata
- Understand Linear Bound Automata and its applications

Unit	Topics	No of Lectures
I	**Automata Theory:** Defining Automaton, Finite Automaton, Transitions and Its properties, Acceptability by Finite Automaton, Nondeterministic Finite State Machines, DFA and NDFA equivalence, Mealy and Moore Machines, Minimizing Automata. **Formal Languages:** Defining Grammar, Derivations, Languages generated by Grammar, Chomsky Classification of Grammar and Languages, Recursive Enumerable Sets, Operations on Languages, Languages and Automata	**15**
II	**Regular Sets and Regular Grammar:** Regular Grammar, Regular Expressions, Finite automata and Regular Expressions, Pumping Lemma and its Applications, Closure Properties, Regular Sets and Regular Grammar **Context Free Languages:** Context-free Languages, Derivation Tree, Ambiguity of Grammar, CFG simplification, Normal Forms, Pumping Lemma for CFG **Pushdown Automata:** Definitions, Acceptance by PDA, PDA and CFG	**15**

III	**Linear Bound Automata:** The Linear Bound Automata Model, Linear Bound Automata and Languages. **Turing Machines:** Turing Machine Definition, Representations, Acceptability by Turing Machines, Designing and Description of Turing Machines, Turing Machine Construction, Variants of Turing Machine, **Undecidability:** The Church-Turing thesis, Universal Turing Machine, Halting Problem, Introduction to Unsolvable Problems	**15**

Textbooks:

1. Theory of Computer Science, K. L. P Mishra, Chandrasekharan, PHI,3rd Edition 2019
2. Introduction to Computer Theory, Daniel Cohen, Wiley, 2nd Edition, 2007
3. Introductory Theory of Computer Science, E.V. Krishnamurthy, Affiliated East-West Press, 2009

Additional References:

1. Theory of Computation, Kavi Mahesh, Wiley India, 2018
2. Elements of The Theory of Computation, Lewis, Papadimitriou, PHI, 2015
3. Introduction to Languages and the Theory of Computation, John E Martin, McGraw-Hill Education, 2010
4. Introduction to Theory of Computation, Michel Sipser, Thomson
5. Introduction to Automata Theory, Languages and Computation, John E. Hopcroft, Pearson Education, 2014

Course Code	Course Title	Credits	Lectures /Week
USCSP401	**Theory of Computation – Practical**	**1**	**3**
1	Write a program for tokenization of given input		
2	Write a program for generating regular expressions for regular grammar		
3	Write a program for generating derivation sequence / language for the given sequence of productions		
4	Design a Program for creating machine that accepts three consecutive one.		
5	Design a Program for creating machine that accepts the string always ending with 101.		
6	Design a program for accepting decimal number divisible by 2.		
7	Design a program for creating a machine which accepts string having equal no. of 1's and 0's.		
8	Design a program for creating a machine which count number of 1's and 0's in a given string.		
9	Design a PDA to accept WCWR where w is any string and WR is reverse of that string and C is a Special symbol.		
10	Design a Turing machine that's accepts the following language an b n c n where n>0		

Course Code	Course Title	Credits	Lectures /Week
USCS402	**Computer Networks**	**2**	**3**

About the Course:
This course introduces computer networks, with a special focus on the Internet architecture and protocols. The course includes topics such as network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, web, email and other application layer protocols.

Course Objectives:

- To Understand Basic Concepts of Networking.
- To Understand Working of Network Layer Architecture.
- To Learn Practical Implementation of Basic Routing Algorithms.
- To Learn Different Networking Protocols.

Learning Outcomes:
After successful completion of this course, students would be able to

- Learn basic networking concepts and layered architecture.
- Understand the concepts of networking, which are important for them to be known as a 'networking professionals'.

Unit	Topics	No of Lectures
I	**Introduction:** Networking standards and Administrations, networks, network types – LAN, MAN, WAN. **Network Models:** The OSI model, TCP/IP protocol suite, **Introduction to Physical layer:** Data and signals, periodic analog signals, digital signals, transmission impairment, data rate limits, performance. **Digital transmissions:** Digital-to-digital conversion, analog-to-digital conversion, transmission modes **Analog transmissions:** digital-to-analog conversion, analog-to-analog conversion. **Bandwidth Utilization – Multiplexing and Spectrum spreading:** Multiplexing, Spread Spectrum **Transmission media:** Guided Media, Unguided Media **Switching:** Introduction, Circuit Switched Network, Packet Switching.	**15**
II	**Introduction to Data Link Layer:** Link layer addressing, Data Link Layer Design Issues. **Error detection and correction**: -Block coding, cyclic codes, checksum, forward error correction, error correcting codes, error detecting codes.	**15**

	Data Link Control: DLC services, data link layer protocols, HDLC, Point-to-point protocol. **Media Access Control:** Random access, controlled access, channelization, **Wired LANs – Ethernet:** Ethernet Protocol, standard Ethernet, fast Ethernet, gigabit Ethernet, 10 gigabit Ethernet **Wired Network:** Telephone Network, Cable Network, SONET, ATM **Wireless LANs:** Introduction, IEEE 802.11 project, Bluetooth, WiMAX, Cellular telephony, Satellite networks. **Introduction to Network Layer:** Network layer services, packet switching, network layer performance, IPv4 addressing, forwarding of IP packets, **Network Layer Protocols** : Internet Protocol, ICMPv4, Mobile IP	
III	**Unicast Routing:** Introduction, routing algorithms, unicast routing protocols. **Next generation IP:** IPv6 addressing, IPv6 protocol, ICMPv6 protocol, transition from IPv4 to IPv6. **Introduction to the Transport Layer:** Transport Layer Protocol, User Datagram Protocol, Transmission Control Protocol, SCTP. **Introduction to Application Layer:** Client Server Programming, Iterative Programming. **Standard Client-Server Protocols:** WWW, HTTP, FTP, Electronic Mail, TELNET, Secure Cell, DNS, SNMP **Quality of Service:** Data Flow to improve QoS, Flow control to improve QoS, Integrated service (Intserv), Differentiated Service(Diffserv).	**15**

Textbooks:

1. Data Communications and Networking, Behrouz A. Forouzan, Fifth Edition, TMH, 2018.
2. Computer Network, Andrew S. Tanenbaum, David J. Wetherall, Fifth Edition, Pearson Education, 2018.

Additional References:

1. Computer Network, Bhushan Trivedi, Oxford University Press, 2016
2. Data and Computer Communication, William Stallings, PHI, 2017

Course Code	Course Title	Credits	Lectures /Week
USCSP402	**Computer Networks – Practical**	**1**	**3**
1	Using, linux-terminal or Windows-cmd, execute following networking commands and note the output: ping, traceroute, netstat, arp, ipconfig, Getmac, hostname, NSLookUp, pathping, SystemInfo		
2	Using Packet Tracer, create a basic network of two computers using appropriate network wire. Use Static IP address allocation and show connectivity		
3	Using Packet Tracer, create a basic network of One server and two computers using appropriate network wire. Use Dynamic IP address allocation and show connectivity		
4	Using Packet Tracer, create a basic network of One server and two computers and two mobile / movable devices using appropriate network wire. Show connectivity		
5	Using Packet Tracer, create a network with three routers with RIPv1 and each router associated network will have minimum three PC. Show Connectivity		
6	Using Packet Tracer, create a network with three routers with RIPv2 and each router associated network will have minimum three PC. Show Connectivity		
7	Using Packet Tracer, create a network with three routers with OSPF and each router associated network will have minimum three PC. Show Connectivity		
8	Using Packet Tracer, create a network with three routers with BGP and each router associated network will have minimum three PC. Show Connectivity		
9	Using Packet Tracer, create a wireless network of multiple PCs using appropriate access point.		
10	Using Wireshark, network analyzer, set the filter for ICMP, TCP, HTTP, UDP, FTP and perform respective protocol transactions to show/prove that the network analyzer is working		

Course Code	Course Title	Credits	Lectures /Week
USCS403	**Software Engineering**	**2**	**3**

About the Course:
This course covers a collection of methods which embody an "engineering" approach to the development of software. It discusses the nature of software and software projects, software development models, software process maturity, project planning, management, and estimations. It also underlines the topics on software testing and quality assurance.

Course Objectives:

- To learn and understand the Concepts of Software Engineering
- To learn and understand Software Development Life Cycle
- To apply the project management and analysis principles to software project development.
- To apply the design & testing principles to software project development.

Learning Outcomes:
After successful completion of this course, students would be able to

- Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements
- Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.
- Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice
- Able to use modern engineering tools necessary for software project management, time management and software reuse.

Unit	Topics	No of Lectures
I	**Introduction:** The Nature of Software, Software Engineering, Professional Software Development, Layered Technology, Process framework, CMM, Process Patterns and Assessment Prescriptive Models: Waterfall Model, Incremental, RAD Models Evolutionary Process Models: Prototyping, Spiral and Concurrent Development Model Specialized Models: Component based, Aspect Oriented development, The Unified Process Phases, Agile Development- Agility, Agile Process, Extreme Programming **Requirement Analysis and System Modeling:** Requirements Engineering, Eliciting Requirements, SRS Validation, Components of SRS, Characteristics of SRS, Object-oriented design using the UML - Class diagram, Object diagram, Use case diagram, Sequence diagram, Collaboration diagram, State chart diagram, Activity diagram, Component diagram, Deployment diagram	**15**

II	**System Design:** System/Software Design, Architectural Design, Low-Level Design Coupling and Cohesion, Functional-Oriented Versus Object-Oriented Approach, Design Specifications, Verification for Design, Monitoring and Control for Design **Software Measurement and Metrics:** Process Metrics and Project Metrics, Software Measurement, Object Oriented Metrics, Software Project Estimation, Decomposition Techniques, LOC based, FP based and Use case based estimations, Empirical estimation Models **Software Project Management: Estimation** in Project Planning Process –Software Scope and Feasibility, Resource Estimation, Empirical Estimation Models – COCOMO II, Estimation for Agile Development, The Make/Buy Decision **Project Scheduling -** Basic Principles, Relationship Between People and Effort, Effort Distribution, Time-Line Charts	**15**
III	**Risk Management -** Risk strategies, Software risks, Risk Identification, projection, RMMM Quality Concepts **Software Quality Assurance** SQA activities, Software reviews, FTR, Software reliability and measures, SQA plan Software Configuration Management, elements of SCM, SCM Process, Change Control Capability Maturity Model **Software Testing :** Verification and Validation, Introduction to Testing, Testing Principles, Testing Objectives, Test Oracles, Levels of Testing, White-Box Testing/Structural Testing, Functional/Black-Box Testing, Test Plan, Test-Case Design	**15**

Textbooks:

1. Software Engineering, A Practitioner's Approach, Roger S, Pressman, 2019
2. Software Engineering: principles and Practices, Deepak Jain, OXFORD University Press, 2008

Additional References:

1. Software Engineering, Ian Sommerville, Pearson Education, 2017
2. Fundamentals of Software Engineering, Fourth Edition, Rajib Mall, PHI, 2018
3. Software Engineering: Principles and Practices, Hans Van Vliet, John Wiley & Sons, 2010
4. A Concise Introduction to Software Engineering, Pankaj Jalote, Springer

Course Code	Course Title	Credits	Lectures /Week
USCSP403	**Software Engineering – Practical**	**1**	**3**

Perform the following exercises for any two projects given in the list of sample projects or any other projects:

1	Write down the problem statement for a suggested system of relevance
2	Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3	Draw the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4	Draw the user‘s view analysis for the suggested system: Use case diagram.
5	Draw the structural view diagram for the system: Class diagram, object diagram.
6	Draw the behavioral view diagram : State-chart diagram, Activity diagram
7	Draw the behavioral view diagram for the suggested system: Sequence diagram, Collaboration diagram
8	Draw the implementation and environmental view diagram: Component diagram, Deployment diagram
9	Perform Estimation of effort using FP Estimation
10	Prepare time line chart/Gantt Chart/PERT Chart
11	Develop test cases for unit testing and integration testing
12	Develop test cases for various white box and black box testing

List of sample projects

a. Student Result Management System
b. Library management system
c. Inventory control system
d. Accounting system
e. Fast food billing system
f. Bank loan system
g. Blood bank system
h. Railway reservation system
i. Automatic teller machine
j. Video library management system
k. Hotel management system
l. Hostel management system
m. Share online trading
n. Hostel management system
o. Resource management system
p. Court case management system

Course Code	Course Title	Credits	Lectures /Week
USCS404	**IoT Technologies**	**2**	**3**

About the Course:

The course aims to provide basic understanding of SoC architectures; IoT, different types of IoT platforms and different types of applications that can be built.

Course Objectives:

- Introduce concepts of SoC and IoT
- Introduce various types of IoT platforms
- Interfacing various types of devices using different protocols with IoT
- Understand practical applications of IoT in real life world

Learning Outcomes:

After successful completion of this course, students would be able to

- understand SoC and IoT
- use different types of IoT Platforms and interfaces
- understand and implement an idea of various types of applications built using IoT

Unit	Topics	No of Lectures
I	**Fundamentals of IoT:** Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M. **System on Chip:** What is System on chip? Structure of System on Chip. SoC Elements: FPGA, GPU, APU, Compute Units. **Different types of IoT/SoC Platforms:** Introduction to Raspberry Pi, Arduino & NodeMCU, Introduction to SoC-ARM Architecture, atmega328 architecture	**15**
II	**Interfacing with IoT Platforms:** Basic hardware components like LED, Button, Camera, 8X8 LED Grid, Motor etc and interfacing them for input/output with IoT devices using PWM, UART, GPIO, I2C, SPI **Using Sensor & Actuators**: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor, Level Sensors, Ultrasonic sensors, Interfacing of Actuators, Interfacing of Relay Switch and Servo Motor **IoT and Protocols IoT Security:** HTTP, UPnP, CoAP, MQTT, XMPP, Privacy and Security Issues in IoT.	**15**

III	**IoT & Web:** Web server for IoT, Sending/Receiving data between web server & IoT device, Cloud for IoT, Node RED, M2M vs IoT Communication Protocols, Basics of WSNs, WSN architecture and types, **IoT Applications:** Modern IoT case studies / applications used in the areas of transportation, agriculture, health care etc **Edge Computing:** Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.	**15**

Textbooks:

1. Introduction to IoT Paperback by Sudip Misra , Anandarup Mukherjee , Arijit Roy , Cambridge Press, 2022
2. Jain, Prof. Satish, Singh, Shashi, "Internet of Things and its Applications", 1st Edition, BPB, 2020.
3. Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram, Internet of Things, Wiley, India, 2019
4. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt Publishing, 2020

Additional References:

1. Internet of Things by Vinayak Shinde, SYBGEN Learning India Pvt. Ltd, 2020
2. Internet of things, Dr. Kamlesh Lakhwani, Dr. Hemant kumar Gianey, Josef Kofi Wireko, Kamalkant Hiran, BPB Publication, 2020
3. Arduino, Raspberry Pi, NodeMCU Simple projects in easy way by Anbazhagan k and Ambika Parameswari k, 2019.
4. IoT based Projects: Realization with Raspberry Pi, NodeMCU Paperback – February 2020, by Rajesh Singh Anita Gehlot, 2020
5. Mastering the Raspberry Pi, Warren Gay, Apress, 2014

Course Code	Course Title	Credits	Lectures /Week
USCSP404	**IoT Technologies – Practical**	**1**	**3**
1	Preparing Raspberry Pi: Hardware preparation and Installation		
2	Demonstrate Arduino Uno and its pins interfacing with IDE.		
3	GPIO: Light the LED with Python with/without a button using either Uno/Raspberry Pi.		
4	SPI: Camera Connection and capturing Images/Videos using SPI		
5	GPIO: LED Grid Module: Program the 8X8 Grid with Different Formulas		
6	Stepper Motor Control: PWM to manage stepper motor speed using Uno/Raspberry Pi.		
7	Node RED: Connect LED to Internet of Things		
8	Use different types of sensors (LDR, Temperature) with Raspberry Pi/Uno.		
9	Trigger a set of led GPIO on any IoT platform via any related web server		
10	Interface with any sensor and send its value over the internet to the server using any suitable protocol		

Course Code	Course Title	Credits	Lectures /Week
USCS405	**Android Application Development**	**2**	**3**

About the Course:
This course is aimed at creating a skilled IT workforce that is focused on developing Apps for mobile and smart Android-based computing platforms. It familiarises the development of android applications using Kotlin for problems that address real-life needs ranging from intuitive UI to rich multimedia experience.

Course Objectives:

- Kotlin Programming Language for application development
- Creating robust mobile applications on simulators and physical devices
- Creating intuitive, reliable mobile apps using the android services and components
- Handling data local and remote data storage
- Create a seamless user interface that works with different mobile screens

Learning Outcomes:
After successful completion of this course, students would be able to

- Build useful mobile applications using Kotlin language on Android
- Install and configure Android Studio for application development
- Master basic to intermediate concepts of Kotlin required for mobile application development
- Use built-in widgets and components, work with the database to store data
- Master key Android programming concepts and deploy the application on Google Play

Unit	Topics	No of Lectures
I	**Introduction to Kotlin**: Basics of Kotlin, type conversions, comments, Kotlin operators, variables in Kotlin, packages, visibility modifiers, control flow statements, Concept of OOPS in Kotlin, classes in Kotlin, delegation and extension functions, the companion object, **Advanced Concepts in Kotlin:** declaring and calling functions, parameters, and arguments in Kotlin, default argument, variable number of arguments, unit-returning function, explicit return type, lambda expression, coroutines, Collections in Kotlin, Mutable and Immutable Collections, Ranges, type Checks, casting concept, this expression, Null safety, exception handling, annotations **App Development with Android Studio**: Android Architecture, Android Application Framework, Android Virtual Device, Creating and running First Android Application, working with Physical Android Device, Adding Kotlin Files in Android Studio **Basics Of Android**- Application Components: Activities, Intent, and Broadcast Receiver, Services, Fragment, Activity Life Cycle, Content Provider, Widgets, and Notifications	**15**

II	**Designing Android UI**: User Interface (UI), Layout and Its Types, Layout Attribute, working with Views, Android UI Controls, Styles and Themes, Event Handler, setting up themes in Manifest and from the application, dialog in activity, using intents, fragments **Handle Images, Listview And Menu**: ImageView, ImageSwitcher, ListView, Menu, and its types**,** Designing menu in XML, Option menu, Context menu, popup menu, **Screen** Navigation, RecyclerView, Interaction of Views **Data binding in Android-**AdapterView, Spinner, Gallery view, AutotextCompleteView, screen orientation, Design the view dynamically **Implementing Data Persistence**: Data Storage-Shared Preference, Internal And External Storage Storing Data Using SQLite Databases, Content Provider, Firebase Real-Time Data	**15**
III	**Graphics, Animations, and Integrating Media in Android:** Drawable Class, Animation in Android, MediaPlayer API and in Android, Mediaplayer and AudioManger Class, **Interacting With Camera** and input gestures: Android Camera, Input gestures-multiple touch, swipe, drag, scroll, zoom, Recording **Gathering Location Data:** **Managing Background Tasks:** Broadcaset Receivers, Services, Threads and Process, AsyncTask, JobScheduler, Manage device Awake State **Deploying Android applications on Google Play**-Publishing/Deploy the application, Versioning, signing Application	**15**

Textbooks:

1. How to Build Android Apps with Kotlin: A hands-on guide to developing, testing, and publishing your first apps with Android, Alex Forrester, Packt Publishing, 2021
2. Android Programming: Crafting UI/UX using Kotlin, SYBGEN Learning, 2020

Additional References:

1. Head First Android Development: A Learner's Guide to Building Android Apps with Kotlin Dawn Griffiths, 3rd Edition, O'Reilly Media, 2021
2. Android Studio 4.2 Development Essentials - Kotlin Edition: Developing Android Apps Using Android Studio 4.2, Kotlin and Android Jetpack, Neil Smyth, Payload Media, 2021
3. Android Programming with Kotlin for Beginners, John Horton, Packt Publishing, 2019
4. Android Development with Kotlin: Enhance your skills for Android development using Kotlin, Marcin Moskala, Packt Publishing

Course Code	Course Title	Credits	Lectures /Week
USCSP405	**Android Application Development – Practical**	**1**	**3**
1	i. Write a program using Kotlin to implement control structures and loops. ii. Write a program to implement object-oriented concepts in Kotlin.		
2	i. Create an Android application to design screens using different layouts and UI including Button, Edittext, Textview, Radio Button etc. ii. Write an android application demonstrating response to event/user interaction for a. Checkbox b. Radio button c. Button d. Spinner		
3	i. Create an application to create Image Flipper and Image Gallery. On click on the image display the information about the image. ii. Create an application to use Gridview for shopping cart application.		
4	i. Create an Android application to demonstrate implicit and explicit intents ii. Create an application to demonstrate shared preferences		
5	i. Create an Android application to demonstrate the use of Broadcast listeners. ii. Create an Android application to create and use services.		
6	i. Create an Android application to demonstrate XML based animation ii. Create an Android application to display canvas and allow the user to draw on it.		
7	i. Create a media player application in android that plays audio. Implement play, pause, and loop features. ii. Create an Android application to use a camera and capture image/video and display them on the screen.		
8	i. Create an android application to implement Asynctask and threading concepts. ii. Create an Android application to demonstrate the different types of menus. a. Pop-up Menu b. Context Menu c. Option Menu		
9	Create an Android application to record the current location. Based on the current location allow the user to use some useful services/applications		
10	Create a suitable Android application to store and retrieve data in the SQLite database.		
11	Create a suitable Android application to work with Firebase for storing and manipulating data.		

Course Code	Course Title	Credits	Lectures /Week
USCS406	**Advanced Application Development**	**2**	**3**

About the Course:
The course aims at developing scalable, robust, and maintainable web applications using MEAN stack and developing advanced mobile applications using Flutter

Course Objectives:

- To understand all the necessary and important technologies such as MongoDB, Express.js, AngularJS, and Node.js.
- To understand modern app development using Flutter

Learning Outcomes:
After successful completion of this course, students would be able to

- Store the data in NoSQL, document-oriented MongoDB database that brings performance and scalability.
- Use Node.js and Express Framework for building fast, scalable network applications
- Use AngularJS framework that offers declarative, two-way data binding for web applications.
- Integrate the front-end and back-end components of the MEAN stack.
- Develop robust mobile applications using Flutter.

Unit	Topics	No of Lectures
I	**Node.js (N):** Introduction to Node.js. Installing Node.js. The package.json File. The Node.js Event Loop. The I/O Cycle. The Anatomy of a Node.js Module. Creating Node Modules. Exploring the Node.js HTTP Module. Creating an HTTP Webserver with Node.js. Responding to HTTP Requests. Routing in Node.js. Creating a Sample Node.js Application. **MongoDB(M):** Introduction to MongoDB. Installing MongoDB. Using MongoDB Compass. Using Mongo Shell Interface. Connecting to MongoDB. Creating Schemas and Models. Querying Documents Using find(). Inserting Documents Using create(). Updating Documents Using findOneAndUpdate(). Deleting Documents Using findOneAndDelete() & deleteMany()	**15**
II	**Server-Side Development with Express (E):** Introduction to the Express Framework. Installing and Testing Express. Creating a Node.js Express App. Restructuring an Express App. Creating Templates. Using Express Middleware Functions. Creating the List Page. Creating the Details Page. Creating the Edit Page. Creating the Add Page. Deleting Data. REST API Basics. Testing REST APIs. Refactoring APIs. **Understanding Angular.JS(A):** Getting Started with Angular. Creating an Angular Application. Angular Project File Structure. Anatomy of an Angular	**15**

	Component. One-way Data Binding. Two-way Data Binding. Using Nglf Directive. Using NgForOf Directive. Angular Modules. Creating NgModules Using Angular Router. Configuring Templates. Creating Navigations. Working with Template-driven Forms. Working with Reactive Forms. Validating Form Data. Services Dependency Injection (DI). Reading Data from Database. Inserting Data into Database. Updating Data in the Database. Delete Data from Database.	
III	**Understanding Flutter:** Importance of Flutter, Flutter Framework, Android Studio, Flutter SDK, Installing and Configuring Flutter SDK. **Dart Programming**: main() function, Dart Variables, Dart Data Types, Dart Conditional Operators, Control Flow & Loops. Dart Functions - Functions, Function Structure, creating a Function, Function Returning Expression. Object-Oriented Programming (OOP) - Creating a Class, Adding Methods to Classes, Class — Getters and Setters, Class Inheritance, Abstract Class. **Flutter Widgets Fundamentals**: Scaffold Widget, Image Widget, Container Widget, Column and Row Widgets, Icon Widget, Layouts in Flutter, Card Widget, Hot Reload and Hot Restart, Stateful and Stateless Widgets **Navigation and Routing:** Button Widget, App Structure and Navigation, Navigate to a New Screen and Back, Navigate with Named Routes, Send and Return Data among Screens, Animate a Widget across Screens, WebView Widget in Flutter	**15**

Textbooks:

1. Node.js, MongoDB and Angular Web Development: The definitive guide to using the MEAN stack to build web applications by Brad Dayley, Brendan Dayley, Caleb Dayley, Pearson, 2018.
2. Beginning Flutter: A Hands On Guide to App Development by Marco L. Napoli, Wrox, 2019

Additional References:

1. Full Stack Javascript Development with Mean - MongoDB, Express, AngularJS, and Node.JS by Adam Bretz, Colin J Ihrig, Shroff/SitePoint, 2015
2. Practical Flutter by Zammetti Frank, Apress, 2019

Course Code	Course Title	Credits	Lectures /Week
USCSP406	**Advanced Application Development – Practical**	**1**	**3**
1	Write a program to implement MongoDB data models		
2	Write a program to implement CRUD operations on MongoDB		
3	Write a program to perform validation of a form using AngularJS		
4	Write a program to create and implement modules and controllers in Angular JS		
5	Write a program to implement Error Handling in Angular JS		
6	Create an application for Customer / Students records using AngularJS		
7	Write a program to create a simple web application using Express, Node JS and Angular JS		
8	Create a simple HTML “Hello World” Project using AngularJS Framework and apply ng-controller, ng-model and expressions		
9	Create an app using Flutter for User Authentication		
10	Create an app using Flutter to implement an Image Gallery		
11	Create an app using Flutter to demonstrate the use of different layouts		
12	Create an app using Flutter to demonstrate navigation in an App		

Course Code	Course Title	Credits	Lectures /Week
USCS4071	**Research Methodology**	**2**	**3**

About the Course:
The course aims to understand the basics research, how research problems are defined, research methods are adopted and/or developed, research is undertaken, and how research results are communicated to the peers.

Course Objectives:

- The research methodology course is proposed to assist students in planning and carrying out research projects.
- The students are exposed to the principles, procedures and techniques of implementing research project.
- The course starts with an introduction to research and carries through the various methodologies involved.
- It continues with finding out the literature using technology, basic statistics required for research and finally report writing.

Learning Outcomes:
After successful completion of this course, students would be able to

- Define research, formulate problem and describe the research process and research methods.
- Understand and apply basic research methods including research design, data analysis and interpretation.
- Understand ethical issues in research, write research report, research paper and publish the paper.

Unit	Topics	No of Lectures
I	**Introduction to Research Methodology:** Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research. **Defining the Research Problem:** Concept and need, Identification of Research problem, defining and delimiting Research problem. **Formulating a Research Problem:** Reviewing Literature, formulating a Research Problem, Research Question, Identifying Variables, Constructing Hypothesis **The Research Design**: Meaning, Need for Research Design, Important Concepts, Different Research Designs, Basic Principles of Experimental Designs.	**15**
II	**Tools for Data Collection**: Collections of Primary Data, Collection of Data through questionnaire and Schedules, other Observation Interview Methods,	**15**

	Collection of Secondary Data, Selection of appropriate method for data collection, Case Study, Focus Group Discussion, Techniques of developing research tools, viz. Questionnaire and rating scales etc. Reliability and validity of Research tools. **Sampling Design:** Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, how to Select a Random Sample. Probability and Non-Probability sampling types and criteria for selection, Developing sampling Frames. **Overview of Hypothesis Testing:** What is a Hypothesis? Characteristics of good Hypothesis. Basic Concepts, Procedure for Hypothesis Testing, Flow Diagram for Hypothesis Testing, Tests of Hypotheses, and One sided and two-sided hypothesis, Type – I and Type – II errors, Null Hypothesis-Alternative Hypothesis.	
III	**Technical Writing:** Writing a Research Proposal, what is a Scientific Paper? Ethics in Scientific Publishing. **Preparing the Text:** How to Prepare the Title, how to List the Authors and Addresses, how to Prepare the Abstract, how to Write the Introduction, how to Write the Materials and Methods Section, how to Write the Results, how to Write the Discussion, how to State the Acknowledgments, how to Cite the References. **Preparing the Tables and Figures:** How to Design Effective Tables, how to Prepare Effective Graphs, how to Prepare Effective Photographs. **Publishing the Paper:** Rights and Permissions, How to Submit the Manuscript, How and When to Use Abbreviations, How to Write a thesis, Outcome of Research, Ethical issues in research	**15**

Textbooks:

1. Kothari C.R., Research Methodology, New Age International Publication, 2019
2. Research Methodology-A Step-by-Step Guide for Beginners, (4th ed.), Ranjit Kumar, Singapore, Pearson Education, 2018
3. Research Methodology, Vaishali Khairnar, Staredu Solutions India Pvt Ltd, 2020

Additional References:

1. Research Methodology: Methods and Techniques, Dr. R. K. Jain, , Fifth Edition, VEI, 2021
2. Research Methodology, R. Panneerselvam, Second Edition, PHI, 2014
3. Dr. Rachna Jain, Research Methodology, Maximax Publishing House
4. How to Write and Publish a Scientific Paper, Cambridge University Press, Barbara Gastel and Robert A. Day, 2017

Course Code	Course Title	Credits	Lectures /Week
USCS4072	**Management & Entrepreneurship**	**2**	**3**

About the Course:
The aim of the course is to develop conceptual understanding of management and administration, and comprehend the environment of making of an entrepreneur. The course focuses on giving students the business management and innovation skills required to succeed in a startup

Course Objectives:

- To understand the idea of management, process and its levels.
- To understand the perception of entrepreneurship, process and its types.
- To understand the concept SSI and steps to start SSI.
- To understand the selection of project, project report, project appraisal, and its feasibility.

Learning Outcomes:
After successful completion of this course, students would be able to

- Understand the meaning of management, functions, administration and its process.
- Understand the foundation of entrepreneurship and its theory, types and its process.
- Identify the steps involved in an entrepreneurial venture (SSI).
- Understand an entrepreneur is converting his business ideas into running concern by selecting the project.

Unit	Topics	No of Lectures
I	**Introduction: Meaning,** Meaning, Characteristics of Management, Nature of Management, Management Functions, Functional Areas of Management, Management and Administration, Role of Management, Levels of Management, Evolution of Management **Planning:** Meaning, Nature, importance, types of planning, types of plans, planning process, decision-making. **Organizing and staffing:** Meaning and Definitions of Organizing, Steps in Organizing, Nature of Organization, Organization Structure, Purpose of Organization, Principles of Organization, Departmentation, Types of Organization, Span of Control, Authority, Power and Responsibility, Delegation of Authority, Centralization and Decentralization, Delegation vs Decentralization, Management by Objectives [MBO], Meaning of Staffing, Nature and Importance of Staffing, Recruitment, Selection.	**15**
II	**Directing and Controlling:** Meaning and Nature of Direction, Principles of Directing, Leadership and Leadership Styles, Motivation, Communication, Noise and Feedback in Communication, Importance of Communication, Channels of Communication, Types of Communication, Forms of Communication, Coordination, Coordination and Cooperation, Importance	**15**

	of Coordination, Techniques of Coordination, Managerial Control, Steps in a Control Process, Essentials of a Sound Control System, Control Methods. **Entrepreneurship:** Evolution of Concept of Entrepreneur, Concept of Entrepreneur, Characteristics of Entrepreneur, Distinction between Entrepreneur and Manager, Technical Entrepreneur, Charms of Being an Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneurs, Intrapreneurs, Ultrapreneurs, Concept of Entrepreneurship, Evolution of Entrepreneurship, Role of Entrepreneurship in Economic Development, Stages in the Entrepreneurial Process, Barriers to Entrepreneurship	
III	**Small Scale Industry:** Meaning and Definition of Small-Scale Industry, Characteristics of SSI, Objectives, Scope, Role of SSI in Economic Development, Advantages of Small-Scale Industries, steps to Start an SSI, Government Policy towards SSI **Preparation of Project:** Meaning, Project Classification, Project Identification, Project Report and its significance, Contents of a Project Report, Formulation of Project Report, Planning Commission Guidelines, Network Analysis, Common Mistakes by Entrepreneurs in Project Formulation, Project Appraisal, Identification of Opportunity, Project Feasibility study.	**15**

Textbooks:

1. Havinal Veerabhadrappa, Management and Entrepreneurship, New Age International Publishers.
2. Kanishka Bedi, Management and Entrepreneurship, Oxford University Press
3. Dr. R. K. Singal, Entrepreneurship Development and Management

Additional References:

1. P. N. Singh, J. C. Saboo, Entrepreneurship Management, 6th Edition, Dr. P. N. Singh Centre for Hrd Publications.
2. Donald L. Sexton & Raymond W. Smilor, The Art and Science of Entrepreneurship, Ballinger, 2022
3. Clifford M.Baumback & Joseph R.Mancuso, Entrepreneurship And Venture Management, Prentice Hall

Evaluation Scheme

I. Internal Evaluation for Theory Courses – 25 Marks

(i) Mid-Term Class Test – 15 Marks

- It should be conducted using any **learning management system** such as **Moodle** (Modular object-oriented dynamic learning environment)
- The test should have **15 MCQ's** which should be solved in a time duration of **30 minutes.**

(ii) Assignment/ Case study/ Presentations – 10 Marks

- Assignment / Case Study Report / Presentation can be uploaded on any **learning management system**.

II. External Examination for Theory Courses – 75 Marks

- Duration: **2.5 Hours**
- Theory question paper pattern:

	All questions are compulsory.		
Question	**Based on**	**Options**	**Marks**
Q.1	Unit I	*Any 4 out of 6*	20
Q.2	Unit II	*Any 4 out of 6*	20
Q.3	Unit III	*Any 4 out of 6*	20
Q.4	Unit I, II and III	*Any 5 out of 6*	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination

- Each core subject carries 50 Marks
  40 marks + 05 marks (journal) + 05 marks (viva)
- Duration: **2 Hours** for each practical course.
- Minimum **80% practical** from each core subjects are required to be completed.
- **Certified Journal is compulsory for appearing at the time of Practical Exam**
- The final submission and evaluation of **journal in electronic form** using a Learning Management System / Platform can be promoted by college.

UNIVERSITY OF MUMBAI
No. UG/63 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office Circular Nos. UG/108 of 2017-18, dated 27th July, 2017 relating to syllabus of the Bachelor of Science (B.Sc.) degree course.

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in Computer Science at its meeting held on 10th May, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.40 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.Sc. in Computer Science (Sem - V & VI), has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
6th July, 2018

To

The Principals of the affiliated Colleges & Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.40/14/06/2018

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No. UG/ 63 -A of 2018 MUMBAI-400 032 6th July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Ad-hoc Board of Studies in Computer Science,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

Academic Council
Item No: _____

UNIVERSITY OF MUMBAI

Syllabus for SemV&VI
Program: Bachelor of Science
Course: Computer Science

Credit Based Semester and Grading System with effect from
Academic Year 2018-2019

Preamble

This is the third year curriculum in the subject of Computer Science. The revised structure is designed to transform students into technically competent, socially responsible and ethical Computer Science professionals. In these Semesters we have made the advancements in the subject based on the previous Semesters Knowledge.

In the first year basic foundation of important skills required for software development is laid. Second year of this course is about studying core computer science subjects. The third year is the further advancement which covers developing capabilities to design formulations of computing models and its applications in diverse areas.

The proposed curriculum contains two semesters, each Semester contains two Electives: Elective-I and II. Every Elective contains three papers based on specific areas of Computer Science. It also includes one Skill Enhancement paper per semester, helps the student to evaluate his/her computer science domain specific skills and also to meet industry expectations. This revised curriculum has not only taken the specific areas of computer science into consideration but will also give the opportunity to the student to prove his/her ability in the subject practically through the Project Implementation. In Semester V and Semester VI student has to undertake a Project. It can boost his/her confidence and also can encourage the student to perform innovations in the subject as the choice of the Project topic is kept open covering most of the areas of Computer Science subject as per the students interest and the subject they have learned during the Course.

Proposed Curriculum contains challenging and varied subjects aligned with the current trend with the introduction of Machine Intelligence specific subject such as Artificial Intelligence, Information Retrieval. Data Management related subjects such as Cloud Computing and Data Science. Image processing topics such as Game Programming, Digital Image Processing. Introduction of physical world through Architecting of IoT and Wireless Sensor Networks and Mobile Communication. Security domain is also evolved by the introduction of Ethical Hacking, Cyber Forensic and Information and Network Security. To get the hands on experience Linux Server Administration and Web Services topics are included.

In essence, the objective of this syllabus is to create a pool of technologically savvy, theoretically strong, innovatively skilled and ethically responsible generation of computer science professionals. Hope that the teacher and student community of University of Mumbai will accept and appreciate the efforts.

T.Y.B.Sc. (Semester V and VI)
Computer Science Syllabus
Credit Based Semester and Grading System
To be implemented from the Academic year 2018-2019

SEMESTER V			
Course	**TOPICS**	**Credits**	**L / Week**
	Elective-I (Select Any Two)		
USCS501	Artificial Intelligence	3	3
USCS502	Linux Server Administration	3	3
USCS503	Software Testing and Quality Assurance	3	3
	Elective-II (Select Any Two)		
USCS504	Information and Network Security	3	3
USCS505	Architecting of IoT	3	3
USCS506	Web Services	3	3
	Skill Enhancement		
USCS507	Game Programming	2	3
	Practical		
USCSP501	Practical of Elective-I	2	6
USCSP502	Practical of Elective-II	2	6
USCSP503	Project Implementation	1	3
USCSP504	Practical of Skill Enhancement : USCS507	1	3

SEMESTER VI			
Course	**TOPICS**	**Credits**	**L / Week**
	Elective-I (Select Any Two)		
USCS601	Wireless Sensor Networks and Mobile Communication	3	3
USCS602	Cloud Computing	3	3
USCS603	Cyber Forensics	3	3
	Elective-II (Select Any Two)		

USCS604	Information Retrieval	3	3
USCS605	Digital Image Processing	3	3
USCS606	Data Science	3	3
	Skill Enhancement		
USCS607	Ethical Hacking	2	3
	Practical		
USCSP601	Practical of Elective-I	2	6
USCSP602	Practical of Elective-II	2	6
USCSP603	Project Implementation	1	3
USCSP604	Practical of Skill Enhancement : USCS607	1	3

SEMESTER V

THEORY

Course: USCS501	TOPICS (Credits : 03 Lectures/Week:03) Artificial Intelligence	
Objectives: Artificial Intelligence (AI) and accompanying tools and techniques bring transformational changes in the world. Machines capability to match, and sometimes even surpass human capability, make AI a hot topic in Computer Science. This course aims to introduce the learner to this interesting area. **Expected Learning Outcomes:** After completion of this course, learner should get a clear understanding of AI and different search algorithms used for solving problems. The learner should also get acquainted with different learning algorithms and models used in machine learning.		
Unit I	**What Is AI:** Foundations, History and State of the Art of AI. **Intelligent Agents:** Agents and Environments, Nature of Environments, Structure of Agents. **Problem Solving by searching:** Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.	**15L**
Unit II	**Learning from Examples:** Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and Choosing the Best Hypothesis, Theory of Learning, Regression and Classification with Linear Models, Artificial Neural Networks, Nonparametric Models, Support Vector Machines, Ensemble Learning, Practical Machine Learning	**15L**

Unit III	**Learning probabilistic models:** Statistical Learning, Learning with Complete Data, Learning with Hidden Variables: The EM Algorithm. Reinforcement learning: Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, Applications of Reinforcement Learning.	**15L**

Textbook(s):

1) Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig,3rd Edition, Pearson, 2010.

Additional Reference(s):

1) Artificial Intelligence: Foundations of Computational Agents, David L Poole,Alan K. Mackworth, 2nd Edition, Cambridge University Press ,2017.
2) Artificial Intelligence, Kevin Knight and Elaine Rich, 3rd Edition, 2017
3) The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani and Jerome Friedman, Springer, 2013

Course:	**TOPICS (Credits : 03 Lectures/Week:03)**
USCS502	**Linux Server Administration**

Objectives:

Demonstrate proficiency with the Linux command line interface, directory & file management techniques, file system organization, and tools commonly found on most Linux distributions. Effectively operate a Linux system inside of a network environment to integrate with existing service solutions. Demonstrate the ability to troubleshoot challenging technical problems typically encountered when operating and administering Linux systems.

Expected Learning Outcomes:

Learner will be able to develop Linux based systems and maintain. Learner will be able to install appropriate service on Linux server as per requirement. Learner will have proficiency in Linux server administration.

Unit I	**Introduction:** Technical Summary of Linux Distributions, Managing Software **Single-Host Administration:** Managing Users and Groups, Booting and shutting down processes, File Systems, Core System Services, Process of configuring, compiling, Linux Kernel **Networking and Security:** TCP/IP for System Administrators, basic network Configuration, Linux Firewall (Netfilter), System and network security	**15L**
Unit II	**Internet Services:** Domain Name System (DNS), File Transfer Protocol (FTP), Apache web server, Simple Mail Transfer Protocol (SMTP), Post Office Protocol and Internet Mail Access Protocol (POP and IMAP), Secure Shell (SSH), Network Authentication, OpenLDAP Server, Samba and LDAP, Network authentication system (Kerberos), Domain Name Service (DNS), Security	**15L**
Unit III	**Intranet Services:** Network File System (NFS), Samba, Distributed File Systems (DFS), Network Information Service (NIS), Lightweight Directory Access Protocol (LDAP), Dynamic Host Configuration Protocol (DHCP), MySQL, LAMP Applications File Servers, Email Services, Chat Applications, Virtual Private Networking.	**15L**

Textbook(s):

1) Linux Administration: A Beginner's Guide, Wale Soyinka, Seventh Edition, McGraw-Hill Education, 2016
2) Ubuntu Server Guide, Ubuntu Documentation Team, 2016

Additional Reference(s):

1) Mastering Ubuntu Server, Jay LaCroix, PACKT Publisher, 2016

Course: USCS503	TOPICS (Credits : 03 Lectures/Week:03) Software Testing and Quality Assurance	
Objectives: To provide learner with knowledge in Software Testing techniques. To understand how testing methods can be used as an effective tools in providing quality assurance concerning for software. To provide skills to design test case plan for testing software **Expected Learning Outcomes:** Understand various software testing methods and strategies. Understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given software. Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance.		
Unit I	**Software Testing and Introduction to quality :** Introduction, Nature of errors, an example for Testing, Definition of Quality , QA, QC, QM and SQA , Software Development Life Cycle, Software Quality Factors **Verification and Validation :** Definition of V &V , Different types of V & V Mechanisms, Concepts of Software Reviews, Inspection and Walkthrough **Software Testing Techniques :** Testing Fundamentals, Test Case Design, White Box Testing and its types, Black Box Testing and its types	**15L**
Unit II	**Software Testing Strategies :** Strategic Approach to Software Testing, Unit Testing, Integration Testing, Validation Testing, System Testing **Software Metrics :** Concept and Developing Metrics, Different types of Metrics, Complexity metrics **Defect Management:** Definition of Defects, Defect Management Process, Defect Reporting, Metrics Related to Defects, Using Defects for Process Improvement.	**15L**
Unit III	**Software Quality Assurance :** Quality Concepts, Quality Movement, Background Issues, SQA activities, Software Reviews, Formal Technical Reviews, Formal approaches to SQA, Statistical Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, , SQA Plan , Six sigma, Informal Reviews	**15L**

	Quality Improvement : Introduction, Pareto Diagrams, Cause-effect Diagrams, Scatter Diagrams, Run charts **Quality Costs :** Defining Quality Costs, Types of Quality Costs, Quality Cost Measurement, Utilizing Quality Costs for Decision-Making	

Textbook(s):

1. Software Engineering for Students, A Programming Approach, Douglas Bell, 4th Edition,, Pearson Education, 2005
2. Software Engineering – A Practitioners Approach, Roger S. Pressman, 5th Edition, Tata McGraw Hill, 2001
3. Quality Management, Donna C. S. Summers, 5th Edition, Prentice-Hall, 2010.
4. Total Quality Management, Dale H. Besterfield, 3rd Edition, Prentice Hall, 2003.

Additional Reference(s):

1. Software engineering: An Engineering approach, J.F. Peters, W. Pedrycz , John Wiley,2004
2. Software Testing and Quality Assurance Theory and Practice, Kshirsagar Naik, Priyadarshi Tripathy , John Wiley & Sons, Inc. , Publication, 2008
3. Software Engineering and Testing, B. B. Agarwal, S. P. Tayal, M. Gupta, Jones and Bartlett Publishers, 2010

Course:	**TOPICS (Credits : 03 Lectures/Week:03)**
USCS504	**Information and Network Security**

Objectives:

To provide students with knowledge of basic concepts of computer security including network security and cryptography.

Expected Learning Outcomes:

Understand the principles and practices of cryptographic techniques. Understand a variety of generic security threats and vulnerabilities, and identify & analyze particular security problems for a given application. Understand various protocols for network security to protect against the threats in a network

Unit I	**Introduction:** Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms **Classical Encryption Techniques:** Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, AES (round details not expected), Multiple Encryption and Triple DES, Block Cipher Modes of Operation, Stream Ciphers **Public-Key Cryptography and RSA:** Principles of Public-Key Cryptosystems, The RSA Algorithm	**15L**
Unit II	**Key Management:** Public-Key Cryptosystems, Key Management, Diffie-Hellman Key Exchange **Message Authentication and Hash Functions**: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and Macs, Secure Hash Algorithm, HMAC **Digital Signatures and Authentication:** Digital Signatures, Authentication Protocols, Digital Signature Standard **Authentication Applications:** Kerberos, X.509 Authentication, Public-Key Infrastructure	**15L**
Unit III	**Electronic Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management **Web Security:** Web Security Considerations, Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction **Intrusion:** Intruders, Intrusion Techniques, Intrusion Detection **Malicious Software:** Viruses and Related Threats, Virus Countermeasures, DDOS **Firewalls:** Firewall Design Principles, Types of Firewalls	**15L**

Textbook(s):

1) Cryptography and Network Security: Principles and Practice 5th Edition, William

Stallings, Pearson,2010

Additional Reference(s):

1) Cryptography and Network Security, Atul Kahate, Tata McGraw-Hill, 2013.
2) Cryptography and Network, Behrouz A Fourouzan, Debdeep Mukhopadhyay, 2nd Edition,TMH,2011

Course: **USCS505**	**TOPICS (Credits : 03 Lectures/Week:03)** **Architecting of IoT**	
Objectives: Discovering the interconnection and integration of the physical world. Learner should get knowledge of the architecture of IoT. **Expected Learning Outcomes:** Learners are able to design & develop IoT Devices. They should also be aware of the evolving world of M2M Communications and IoT analytics.		
Unit I	**IoT-An Architectural Overview**: Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. **IoT Architecture-State of the Art** : Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views	**15L**
Unit II	**IoT Data Link Layer and Network Layer Protocols:** PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART,Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy DASH7 **Network Layer**:IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP	**15L**

Unit III	**Transport layer protocols :** Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) **Session layer:** Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT **Service layer protocols:** Service Layer -oneM2M, ETSI M2M, OMA, BBF	**15L**

Textbook(s):

1. From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle,1st Edition, Academic Press, 2014.
2. Learning Internet of Things, Peter Waher, PACKT publishing, BIRMINGHAM – MUMBAI,2015

Additional References(s):

1. Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications, Daniel Minoli, Wiley Publications,2013
2. Internet of Things (A Hands-onApproach), Vijay Madisetti and ArshdeepBahga,1st Edition, VPT, 2014.
3. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html

Course: **USCS506**	**TOPICS (Credits : 03 Lectures/Week:03)** **Web Services**

Objectives:

To understand the details of web services technologies like SOAP, WSDL, and UDDI. To learn how to implement and deploy web service client and server. To understand the design principles and application of SOAP and REST based web services (JAX-Ws and JAX-RS).To understand WCF service. To design secure web services and QoS of Web Services

Expected Learning Outcomes:

Emphasis on SOAP based web services and associated standards such as WSDL. Design SOAP based / RESTful / WCF services Deal with Security and QoS issues of Web Services

Unit I	**Web services basics :** What Are Web Services? Types of Web Services Distributed computing infrastructure, overview of XML, SOAP, Building Web Services with JAX-WS, Registering and Discovering Web Services, Service Oriented Architecture, Web Services Development Life Cycle, Developing and consuming simple Web Services across platform	**15L**
Unit II	**The REST Architectural style :** Introducing HTTP, The core architectural elements of a RESTful system, Description and discovery of RESTful web services, Java tools and frameworks for building RESTful web services, JSON message format and tools and frameworks around JSON, Build RESTful web services with JAX-RS APIs, The Description and Discovery of RESTful Web Services, Design guidelines for building RESTful web services, Secure RESTful web services	**15L**
Unit III	**Developing Service-Oriented Applications with WCF :** What Is Windows Communication Foundation, Fundamental Windows Communication Foundation Concepts, Windows Communication Foundation Architecture, WCF and .NET Framework Client Profile, Basic WCF Programming, WCF Feature Details. Web Service QoS	**15L**

Textbook(s):

1) Web Services: Principles and Technology, Michael P. Papazoglou, Pearson Education Limited, 2008
2) RESTful Java Web Services, Jobinesh Purushothaman, PACKT Publishing,2nd Edition, 2015
3) Developing Service-Oriented Applications with WCF, Microsoft, 2017 https://docs.microsoft.com/en-us/dotnet/framework/wcf/index

Additional Reference(s):

1) Leonard Richardson and Sam Ruby, RESTful Web Services, O'Reilly, 2007
2) The Java EE 6Tutorial, Oracle, 2013

Course: USCS507	TOPICS (Credits : 03 Lectures/Week: 03) Game Programming	
Objectives: Learner should get the understanding computer Graphics programming using Directx or Opengl. Along with the VR and AR they should also aware of GPU, newer technologies and programming using most important API for windows. **Expected Learning Outcomes:** Learner should study Graphics and gamming concepts with present working style of developers where everything remains on internet and they need to review it, understand it, be a part of community and learn.		
Unit I	**Mathematics for Computer Graphics, DirectX Kickstart:** **Cartesian Coordinate system:** The Cartesian XY-plane, Function Graphs, Geometric Shapes, Polygonal Shapes, Areas of Shapes, Theorem of Pythagoras in 2D, Coordinates, Theorem of Pythagoras in 3D, 3D Polygons, Euler's Rule **Vectors:** Vector Manipulation, multiplying a Vector by a Scalar, Vector Addition and Subtraction, Position Vectors, Unit Vectors, Cartesian Vectors, Vector Multiplication, Scalar Product, Example of the Dot Product, The Dot Product in Lighting Calculations, The Dot Product in Back-Face Detection, The Vector Product, The Right-Hand Rule, deriving a Unit Normal Vector for a Triangle Areas, Calculating 2D Areas **Transformations:** 2D Transformations, Matrices, Homogeneous Coordinates, 3D Transformations, Change of Axes, Direction Cosines, rotating a Point about an Arbitrary Axis, Transforming Vectors, Determinants, Perspective Projection, Interpolation **DirectX:** Understanding GPU and GPU architectures. How they are different from CPU Architectures? Understanding how to solve by GPU?	**15L**

Unit II	**DirectX Pipeline and Programming:** **Introduction To DirectX 11:** COM, Textures and Resources Formats, The swap chain and Page flipping, Depth Buffering, Texture Resource Views, Multisampling Theory and MS in Direct3D, Feature Levels **Direct3D 11 Rendering Pipeline:** Overview, Input Assembler Stage (IA), Vertex Shader Stage (VS), The Tessellation Stage (TS), Geometry Shader Stage (GS), Pixel Shader Stage (PS), Output merger Stage (OM) Understanding Meshes or Objects, Texturing, Lighting, Blending. **Interpolation and Character Animation:** **Trigonometry:** The Trigonometric Ratios, Inverse Trigonometric Ratios, Trigonometric Relationships, The Sine Rule, The Cosine Rule, Compound Angles, Perimeter Relationships **Interpolation**: Linear Interpolant, Non-Linear Interpolation, Trigonometric Interpolation, Cubic Interpolation, Interpolating Vectors, Interpolating Quaternions **Curves:** Circle, Bezier, B-Splines **Analytic Geometry:** Review of Geometry, 2D Analytic Geometry, Intersection Points, Point in Triangle, and Intersection of circle with straight line.	**15L**
Unit III	**Introduction to Rendering Engines:** Understanding the current market Rendering Engines. Understanding AR, VR and MR.Depth Mappers, Mobile Phones, Smart Glasses, HMD's **Unity Engine: Multi-platform publishing, VR + AR:** Introduction and working in Unity, 2D, Graphics, Physics, Scripting, Animation, Timeline, Multiplayer and Networking, UI, Navigation and Pathfinding, XR, Publishing. **Scripting:** Scripting Overview, Scripting Tools and Event Overview **XR:** VR, AR, MR, Conceptual Differences. SDK, Devices	**15L**

Text Book(s):

1) Mathematics for Computer Graphics, John Vince, Springer-Verlag London, 5th Edition,2017
2) Mathematics for 3D Game Programming and Computer Graphic, Eric Lengyel, Delmar

Cengage Learning, Delmar Cengage Learning,2011

3) Introduction To 3D Game Programming With Directx® 11,Frank D Luna, Mercury Learning And Information,2012.
4) https://docs.unity3d.com/Manual/index.html - Free

Additional Reference(s):

1) Computer Graphics, C Version, Donald Hern and Pauline Baker, Pearson Education, 2nd Edition, 1997
2) HLSL Development Cookbook, Doron Feinstein, PACKT Publishing,2013

Suggested List of Practical- SEMESTER V

Course: USCSP501	(Credits : 02 Lectures/Week: 06) Practical of Elective-I	

USCS501: Artificial Intelligence

Practical shall be implemented in LISP

1. Implement Breadth first search algorithm for Romanian map problem.
2. Implement Iterative deep depth first search for Romanian map problem.
3. Implement A* search algorithm for Romanian map problem.
4. Implement recursive best-first search algorithm for Romanian map problem.
5. Implement decision tree learning algorithm for the restaurant waiting problem.
6. Implement feed forward back propagation neural network learning algorithm for the restaurant waiting problem.
7. Implement Adaboost ensemble learning algorithm for the restaurant waiting problem.
8. Implement Naive Bayes' learning algorithm for the restaurant waiting problem.
9. Implement passive reinforcement learning algorithm based on adaptive dynamic programming (ADP) for the 3 by 4 world problem
10. Implement passive reinforcement learning algorithm based on temporal differences (TD) for 3 by 4 world problem.

USCS502: Linux Server Administration

- Practical shall be performed using any Linux Server (with 8GB RAM).

- Internet connection will be required so that Linux server (command line mode) can be connected to Internet.

1. Install DHCP Server in Ubuntu 16.04
2. Initial settings: Add a User, Network Settings, Change to static IP address, Disable IPv6 if not needed, Configure Services, display the list of services which are running, Stop and turn OFF auto-start setting for a service if you don't need it, Sudo Settings
3. Configure NTP Server (NTPd), Install and Configure NTPd, Configure NTP Client (Ubuntu and Windows)
4. SSH Server : Password Authentication

Configure SSH Server to manage a server from the remote computer, SSH Client : (Ubuntu and Windows)

5. Install DNS Server BIND, Configure DNS server which resolves domain name or IP address, Install BIND 9, Configure BIND, Limit ranges you allow to access if needed.
6. Configure DHCP Server, Configure DHCP (Dynamic Host Configuration Protocol) Server, Configure NFS Server to share directories on your Network, Configure NFS Client. (Ubuntu and Windows Client OS)
7. Configure LDAP Server, Configure LDAP Server in order to share users' accounts in your local networks, Add LDAP User Accounts in the OpenLDAP Server, Configure LDAP Client in order to share users' accounts in your local networks. Install phpLDAPadmin to operate LDAP server via Web browser.
8. Configure NIS Server in order to share users' accounts in your local networks, Configure NIS Client to bind NIS Server.
9. Install MySQL to configure database server, Install phpMyAdmin to operate MySQL on web browser from Clients.
10. Install Samba to share folders or files between Windows and Linux.

USCS503: Software Testing and Quality Assurance

1. Install Selenium IDE; Write a test suite containing minimum 4 test cases for different formats.
2. Conduct a test suite for any two web sites.
3. Install Selenium server (Selenium RC) and demonstrate it using a script in Java/PHP.
4. Write and test a program to login a specific web page.
5. Write and test a program to update 10 student records into table into Excel file
6. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
7. Write and test a program to provide total number of objects present / available on the page.
8. Write and test a program to get the number of items in a list / combo box.
9. Write and test a program to count the number of check boxes on the page checked and unchecked count.
10. Load Testing using JMeter, Android Application testing using Appium Tools, Bugzilla Bug tracking tools.

Course: USCSP502	(Credits : 02 Lectures/Week: 06) Practical of Elective-II	

USCS504: Information and Network security

1.Write programs to implement the following Substitution Cipher Techniques:

- Caesar Cipher
- Monoalphabetic Cipher

2 Write programs to implement the following Substitution Cipher Techniques:

- Vernam Cipher
- Playfair Cipher

3 Write programs to implement the following Transposition Cipher Techniques:

- Rail Fence Cipher
- Simple Columnar Technique

4 Write program to encrypt and decrypt strings using

- DES Algorithm
- AES Algorithm

5 Write a program to implement RSA algorithm to perform encryption / decryption of a given string.

6 Write a program to implement the Diffie-Hellman Key Agreement algorithm to generate symmetric keys.

7 Write a program to implement the MD5 algorithm compute the message digest.

8 Write a program to calculate HMAC-SHA1 Signature

9 Write a program to implement SSL.

10 Configure Windows Firewall to block:

- A port
- An Program
- A website

USCS505: Architecting of IoT

1. a) Edit text files with nano and cat editor, Learn sudo privileges and Unix shell commands such as cd , ls , cat, etc

b) Learn to set dynamic and static IP. Connect to and Ethernet and WiFi network. Learn to vnc and ssh into a raspberry pi using vnc and putty from a different computer on the network.

c) Write a basic bash script to open programs in kiosk mode. Learn how to autostart programs on boot.

2. Run the node red editor and run simple programs and trigger gpios. Use basic nodes such as inject, debug, gpio
3. Open the python idle editor and run simple Python scripts such as to print Fibonacci numbers, string functions. Learn how to install modules using Pip and write functions
4. Setup a physical button switch and trigger an led in node red and python w debounce
5. Write simple JavaScript functions in Node-Red simple HTTP server page using node red
6. Setup a TCP server and client on a raspberry pi using Python modules to send messages and execute shell commands from within python such as starting another application
7. Trigger a set of led Gpios on the pi via a Python Flask web server
8. Interface the raspberry pi with a 16x2 LCD display and print values.
9. Setup a Mosquitto MQTT server and client and write a Python script to communicate data between Pi's.
10. Interface with an Accelerometer Gyro Mpu6050 on the i2c bus and send sensor values over the internet via mqtt.

USCS506: Web Services

1. Write a program to implement to create a simple web service that converts the temperature from Fahrenheit to Celsius and vice a versa.
2. Write a program to implement the operation can receive request and will return a response in two ways. a) One - Way operation b) Request –Response
3. Write a program to implement business UDDI Registry entry.
4. Develop client which consumes web services developed in different platform.
5. Write a JAX-WS web service to perform the following operations. Define a Servlet / JSP that consumes the web service.
6. Define a web service method that returns the contents of a database in a JSON string. The contents should be displayed in a tabular format.
7. Define a RESTful web service that accepts the details to be stored in a database and performs

CRUD operation.

8. Implement a typical service and a typical client using WCF.
9. Use WCF to create a basic ASP.NET Asynchronous JavaScript and XML (AJAX) service.
10. Demonstrates using the binding attribute of an endpoint element in WCF.

Course: **USCSP503**	**(Credits : 01 Lectures/Week: 03) Project Implementation**	
Please Refer to Project Implementation Guidelines		
Course: **USCSP504**	**(Credits : 01 Lectures/Week: 03) Practical of Skill Enhancement**	

USCS507 : Game Programming

1. Setup DirectX 11, Window Framework and Initialize Direct3D Device
2. Buffers, Shaders and HLSL (Draw a triangle using Direct3D 11)
3. Texturing (Texture the Triangle using Direct 3D 11)
4. Lightning (Programmable Diffuse Lightning using Direct3D 11)
5. Specular Lightning (Programmable Spot Lightning using Direct3D 11)
6. Loading models into DirectX 11 and rendering.

Perform following Practical using online content from the Unity Tutorials Web--sites: https://unity3d.com/learn/tutorials/s/interactive-tutorials

7. https://unity3d.com/learn/tutorials/s/2d-ufo-tutorial
8. https://unity3d.com/learn/tutorials/s/space-shooter-tutorial
9. https://unity3d.com/learn/tutorials/s/roll-ball-tutorial
10. https://unity3d.com/learn/tutorials/topics/vr/introduction?playlist=22946

SEMESTER VI

THEORY

Course: USCS601	TOPICS (Credits : 03 Lectures/Week: 03) Wireless Sensor Networks and Mobile Communication	
Objectives: In this era of wireless and adhoc network, connecting different wireless devices and understanding their compatibility is very important. Information is gathered in many different ways from these devices. Learner should be able to conceptualize and understand the framework. On completion, will be able to have a firm grip over this very important segment of wireless network. **Expected Learning Outcomes:** After completion of this course, learner should be able to list various applications of wireless sensor networks, describe the concepts, protocols, design, implementation and use of wireless sensor networks. Also implement and evaluate new ideas for solving wireless sensor network design issues.		
Unit I	**Introduction:** Introduction to Sensor Networks, unique constraints and challenges. Advantage of Sensor Networks, Applications of Sensor Networks, Mobile Adhoc NETworks (MANETs) and Wireless Sensor Networks, Enabling technologies for Wireless Sensor Networks. **Sensor Node Hardware and Network Architecture:** Single-node architecture, Hardware components & design constraints, Operating systems and execution environments, introduction to TinyOS and nesC. Network architecture, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts.	**15L**
Unit II	**Medium Access Control Protocols:** Fundamentals of MAC Protocols, MAC Protocols for WSNs, Sensor-MAC Case Study. **Routing Protocols** : Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless Sensor Networks, Routing Strategies in Wireless Sensor Networks. **Transport Control Protocols :** Traditional Transport Control Protocols,	**15L**

	Transport Protocol Design Issues, Examples of Existing Transport Control Protocols, Performance of Transport Control Protocols.	
Unit III	**Introduction, Wireless Transmission and Medium Access Control:** Applications, A short history of wireless communication. **Wireless Transmission:** Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems. **Telecommunication, Satellite and Broadcast Systems: GSM:** Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, security, New data services; DECT: System architecture, Protocol architecture; ETRA, UMTS and IMT- 2000. Satellite Systems: History, Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover.	**15L**

Textbook(s):

1) Protocols and Architectures for Wireless Sensor Network, Holger Kerl, Andreas Willig, John Wiley and Sons, 2005
2) Wireless Sensor Networks Technology, Protocols, and Applications ,Kazem Sohraby, Daniel Minoli and TaiebZnati, John Wiley & Sons, 2007
3) Mobile communications, Jochen Schiller,2nd Edition, Addison wisely , Pearson Education,2012

Additional Reference(s):

1) Fundamentals of Wireless Sensor Networks, Theory and Practice, Waltenegus Dargie, Christian Poellabauer , Wiley Series on wireless Communication and Mobile Computing, 2011
2) Networking Wireless Sensors, Bhaskar Krishnamachari , Cambridge University Press, 2005

Course: USCS602	TOPICS (Credits : 03 Lectures/Week: 03) Cloud Computing	

Objectives:

To provide learners with the comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture, implantations and applications. To expose the learners to frontier areas of Cloud Computing, while providing sufficient foundations to enable further study and research.

Expected Learning Outcomes:

After successfully completion of this course, learner should be able to articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing using open source technology. Learner should be able to identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. They should explain the core issues of cloud computing such as security, privacy, and interoperability.

Unit I	Introduction to Cloud Computing, Characteristics and benefits of Cloud Computing, Basic concepts of Distributed Systems, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing. Elements of Parallel Computing. Elements of Distributed Computing. Technologies for Distributed Computing. Cloud Computing Architecture. The cloud reference model. Infrastructure as a service. Platform as a service. Software as a service. Types of clouds.	**15L**
Unit II	Characteristics of Virtualized Environments. Taxonomy of Virtualization Techniques. Virtualization and Cloud Computing. Pros and Cons of Virtualization. Virtualization using KVM, Creating virtual machines, oVirt - management tool for virtualization environment. Open challenges of Cloud Computing	**15L**
Unit III	Introduction to OpenStack, OpenStack test-drive, Basic OpenStack operations, OpenStack CLI and APIs, Tenant model operations, Quotas, Private cloud building blocks, Controller deployment, Networking deployment, Block Storage deployment, Compute deployment, deploying and utilizing OpenStack in production environments, Building a production environment, Application orchestration using OpenStack Heat	**15L**

Textbook(s):

1) Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi, Tata McGraw Hill Education Private Limited, 2013
2) OpenStack in Action, V. K. CODY BUMGARDNER, Manning Publications Co, 2016

Additional Reference(s)*:*

1) OpenStack Essentials, Dan Radez, PACKT Publishing, 2015
2) OpenStack Operations Guide, Tom Fifield, Diane Fleming, Anne Gentle, Lorin Hochstein, Jonathan Proulx, Everett Toews, and Joe Topjian, O'Reilly Media, Inc., 2014
3) https://www.openstack.org

Course: **USCS603**	**TOPICS (Credits :03 Lectures/Week:03)** **Cyber Forensics**	

Objectives:

To understand the procedures for identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered

Expected Learning Outcomes :

The student will be able to plan and prepare for all stages of an investigation - detection, initial response and management interaction, investigate various media to collect evidence, report them in a way that would be acceptable in the court of law.

Unit I	**Computer Forensics :** Introduction to Computer Forensics and standard procedure, Incident Verification and System Identification ,Recovery of Erased and damaged data, Disk Imaging and Preservation, Data Encryption and Compression, Automated Search Techniques, Forensics Software **Network Forensic :** Introduction to Network Forensics and tracking network traffic, Reviewing Network Logs, Network Forensics Tools, Performing Live Acquisitions, Order of Volatility, Standard Procedure **Cell Phone and Mobile Device Forensics:** Overview, Acquisition Procedures for Cell Phones and Mobile Devices	**15L**

Unit II	**Internet Forensic :** **Introduction** to Internet Forensics, World Wide Web Threats, Hacking and Illegal access, Obscene and Incident transmission, Domain Name Ownership Investigation, Reconstructing past internet activities and events **E-mail Forensics :** e-mail analysis, e-mail headers and spoofing, Laws against e-mail Crime, **Messenger Forensics:** Yahoo Messenger **Social Media Forensics:** Social Media Investigations **Browser Forensics:** Cookie Storage and Analysis, Analyzing Cache and temporary internet files, Web browsing activity reconstruction	**15L**
Unit III	**Investigation, Evidence presentation and Legal aspects of Digital Forensics:** Authorization to collect the evidence , Acquisition of Evidence, Authentication of the evidence, Analysis of the evidence, Reporting on the findings, Testimony **Introduction to Legal aspects of Digital Forensics:** Laws & regulations, Information Technology Act, Giving Evidence in court, Case Study – Cyber Crime cases, Case Study – Cyber Crime cases	**15L**

Textbook(s):

1. Guide to computer forensics and investigations, Bill Nelson, Amelia Philips and Christopher Steuart, course technology,5th Edition,2015

Additional Reference(s)*:*

2. Incident Response and computer forensics, Kevin Mandia, Chris Prosise, Tata McGrawHill,2nd Edition,2003

Course:	**TOPICS (Credits : 03 Lectures/Week: 03)**	
USCS604	**Information Retrieval**	

Objectives:

To provide an overview of the important issues in classical and web information retrieval. The focus is to give an up-to- date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents and of methods for evaluating systems.

Expected Learning Outcomes:

After completion of this course, learner should get an understanding of the field of information retrieval and its relationship to search engines. It will give the learner an understanding to apply information retrieval models.		
Unit I	**Introduction to Information Retrieval:** Introduction, History of IR, Components of IR, and Issues related to IR, Boolean retrieval, Dictionaries and tolerant retrieval.	**15L**
Unit II	**Link Analysis and Specialized Search:** Link Analysis, hubs and authorities, Page Rank and HITS algorithms, Similarity, Hadoop & Map Reduce, Evaluation, Personalized search, Collaborative filtering and content-based recommendation of documents and products, handling "invisible" Web, Snippet generation, Summarization, Question Answering, Cross- Lingual Retrieval.	**15L**
Unit III	**Web Search Engine:** Web search overview, web structure, the user, paid placement, search engine optimization/spam, Web size measurement, search engine optimization/spam, Web Search Architectures. **XML retrieval:** Basic XML concepts, Challenges in XML retrieval, A vector space model for XML retrieval, Evaluation of XML retrieval, Text-centric versus data-centric XML retrieval.	**15L**

Text book(s):

1) Introduction to Information Retrieval, C. Manning, P. Raghavan, and H. Schütze, Cambridge University Press, 2008
2) Modern Information Retrieval: The Concepts and Technology behind Search, Ricardo Baeza -Yates and Berthier Ribeiro – Neto, 2nd Edition, ACM Press Books 2011.
3) Search Engines: Information Retrieval in Practice, Bruce Croft, Donald Metzler and Trevor Strohman, 1st Edition, Pearson, 2009.

Additional Reference(s):

1) Information Retrieval Implementing and Evaluating Search Engines, Stefan Büttcher, Charles L. A. Clarke and Gordon V. Cormack, The MIT Press; Reprint edition (February 12, 2016)

Course: USCS605	TOPICS (Credits : 03 Lectures/Week: 03) Digital Image Processing	
Objectives: To study two-dimensional Signals and Systems. To understand image fundamentals and transforms necessary for image processing. To study the image enhancement techniques in spatial and frequency domain. To study image segmentation and image compression techniques. **Expected Learning Outcomes**: Learner should review the fundamental concepts of a digital image processing system. Analyze the images in the frequency domain using various transforms. Evaluate the techniques for image enhancement and image segmentation. Apply various compression techniques. They will be familiar with basic image processing techniques for solving real problems.		
Unit I	**Introduction to Image-processing System :** Introduction, Image Sampling, Quantization, Resolution, Human Visual Systems, Elements of an Image-processing System, Applications of Digital Image Processing **2D Signals and Systems :** 2D signals, separable sequence, periodic sequence, 2D systems, classification of 2D systems, 2D Digital filter **Convolution and Correlation :** 2D Convolution through graphical method, Convolution through 2D Z—transform, 2D Convolution through matrix analysis, Circular Convolution, Applications of Circular Convolution, 2D Correlation **Image Transforms:** Need for transform, image transforms, Fourier transform, 2D Discrete Fourier Transform, Properties of 2D DFT, Importance of Phase, Walsh transform, Hadamard transform, Haar transform, Slant transform, Discrete Cosine transform, KL transform	**15L**
Unit II	**Image Enhancement :**Image Enhancement in spatial domain, Enhancement trough Point operations, Histogram manipulation, Linear and nonlinear Gray Level Transformation, local or neighborhood operation, Median Filter, Spatial domain High pass filtering, Bit-plane slicing, Image Enhancement in frequency domain, Homomorphic filter, Zooming operation, Image Arithmetic	**15L**

	Binary Image processing : Mathematical morphology, Structuring elements, Morphological image processing, Logical operations, Morphological operations, Dilation and Erosion, Distance Transform **Colour Image processing :**Colour images, Colour Model, Colour image quantization, Histogram of a colour image	
Unit III	**Image Segmentation:** Image segmentation techniques, Region approach, Clustering techniques, Thresholding, Edge-based segmentation, Edge detection, Edge Linking, Hough Transform **Image Compression:** Need for image compression, Redundancy in images, Image-compression scheme, Fundamentals of Information Theory, Run-length coding, Shannon-Fano coding, Huffman Coding, Arithmetic Coding, Transform-based compression, Image-compression standard	**15L**

Textbook(s):

1) Digital Image Processing, S Jayaraman, S Esakkirajan, T Veerakumar,Tata McGraw-Hill Education Pvt. Ltd., 2009

Additional Reference(s)*:*

1) Digital Image Processing 3rd Edition, Rafael C Gonzalez, Richard E Woods, Pearson, 2008
2) Scilab Textbook Companion for Digital Image Processing, S. Jayaraman, S. Esakkirajan And T. Veerakumar, 2016 (https://scilab.in/textbook_companion/generate_book/125)

Course: **USCS606**	**TOPICS (Credits : 03 Lectures/Week: 03)** **Data Science**	

Objectives:

Understanding basic data science concepts. Learning to detect and diagnose common data issues, such as missing values, special values, outliers, inconsistencies, and localization. Making aware of how to address advanced statistical situations, Modeling and Machine Learning.

Expected Learning Outcomes:

After completion of this course, the students should be able to understand & comprehend the problem; and should be able to define suitable statistical method to be adopted.

Unit I	**Introduction to Data Science:** What is Data? Different kinds of data,	**15L**

	Introduction to high level programming language + Integrated Development Environment (IDE), Exploratory Data Analysis (EDA) + Data Visualization, Different types of data sources, **Data Management**: Data Collection, Data cleaning/extraction, Data analysis & Modeling	
Unit II	**Data Curation:** Query languages and Operations to specify and transform data, Structured/schema based systems as users and acquirers of data Semi-structured systems as users and acquirers of data, Unstructured systems in the acquisition and structuring of data, Security and ethical considerations in relation to authenticating and authorizing access to data on remote systems, Software development tools, Large scale data systems, Amazon Web Services (AWS)	**15L**
Unit III	**Statistical Modelling and Machine Learning:** Introduction to model selection: Regularization, bias/variance tradeoff e.g. parsimony, AIC, BIC, Cross validation, Ridge regressions and penalized regression e.g. LASSO **Data transformations**: Dimension reduction, Feature extraction, Smoothing and aggregating **Supervised Learning**: Regression, linear models, Regression trees, Time-series Analysis, Forecasting, Classification: classification trees, Logistic regression, separating hyperplanes, k-NN **Unsupervised Learning**: Principal Components Analysis (PCA), k-means clustering, Hierarchical clustering, Ensemble methods	**15L**

Textbook(s):

1) Doing Data Science, Rachel Schutt and Cathy O'Neil, O'Reilly,2013
2) Mastering Machine Learning with R, Cory Lesmeister, PACKT Publication,2015

Additional Reference(s):

1) Hands-On Programming with R, Garrett Grolemund,1st Edition, 2014
2) An Introduction to Statistical Learning, James, G., Witten, D., Hastie, T., Tibshirani, R.,Springer,2015

Course: USCS607	TOPICS (Credits : 02 Lectures/Week: 03) Ethical Hacking	
Objectives: To understand the ethics, legality, methodologies and techniques of hacking. **Expected Learning Outcomes:** Learner will know to identify security vulnerabilities and weaknesses in the target applications. They will also know to test and exploit systems using various tools and understand the impact of hacking in real time machines.		
Unit I	**Information Security : Attacks and Vulnerabilities** **Introduction to information security** : Asset, Access Control, CIA, Authentication, Authorization, Risk, Threat, Vulnerability, Attack, Attack Surface, Malware, Security-Functionality-Ease of Use Triangle **Types of malware** :Worms, viruses, Trojans, Spyware, Rootkits **Types of vulnerabilities** : OWASP Top 10 : cross-site scripting (XSS), cross site request forgery (CSRF/XSRF), SQL injection, input parameter manipulation, broken authentication, sensitive information disclosure, XML External Entities, Broken access control, Security Misconfiguration, Using components with known vulnerabilities, Insufficient Logging and monitoring, OWASP Mobile Top 10, CVE Database **Types of attacks and their common prevention mechanisms** : Keystroke Logging, Denial of Service (DoS /DDoS), Waterhole attack, brute force, phishing and fake WAP, Eavesdropping, Man-in-the-middle, Session Hijacking, Clickjacking, Cookie Theft, URL Obfuscation, buffer overflow, DNS poisoning, ARP poisoning, Identity Theft, IoT Attacks, BOTs and BOTNETs **Case-studies** : Recent attacks – Yahoo, Adult Friend Finder, eBay, Equifax, WannaCry, Target Stores, Uber, JP Morgan Chase, Bad Rabbit	**15L**
Unit II	**Ethical Hacking – I (Introduction and pre-attack)** **Introduction**: Black Hat vs. Gray Hat vs. White Hat (Ethical) hacking, Why is Ethical hacking needed?, How is Ethical hacking different from security auditing and digital forensics?, Signing NDA, Compliance and Regulatory	**15L**

	concerns, Black box vs. White box vs. Black box, Vulnerability assessment and Penetration Testing. **Approach : Planning -** Threat Modeling, set up security verification standards, Set up security testing plan – When, which systems/apps, understanding functionality, black/gray/white, authenticated vs. unauthenticated, internal vs. external PT, Information gathering, Perform Manual and automated (Tools: WebInspect/Qualys, Nessus, Proxies, Metasploit) VA and PT, How WebInspect/Qualys tools work: Crawling/Spidering, requests forging, pattern matching to known vulnerability database and Analyzing results, Preparing report, Fixing security gaps following the report **Enterprise strategy** : Repeated PT, approval by security testing team, Continuous Application Security Testing, **Phases:** Reconnaissance/foot-printing/Enumeration, **Phases**: Scanning, Sniffing	
Unit III	**Ethical Hacking :Enterprise Security** **Phases : Gaining and Maintaining Access** : **Systems hacking** – Windows and Linux – Metasploit and Kali Linux, Keylogging, Buffer Overflows, Privilege Escalation, Network hacking - ARP Poisoning, Password Cracking, WEP Vulnerabilities, MAC Spoofing, MAC Flooding, IPSpoofing, SYN Flooding, Smurf attack, **Applications hacking** : SMTP/Email-based attacks, VOIP vulnerabilities, Directory traversal, Input Manipulation, Brute force attack, Unsecured login mechanisms, SQL injection, XSS, Mobile apps security, **Malware analysis** : Netcat Trojan, wrapping definition, reverse engineering **Phases :** Covering your tracks : Steganography, Event Logs alteration **Additional Security Mechanisms** : IDS/IPS, Honeypots and evasion techniques, Secure Code Reviews (Fortify tool, OWASP Secure Coding Guidelines)	**15L**

Textbook(s):

1) Certified Ethical Hacker Study Guide v9, Sean-Philip Oriyano, Sybex; Study Guide Edition,2016
2) CEH official Certified Ethical Hacking Review Guide, Wiley India Edition, 2007

Additional Reference(s):

1) Certified Ethical Hacker: Michael Gregg, Pearson Education,1st Edition, 2013
2) Certified Ethical Hacker: Matt Walker, TMH,2011
3) http://www.pentest-standard.org/index.php/PTES_Technical_Guidelines
4) https://www.owasp.org/index.php/Category:OWASP_Top_Ten_2017_Project
5) https://www.owasp.org/index.php/Mobile_Top_10_2016-Top_10
6) https://www.owasp.org/index.php/OWASP_Testing_Guide_v4_Table_of_Contents
7) https://www.owasp.org/index.php/OWASP_Secure_Coding_Practices_-_Quick_Reference_Guide
8) https://cve.mitre.org/
9) https://access.redhat.com/blogs/766093/posts/2914051
10) http://resources.infosecinstitute.com/applications-threat-modeling/#gref
11) http://www.vulnerabilityassessment.co.uk/Penetration%20Test.html

Suggested List of Practical – SEMESTER VI

Course: **USCSP601**	**(Credits : 02 Lectures/Week:06)** **Practical of Elective-I**	

USCS601: Wireless Sensor Networks and Mobile Communication

Practical experiments require software tools like INET Framework for OMNeT++, NetSim , TOSSIM, Cisco packet tracer 6.0 and higher version.

1. Understanding the Sensor Node Hardware. (For Eg. Sensors, Nodes(Sensor mote), Base Station, Graphical User Interface.)
2. Exploring and understanding TinyOS computational concepts:- Events, Commands and Task.
   - nesC model
   - nesC Components
3. Understanding TOSSIM for
   - Mote-mote radio communication
   - Mote-PC serial communication
4. Create and simulate a simple adhoc network
5. Understanding, Reading and Analyzing Routing Table of a network.
6. Create a basic MANET implementation simulation for Packet animation and Packet Trace.
7. Implement a Wireless sensor network simulation.
8. Create MAC protocol simulation implementation for wireless sensor Network.
9. Simulate Mobile Adhoc Network with Directional Antenna
10. Create a mobile network using Cell Tower, Central Office Server, Web browser and Web Server. Simulate connection between them.

USCS602: Cloud Computing

1. Study and implementation of Infrastructure as a Service.
2. Installation and Configuration of virtualization using KVM.
3. Study and implementation of Infrastructure as a Service
4. Study and implementation of Storage as a Service
5. Study and implementation of identity management
6. Study Cloud Security management

7. Write a program for web feed.
8. Study and implementation of Single-Sing-On.
9. User Management in Cloud.
10. Case study on Amazon EC2/Microsoft Azure/Google Cloud Platform

USCS603: Cyber Forensics

1. Creating a Forensic Image using FTK Imager/Encase Imager :

- Creating Forensic Image
- Check Integrity of Data
- Analyze Forensic Image

2. Data Acquisition:

- Perform data acquisition using:
- USB Write Blocker + Encase Imager
- SATA Write Blocker + Encase Imager
- Falcon Imaging Device

3. Forensics Case Study:

- Solve the Case study (image file) provide in lab using Encase Investigator or Autopsy

4. Capturing and analyzing network packets using Wireshark (Fundamentals) :

- Identification the live network
- Capture Packets
- Analyze the captured packets

5. Analyze the packets provided in lab and solve the questions using Wireshark :

- What web server software is used by www.snopes.com?
- About what cell phone problem is the client concerned?
- According to Zillow, what instrument will Ryan learn to play?
- How many web servers are running Apache?
- What hosts (IP addresses) think that jokes are more entertaining when they are explained?

6. Using Sysinternals tools for Network Tracking and Process Monitoring :

- Check Sysinternals tools

- Monitor Live Processes
- Capture RAM
- Capture TCP/UDP packets
- Monitor Hard Disk
- Monitor Virtual Memory
- Monitor Cache Memory

7. Recovering and Inspecting deleted files

- Check for Deleted Files
- Recover the Deleted Files
- Analyzing and Inspecting the recovered files

  Perform this using recovery option in ENCASE and also Perform manually through command line

8. Acquisition of Cell phones and Mobile devices
9. Email Forensics

- Mail Service Providers
- Email protocols
- Recovering emails
- Analyzing email header

10. Web Browser Forensics

- Web Browser working
- Forensics activities on browser
- Cache / Cookies analysis
- Last Internet activity

Course: **USCSP602**	**(Credits : 02 Lectures/Week:06)** **Practical of Elective-II**	

USCS604: Information Retrieval

Practical may be done using software/tools like Python / Java / Hadoop

1. Write a program to demonstrate bitwise operation.
2. Implement Page Rank Algorithm.
3. Implement Dynamic programming algorithm for computing the edit distance between

strings s1 and s2. (Hint. Levenshtein Distance)

4. Write a program to Compute Similarity between two text documents.
5. Write a map-reduce program to count the number of occurrences of each alphabetic character in the given dataset. The count for each letter should be case-insensitive (i.e., include both upper-case and lower-case versions of the letter; Ignore non-alphabetic characters).
6. Implement a basic IR system using Lucene.
7. Write a program for Pre-processing of a Text Document: stop word removal.
8. Write a program for mining Twitter to identify tweets for a specific period and identify trends and named entities.
9. Write a program to implement simple web crawler.
10. Write a program to parse XML text, generate Web graph and compute topic specific page rank.

USCS605: Digital Image Processing

Practical need to be performed using Scilab under Linux or Windows

1. 2D Linear Convolution, Circular Convolution between two 2D matrices
2. Circular Convolution expressed as linear convolution plus alias
3. Linear Cross correlation of a 2D matrix, Circular correlation between two signals and Linear auto correlation of a 2D matrix, Linear Cross correlation of a 2D matrix
4. DFT of 4x4 gray scale image
5. Compute discrete cosine transform, Program to perform KL transform for the given 2D matrix
6. Brightness enhancement of an image, Contrast Manipulation, image negative
7. Perform threshold operation, perform gray level slicing without background
8. Image Segmentation
9. Image Compression
10. Binary Image Processing and Colour Image processing

USCS606:Data Science

Practical shall be performed using R

1. Practical of Data collection, Data curation and management for Unstructured data (NoSQL)

2. Practical of Data collection, Data curation and management for Large-scale Data system (such as MongoDB)
3. Practical of Principal Component Analysis
4. Practical of Clustering
5. Practical of Time-series forecasting
6. Practical of Simple/Multiple Linear Regression
7. Practical of Logistics Regression
8. Practical of Hypothesis testing
9. Practical of Analysis of Variance
10. Practical of Decision Tree

Course: **USCSP603**	**(Credits : 01 Lectures/Week: 03) Project Implementation**	

Please Refer to Project Implementation Guidelines

Course: **USCSP604**	**(Credits : 01 Lectures/Week: 03) Practical of Skill Enhancement**	

USCS607 : Ethical Hacking

1. Use Google and Whois for Reconnaissance
2. a) Use CrypTool to encrypt and decrypt passwords using RC4 algorithm
   b) Use Cain and Abel for cracking Windows account password using Dictionary attack and to decode wireless network passwords
3. a) Run and analyze the output of following commands in Linux – ifconfig, ping, netstat, traceroute
   b) Perform ARP Poisoning in Windows
4. Use NMap scanner to perform port scanning of various forms – ACK, SYN, FIN, NULL, XMAS
5. a) Use Wireshark (Sniffer) to capture network traffic and analyze
   b) Use Nemesy to launch DoS attack
6. Simulate persistent cross-site scripting attack
7. Session impersonation using Firefox and Tamper Data add-on

8. Perform SQL injection attack
9. Create a simple keylogger using python
10. Using Metasploit to exploit (Kali Linux)

Project Implementation Guidelines

1. A learner is expected to carry out two different projects: one in Semester V and another in Semester VI.
2. A learner can choose any topic which is covered in Semester I- semester VI or any other topic with the prior approval from head of the department/ project in charge.
3. The Project has to be performed individually.
4. A learner is expected to devote around three months of efforts in the project.
5. The project can be application oriented/web-based/database/research based.
6. It has to be an implemented work; just theoretical study will not be acceptable.
7. A learner can choose any programming language, computational techniques and tools which have been covered during BSc course or any other with the prior permission of head of the department/ project guide.
8. A project guide should be assigned to a learner. He/she will assign a schedule for the project and hand it over to a learner. The guide should oversee the project progress on a weekly basis by considering the workload of 3 lectures as assigned.
9. The quality of the project will be evaluated based on the novelty of the topic, scope of the work, relevance to the computer science, adoption of emerging techniques/technologies and its real-world application.
10. A learner has to maintain a project report with the following subsections

    a) Title Page

    b) Certificate

    A certificate should contain the following information –

    - The fact that the student has successfully completed the project as per the syllabus and that it forms a part of the requirements for completing the BSc degree in computer science of University of Mumbai.
    - The name of the student and the project guide
    - The academic year in which the project is done
    - Date of submission,
    - Signature of the project guide and the head of the department with date along with the department stamp,

- Space for signature of the university examiner and date on which the project is evaluated.

c) Self-attested copy of Plagiarism Report from any open source tool.

d) Index Page detailing description of the following with their subsections:

- Title: A suitable title giving the idea about what work is proposed.
- Introduction: An introduction to the topic giving proper back ground of the topic.
- Requirement Specification: Specify Software/hardware/data requirements.
- System Design details : Methodology/Architecture/UML/DFD/Algorithms/protocols etc. used(whichever is applicable)
- System Implementation: Code implementation
- Results: Test Cases/Tables/Figures/Graphs/Screen shots/Reports etc.
- Conclusion and Future Scope: Specify the Final conclusion and future scope
- References: Books, web links, research articles, etc.

11. The size of the project report shall be around twenty to twenty five pages, excluding the code.
12. The Project report should be submitted in a spiral bound form
13. The Project should be certified by the concerned Project guide and Head of the department.
14. A learner has to make a presentation of working project and will be evaluated as per the Project evaluation scheme

Scheme of Examination

1. Theory:

I. Internal 25 Marks :

a) Test – 20 Marks

20 marks Test – Duration 40 mins
It will be conducted either using any open source learning management system like Moodle (Modular object-oriented dynamic learning environment)

OR

A test based on an equivalent online course on the contents of the concerned course (subject) offered by or build using MOOC (Massive Open Online Course) platform.

b) 5 Marks – Active participation in routine class instructional deliveries
Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.

II. External 75 Marks as per University Guidelines

11. Practical and Project Examination:

There will be separate Practical examination for Elective-I, II, Skill enhansement and project of these Elective-I 100, Elective-II: 100 and Skill Enhansement: 50 and Project Implementation: 50.

In the Practical Examination of Elective-I and II, the student has to perform practical on each of the subjects chosen. The Marking Scheme for each of the Elective is given below:

	Subject Code	**Experiment-I**	**Experiment-II**	**Total Marks**
Elective-I	**USCSP501/ USCSP601**	Experiment-40+Journal-5 +viva-5 Total:50M	Experiment-40+Journal-5+viva-5 Total:50M	100 M
Elective-II	**USCSP502/ USCSP602**	Experiment-40+Journal-5 +viva-5 Total:50M	Experiment-40+Journal-5+viva-5 Total:50M	100 M

Project Implementation	**USCSP503/ USCSP603**	****Project Evaluation Scheme**	**50M**
Skill Enhancement	**USCSP504/ USCSP604**	Experiment-40+Journal:5+viva-5 Total-50M	**50M**
Total Marks			**300M**

(Certified Journal is compulsory for appearing at the time of Practical Examination)

****Project Evaluation Scheme:**

Presentation	**Working of the Project**	**Quality of the Project**	**Viva**	**Documentation**
10Marks	10 Marks	10 Marks	10 Marks	10Marks

(Certified Project Document is compulsory for appearing at the time of Project Presentation)

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AC 29/4/13
Item no, 4.92

UNIVERSITY OF MUMBAI

Syllabus for M.Sc. Semester III &IV

Program: M.Sc.

Course: Environmental Sciences

(Credit Based Semester and Grading System with effect from the academic year 2012–2013)

M. Sc. Environmental Sciences Syllabus

Credit Based and Grading System

To be implemented from the Academic year 2012-2013

Semester –III

Theory				
Course	Unit	TOPIC	Credits	L / Week
PSEVS301	I	Water and Wastewater Pollution Control	4	1
	II	Air Pollution Control		1
	III	Hazardous and Radioactive Waste Management		1
	IV	Biomedical Waste and Electronic (E-Waste Management)		1
PSEVS302	I	Environmental Monitoring and sampling	4	1
	II	Instrumental methods of environmental analysis-I		1
	III	Instrumental methods of environmental analysis-II		1
	IV	Statistical Aspects		1
PSEVS303	I	Basic concepts of Eco-toxicology	4	1
	II	Toxicants in the Environment		1
	III	Evaluation of toxicity		1
	IV	Organ toxicity		1
PSEVS304	I	Industrial Hygiene	4	1
	II	Industrial Work Environment		1
	III	Disaster Management and Risk Assessment		1
	IV	Safety		1
			16	**16**
Practicals				
PSEVS3P1		Practicals based on PSEVS301	2	4
PSEVS3P2		Practicals based on PSEVS3O2	2	4
PSEVS3P3		Practicals based on PSEVS3O3	2	4
PSEVS3P4		Practicals based on PSEVS304	2	4
Total			**08**	**16**
TOTAL			**24**	**32**

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SEMESTER –IV

Theory				
Course	Unit	TOPIC	Credits	L / Week
PSEVS401	I	Introduction to Ecotechnology	4	1
	II	Sanitation -PhytosanitationAnd Green Inhibitors		1
	III	Climate Change Mitigation And Carbon Sequestration		1
	IV	Restoration Ecology& Remediation Technology		1
PSEVS402	I	Environmental Biotechnology	4	1
	II	Biotechnology in Protection and Conservation of the Environment		1
	III	Organic Farming		1
	IV	Environmental Nanotechnology		1
PSEVS403	I	Understanding sustainable development	4	1
	II	Business strategies and sustainability		1
	III	Sustainable urban development		1
	IV	Sustainability in practice		1
PSEVS404	I	Introduction to principles of Environment Management	4	1
	II	Environment Management Systems and Life Cycle Assessment		1
	III	Environmental Audit and Environmental Economics		1
	IV	Environmental Design(ED) and Modeling		1
			16	16
Practicals				
PSEVS4P1		Practicals based on PSEVS401	2	4
PSEVS4P2		Practicals based on PSEVS402	2	4
PSEVS4P3		Practicals based on PSEVS403	2	4
PSEVS4P4		Practicals based on PSEVS404	2	4
Total			08	16
TOTAL			24	32

Semester -III

PSEVS 301: Advanced Pollution Control Technology

PSEVS 302: Instrumentation and Biostatistics

PSEVS 303: Environmental Toxicology

PSEVS 304: Industrial Hygiene and Chemical Safety

Semester -IV

PSEVS 401: Eco Technology

PSEVS 402: Environmental Biotechnology and Nanotechnology

PSEVS 403: Sustainable Management

PSEVS 404: Environmental Management

SEMESTER -III

PSEVS 301

Advanced Pollution Control Technology

Unit I: Water and Wastewater Pollution Control **15 L (1 Credit)**

- General scheme for the treatment of water for drinking purpose.
- WaterTreatment:UV, H_2O_2 ,Ozonization, chemical precipitation, disinfection, adsorption, softening, desalinization / demineralization, membrane processes.
- Biological treatment processes for wastewater- **aerobic processes**: Suspended floc type- the activated sludge processes. Extended aeration, Aerated lagoons, Waste stabilization ponds, rotating biological contact system, the trickling filter process. **Anaerobic processes**: Flow through systems and contactsystems. UASB reactors and modifications. Sludge types, treatment and disposal. Processing of sludges- conditioning, thickening, dewatering, drying, incineration and disposal.
- Concept of common effluent treatment plant (CETP) their importance and advantages, role in wastewater treatment. Unit processes involved. Effluent discharge standards, industry specific minimum and national standards.

Unit II: Air Pollution Control **15 L (1 Credit)**

- Treatment Processes for Particulate matter: Absorption in liquids by Scrubbers, adsorption on solids. Combustion: flaring, thermal incineration, catalytic oxidation.
- Treatment Processes for other gaseous pollutants: Odour, VOCs, oxides of sulphur and nitrogen emissions.
- Indoor air quality management, principles and control measures, steps for improving indoor air quality.
- Auto-exhausts, its components. Control of auto-exhausts emissions. Emission specific control options, use of after burners, engine modifications / tuning; importance of good maintenance and driving habits.

Unit III: Hazardous and Radioactive Waste Management 15 L (1 Credit)

- Hazardous wastes:Sources and characteristics. Classification. Health and environmental effects. Safe storage, transport and treatment of. Stabilization and disposal Criteria for selection for secured and unsecured landfill disposal sites.
- Radioactive waste: sources, classification, health and safety aspects. Control and Management of radioactive wastes

Unit IV: Biomedical Waste and Electronic (E-Waste Management) 15 L (1 Credit)

- Biomedical Waste: Definition, Sources of generation, categories, colour coding system for segregation, transportation specifications, treatment methods: Incineration, Microwave, Plasma Pyrolysis, Hydroclave etc. Treatment and disposal of Plastic waste, Treatment and disposal of metal sharps.Biomedical Waste (Handling and Management) Rules, 1998
- E-Waste: Sources of generation, categories, segregation, transportation, treatment methods: Plastic waste treatment and disposal. E-Waste (Handling and Management) Rules 2011

TEXTS/REFERENCES

1. Wastewater Treatment for Pollution Control: Soli J. Arceivala, Tata McGrawHill Publishing Company, New Delhi.
2. Water Supply & Sanitary Engineering: G.S. Birdie
3. Textbook of Water Supply & Sanitary Engineering: S.K. Husain
4. Water Supply & Sanitary Engineering: R. C. Rangwala and S. C. Rangwala,Charotal Publishing House, Anand.
5. Wastewater Treatment: M. N. Rao, A. K. Datta, IBH Publishing Company, NewDelhi.
6. A Textbook of Sanitary Engineering: VinayakGharpure, Engineering BookPublishing Company, Pune.
7. Water Pollution: V. P. Kudesia, PragatiPrakashan, Meerut.
8. Environmental Problems and Solution: D.K. Asthana, S.Chand and Company,New Delhi.
9. A Textbook of Environment: K. M. Agarwal and P.K. Sikdar, Macmillon IndiaLtd, Nagpur
10. Environmental Chemistry : B.K. Sharma, and H. Kaur.
11. Elements of Environmental Chemistry : H.V. Jadhav.
12. Environmental Chemistry : S. K. Banerjee.
13. A text book of Environmental Chemistry and Pollution Control : S.S.Dara.

SEMESTER -III

PSEVS 302

Instrumentation and Biostatistics

Unit I:Environmental Monitoring and sampling **15 L (1 Credit)**

- Concepts of environmental monitoring and its significance.
- Methods of physical characterization of samples.
- Sampling of air ,water and soil:- Protocol and methods of sampling, sampling devices, Preservation, storage and processing of air, water and soil samples

Unit II:Instrumental methods of environmental analysis- I **15 L (1 Credit)**

- Conductometry, Potentiometry, Voltammetry :Theory, instrumentation and applications.
- Colorimetry and spectrophotometry: Electromagnetic radiation spectrum. Interaction of radiation with matter. Beer- Lambert's law, Flame photometry.
- Conventional microscopy and Scanningelectron microscopy.
- Hyphenated techniques for analysis – GC-MS, HPTLC, GC-AES. Electrophoresis: Theory , classification , instrumentation and applications.

Unit III:Instrumental methods of environmental analysis- II **15 L (1 Credit)**

- Principle, instrumentation and environmental applications of Neutron Activation Analysis, X-Ray Fluorescence, X-Ray Diffraction, Thermogravimetry.
- Continuous monitoring analysis – fluorescent analyzer for SO_2, chemiluminescentanalyzer for NOx, NDIR for CO, Flow injection analyzer.

Unit IV:Statistical Aspects **15 L (1 Credit)**

- Collection, classification and tabulation of data. Essentials of good tabular form. Preparation of one-way and two-way frequency tables. Diagrammatic and graphical representation of data (data bar, pie, picot and histograms, frequency polygons), frequency curves and cumulative curves.
- Measures of central tendency and dispersion : mean. median, mode , range, standard and relative deviation,coefficient of variation, skewness, kurtosis confidence limits and confidence intervals and normal distribution curve, Analysis of variance one way and two way classification, probit analysis
- Accuracy, precision and errors: Classification, Minimisation of errors, Rejection of data . Z, t, F, and chi-square tests
- Correlation and Regression: Pearson's coefficient, Spearman's coefficient, regression lines and their use. Curve fitting.
- Probability: Exclusive and independent events, addition and multiplication theorems, dependent events and conditional probability

TEXTS/REFERENCES

1. Fulekar, M. H. and BhawanaPathak "Bioinstrumentation" I K International Publication, New Delhi, 2013.
2. Willard. H., Merritt, L., Dean, D.A. and Settle F.A., 'Instrumental Methods of Analysis', 7th edition, Wordsworth, New York, 1998.
3. Galen. W. Ewing, 'Instrumental Methods of Chemical Analysis 5th edition, McGraw Hill, New York., 1995.
4. Roger Reeve,Introduction to Environmental Analysis, John Wiley & Sons Ltd,2002
5. Fundamentals of Analytical chemistry, D.A. Skoog, D.M. West and F.J.Holler, Harcourt Asia PTE. Ltd., 7th edition, New Delhi,2001.
6. APHA standard methods for Water and Wastewater Examination, 20th Edition, Washington,1998.

SEMESTER -III

PSEVS 303

Environmental Toxicology

Unit I: Basic concepts of Eco-toxicology 15 L (1 Credit)

- Introduction to ecotoxicology, Principles of toxicology,scope of toxicology.
- Types of toxicsubstances - degradable and non-degradable. Factors influencing toxicity, drug toxicity.
- Biochemical basis toxicity – mechanism of toxicity and receptor mediated events, acute and chronic toxicity.
- Sigmoid relationships, Corollary of toxicology. Influence of ecological factors on the effects of toxicity.

Unit II: Toxicants in the Environment 15 L (1 Credit)

- Toxic substances in the environment, their sources and entryroutes.
- Transport of toxicants by air and water: Transport through food chain - bioaccumulation and biomagnificationof toxic materials in food chain.
- Toxicology of major pesticides- biotransformation, biomonitoring, programs and parameters ofbiomonitoring, concept of bioindictor, bioindicator groups and examples.
- Environmental impacts of pesticides:Physiological and metabolic effects on flora andfauna.

Unit III:Evaluation of toxicity 15 L (1 Credit)

- Methods used to assess toxicity classification of toxic materials.
- Concepts of Bioassay- types, characteristics. Importance and significance of bioassay,

Microbial bioassay for toxicity testing, Bioassay test models and classification.

- Threshold limit value, LC50 LD50.Toxicity Testing, Concept of Dosimetry: lethal, sub-lethal & chronic tests
- Dose response curves

Unit IV: Organ toxicity **15 L (1 Credit)**

- Hepatotoxicity: Common examples of hepatotoxicants, injuries caused to liver
- Nepherotoxicity: Common examples of nepherotoxicants, injuries caused to kidney
- Pulmonary toxicity: Common examples of pulmonary toxicants, injuries caused to lungs.
- Neurotoxicity: Common examples of neuro toxicants, injuries caused to nervous tissues.

TEXTS/REFERENCES

1. Principles of Environmental Toxicology: I. C. Shaw and J. Chadwick; Taylor&Francis ltd
2. Basic Environmental Health (2001): AnnaleeYassi, TordKjellstom, Theo de Kok, Tee Guidotti
3. Environmental Health : Monroe T. Morgan
4. Handbook of Environmental Health and Safety – principle and practices : H. Koren; Lewis Publishers
5. Moore, G.S., 2002, Living with the Earth: concepts in Environmental Health Science (2nd Ed.), Lewis publishers, Michigan
6. Walker, C.H., Hopkin, S.P., Sibly, R.M., and Peakall, D.B. 2001. Principles of Ecotoxicology. 2nd Ed. Taylor & Francis, London.
7. Environmental biology and Toxicology, by Sharma P.D. Rastogi and Lamporary., 1994.
8. Environmental pollution and Toxicology by MeeraAsthana and Astana D.K., Alka printers, 1990. 3. Toxicology, by A.Sood, Sarup and sons New Delhi, 1999
9. Text book of Preventive and Social Medicine, by Park J.E. and Park K., Banosidas Bharat Publishers, Jabalpur, 1985
10. Environmental Epidemiology, by AnisaBasheer, Rawat Publication Jaipur, New Delhi 1995.

SEMESTER -III

PSEVS304

Industrial Hygiene and Chemical Safety

Unit I: Industrial Hygiene **15 L (1 Credit)**

- Introduction, definition, scope, significance and applications.
- Occupational environmental stresses i.e Physical, stresses – Noise, vibration, illumination, ventilation, heat stresses, Chemical stresses: Toxic chemicals, hazardous chemicals. Flammable chemical, explosive chemicals. etc. Inhalation and ingestion risks.
- Airborne Chemicals: Dust or aerosols (respirable and non respirable, inhalable and total dust), gases, fumes, vapours, mist and smoke.
- Concept of threshold limiting values(concentration), TLVs, time weighted averages (TWAs), short term exposure limits (STELs), minimal national standards(MINAS), International and national regulatory agencies like ACGIH, OSHA.

Unit II: Industrial Work Environment **15 L (1 Credit)**

- Monitoring of Work Environment:Identification of contaminants. Sampling strategies: monitoring methods / protocol on procedures. Sampling of airborne contaminants, viz dust, gases, fumes, vapours, mists etc in work place environment and analysis methods for quantification – Instrumental and manual methods.
- Notifiable Diseases: Pneumoconiosis, Silicosis, Asbestosis, Bagassosis, Byssiniosis.
- Work environment control measures: Substitution, isolation, ventilation, local exhaust system and engineering control methods.
- House keeping and maintenance. Modification of the processes and operation. Process and product specific control measures. Report writing

Unit III: Disaster Management and Risk Assessment **15 L (1 Credit)**

- Introduction , definitions, Natural Hazards, nature, causes impacts and occurrences. Earthquakes, volcanic activity, landslides, cyclones, floods, draughts, forest fires; their Mitigation.
- Industrial and technological hazards; types and causes of industrial accidents: fire, explosion, toxic release and dispersion.
- Disaster management: Components of disaster management plan on-site and off-site emergency plans.
- Technical hazards control system- incident reduction, incident management Techniques of hazards assessment: PHA, HAZOP, HAZAN, MCAA

Unit IV: Safety **15 L (1 Credit)**

- Precautions in the processes and operations involving explosives, flammables, toxic substances, dusts, vapours, cloud formation and combating.
- Safety precautions for transportation for hazardous chemicals. Handling and storage of hazardous chemicals. Safety in pipelines and co33lour coding.
- Risk assessment and on site and off site emergency planning. Safety audit in chemical industry. Accidents and unusual occurrences reporting .
- Respiratory personal protective equipment (RPPE)& non respiratory personal protecti equipment (NRPPE): head protection , ear protection , face and eye protection , hand protection, foot protection and body protection. Quality control of protective equipments.

TEXTS/REFERENCES

1. Industrial Hygiene & Chemical Safety - M.H.Fulekar: I. K.International Publishing House, New Delhi.
2. Industrial Hygiene Reference And Study Guide- Allan K. Fleeger, Dean Lillquist, AIHA, 01-May-2006
3. Personal Protective Equipment -Guide to Ports/Dock Workers - M.H.Fulekar : Government of India's Publication
4. Fundamentals of Industrial Hygiene-Barbara A. Plog, Patricia J. Quinlan, National Safety Council Press, 2002
5. Occupational safety management and engineering, Willie Hammer, Dennis Price, Prentice Hall, 2001
6. Industrial Safety and Health Management, C. Ray Asfahl, David W. Rieske, Prentice Hall, 31-Jul-2009
7. Fundamentals of Occupational Safety and Health, Mark A. Friend, James P. Kohn, Government Institutes, 16-Aug-2010
8. Handbook of occupational safety and health, Louis J. DiBerardinis, John Wiley, 1999
9. Occupational Hygiene. Blackwell Science, Harrington, J.M. & K. Gardiner. 1995, Oxford.
10. Industrial Hygiene Evaluation Methods. Micheal S. Bisesi. CRC Press, 28-Aug-2003

PRACTICALS

Semester -III

PSEVSP301

Advanced Pollution Control Technology

A. Minor Experiments

1. Determination of heavy metals (Fe/Cu) by spectrophotometric methods
2. Removal of suspended solids by sand filter method.
3. Detection/estimation of Cr (VI) in presence of Cr (III)
4. Estimation of mixed liquor suspended solids (MLSS)and Sludge Volume Index (SVI) in activated sludge.

B. Major Experiments

1. Jar Test (removal of suspended solids by coagulation, e.g. use of alum).
2. Waste water analysis for pH, conductivity, TDS, DO, COD, BOD, alkalinity, chloride and hardness.
3. Estimation of fluoride in waste samples by spectrophotometry.
4. Study of adsorption isotherm : Removal of Cr by activated charcoal.

PSEVSP302
Instrumentation and Biostatistics

A. Minor Experiments

1. Estimation of Chloride in water sample by conductometric titration.
2. Estimation of Fe^{+2} by potentiometric titration.
3. Determination of mean, median, mode, geometric mean, range, quartile using a given data
4. Determination of standard deviation,variance, coefficient of variation, skewness, kurtosis using a given data

B. Major Experiments

1. Separation of proteins using Polyacrylamide Gel Electrophoresis.
2. Determination Pesticides in soil/plants by GC-MS.
3. Analysis of a given data by t- test/ f test,
4. Analysis of a given data by z test /Annova

PSEVSP303
Environmental Toxicology

A. Minor Experiments

1. Study of instruments and equipment used in the MicrobiologyLaboratory.
2. Enrichment and Isolation of anaerobic bacteria
3. Isolation and Enumeration of microorganisms from soil
4. Effect of Heavy Metal toxicants on the behaviour pattern of earthworm

1. Major Experiments

1. Effect of effluents containing heavy metals on germination of groundnut.
2. Determination of LC50.
3. Effect of different concentrations of any 2 heavy metals on growth of microorganisms
4. Estimation of any toxicant by agar diffusion assay.

PSEVSP304
Industrial Hygiene and Chemical Safety

A. Minor Experiments

1. Preparation of Material Safety Data Sheet for some common chemicals.
2. To neutralize the given sample using NaOH / HCL/ $CaCO_3$
3. Determination of CO_2 from the atmosphere by volumetric method in a workplace Environment.
4. Estimate Noise Levels and Determine L_{10}, L_{50}, L_{90} by histogram method.

B. Major Experiments

1. Air sampling of gases (sulphur dioxide, nitrogen dioxide, carbon disulphide, carbon monoxide etc.) and analysis by UV-Visible spectrophotometer.
2. Estimation of sulphur in coal and calculation of release of SO_2 on combustion of per ton of coal.
3. Enlisting the characteristics, advantages and disadvantages of PPE and NRPPE of any industry.
4. Preparation of DMP for nuclear power plant, petrochemical industry, fertilizer plant, hydropower station, chemical industry, thermal power plant, textile mill, metallurgical industry

SEMESTER -IV

PSEVS401

Eco Technology

Unit I:INTRODUCTION TO ECOTECHNOLOGY 15 L (1 Credit)

- Definition, Principles and Concept of Ecotechnology, Why Ecotechnology and Applications of Ecotechnology.
- Appropriate technology for rural environment: Gandhian philosophy: swadeshi movement, concept & definition, characteristic features of appropriate technologies, an account of various technologies developed for rural people- Biogas schemes for rural development, solar cells, solar cooker, solar heaters, smokeless chulas, Biogas stoves, community Biogas plant.

Unit II:Sanitation -PhytosanitationAnd Green Inhibitors 15 L (1 Credit)

- Meaning, concept and importance of SPS, in reference to WTO-SRS Agreement, important phytosanitation technologies-HBPST,TDC,SPS committee-Who and What they do, the ten commandmentsof SPS agreement of WTO.
- Green inhibitors: Factors pertaining to metal samples, Inhibitors in use, Cooling systems, Processing with acid solutions, Corrosion ,Problems in oil industry, Corrosion inhibition in the mining industry, Atmospheric corrosion inhibition mechanisms, Standardized Environmental testing, Hybrid coating & corrosion inhibitors, Environmental green inhibitors, Industrial application of corrosion inhibition.

Unit III: Climate Change Mitigation And Carbon Sequestration 15 L (1 Credit)

- Carbon related definitions C-pool, C-stock, C-Flux, C-sink, C-source, sequestration/uptake.
- A brief understanding of the Clean Development Mechanism (CDM) to combat CC, Developing C market for combating CC, how India can benefit from CDM projects,.
- Development of C-sequestration projects their modalities & procedures- reducing emissions from degradation and deforestation (REDD and REDD+),International efforts in combating global warming & CC.A brief understanding of UNFCCC (Kyotoprotocol)NATCOM, IPCC,CBD,UNCCD,world heritage conventions , UN forum on forests etc.

Unit IV:Restoration Ecology& Remediation Technology 15 L (1 Credit)

- Definitions, aims and objectives, principles, concept & strategies (long tern vs short term), physical chemical & biological restoration, role of ecological principles in restoration, holistic approach in restoration.
- Greenness improvement & planting technologies, bamboo forest maintenance, biotopes, recycled water technology, soil & ground water contamination survey & cleaning technologies.

TEXTS/REFERENCES

1. Faegri, K.vanderpifl (1976). The principles of pollination ecology.3rd Edition pergamon press, NY
2. Burroughs (2007). Climate Change: A multi disciplinary approach, 2nd Edition, Cambridge, New York university press ISBN 9780521690331
3. Cunningham. Principles of Environmental Science.
4. Green Corrosion Inhibitors by V.S.Sastri

SEMESTER -IV

PSEVS402

Environmental Biotechnology and Nanotechnology

Unit I: Environmental Biotechnology 15 L (1 Credit)

- Basic Concept, Brief account of the structure and functions of DNA and RNA, Recombinant DNA Technology, Tools in rDNA Technology.
- Transgenic Plants, Insect Tolerant and Herbicide Tolerant Plants, Environmental Impact of Transgenic Plants, Genetically Modified Organism (GMOs) Impact on the Environment, Molecular Probes in Environmental Monitoring.
- Bioremediation Technology: Land Treatment, Surface Soil Contaminant Remediation: Case Studies, Slurry Bioreactor, Bioremediation of Metals.
- Phytoremediation- Approaches, Technical Considerations, Types of Phytoremediation, Factors influencing Phytoremediation, Uptake and Translocation, Enzymatic Transformation, Detoxification and Tolerance for Heavy Metals.

Unit II: Biotechnology in Protection and Conservation of the Environment 15 L (1 Credit)

- Degradation of Xenobiotic compounds, Microbial degradation of surfactants, Biological Odorization, Bioleaching- *Thiobacillusferroxidant* in leaching,
- Metal recovery by Microbial Accumulation, Biosensors in Environmental Monitoring and Analysis, Biopolymers, Bioplastics
- Biocomposting; Aerobic composting methods such as Windrow, Static pile and In-vessel methods for composting, Preparation of Biocompost, Particle size, Carbon to Nitrogen ratio, Temperature, Aeration, pH Control, Anaerobic Composting Fermentation/Digestion: Role of Hydrolyzing Microbes, Acetogens and Methanogens, Marketing of Biocompost
- Vermicomposting: Introduction, Biology of Earthworm, Type/ Species of, Preparation of Worm Pit, Bedding Material, Addition of Worms, Sampling, Washing and Sieving Addition of Organic Waste, Harvesting the Final Product.

Unit III: Organic Farming **15 L (1 Credit)**

- **Biopesticides**:Introduction,Biological Insecticides, Properties of *Bacillus thuringiensis*, Microbial Pesticides, Entomopathogenic Fungi or Viruses, Entomopathogenic Nematodes Biochemical Pesticides Plant-Incorporated Protectants (PIPs) like GM plants etc, Insect Pheromones and other Semiochemicals, Applications of Biopesticides.
- **Biofertilizers**:Classification, Nitrogen Fixation (Bacterial, with Blue Green Algae, VAM etc.), Symbiotic Nitrogen Fixers *Rhizobium sp.,* Non-symbiotic, Free Living Nitrogen Fixers *Azotobacter, Azospirillum* etc. BGA Inoculants *Azolla-Anabaena,,* Phosphate Solubilizing Microorganisms (PSM) *Bacillus Pseudomonas, PenicilliumAspergillus* etc. Mycorrhiza, Cellulolytic microorganisms and Organic fertilizers.

Unit IV: Environmental Nanotechnology **15 L (1 Credit)**

- Nanotechnology and its Applications in Agriculture and Food Industry, Nanotechnology : Materials and Manufacture, Nanotechnology for Renewable Energy,
- Nanotechnology in the Environment, Nanotechnology- Risks for Health and Environment, Benefits for the Environment.
- Nanomaterials-Remediation, Nano Membranes, Nano Fibers, Nano Clays Adsorbents, Zeolites, Nano Catalysts, Carbon Nano tubes,
- Environmental Nano Remediation Technology- Thermal, Physico-Chemical, and Biological Methods, Nano Filtration for the Treatment of Wastes, Removal of Organics, Inorganics and Pathogens, Nanotechnology for Water Purification.

TEXTS/REFERENCES

1. M.H.Fulekar (2010) Bioremediation technology recent advances, springer
2. *Environmental Biotechnology - Theory and Application* – M.H.Fulekar: CRC Press and Science Publisher, USA
3. M.H.Fulekar (2005) Environmental Biotechnology Oxford IBH Publishing cooperation
4. *Bioinformatics – Application in Life & Environmental Sciences* - M.H.Fulekar: Springer Publisher
5. Environmental Biotechnology-Alan Scragg,Oxford University Press.
6. Environmental Biotechnology, A BiosystemsApproach,*Author(s):Daniel A. Vallero, PhD,* ISBN: 978-0-12-375089-1,Copyright © 2010 Elsevier
7. Bruce Rittman, Perry L. McCarty. Environmental Biotechnology: Principles and Applications, 2nd Edition, McGraw-Hill, 2000.
8. Environmental Biotechnology: Basic Concepts and Applications . 2006,InduShekhar Thakur, I. K. International Pvt Ltd.

9. N.P Cheremisinoff (1996) Biotechnology for Waste and Wastewater Treatment, William Andrew Publishing,New York
10. Raina M. Maier, Ian L. Pepper, Charles P. Gerba. Environmental Microbiology, Academic Press, 2000.

SEMESTER -IV

PSEVS403

Sustainable Management

Unit I:Understanding sustainable development **15 L (1 Credit)**

- Definition and dimensions of sustainability, The ecological footprint and carrying capacity
- Global challenges of sustainable development:Our common future report, Agenda 21 and Millenium Development Goals, Earth Charter , domains of sustainability-Economics, ecology, politics and culture.
- National Action Plan on Climate Change.
- National sustainable development strategies in India: Twenty point program of Govt. of India, Key programs introduced to increase agricultural productivity and profitability. Policies and programs relevant to sustainable development in India key legislations relative to sustainable development
- Strategies for promoting sustainable development-International Trade-TRIPS,IPR; finance, technology, Science and education
- Resistances to the concept and some alternative approaches, Important current issues and areas of debate in relation to sustainable development.

Unit II:Business strategies and sustainability **15 L (1 Credit)**

- Business and sustainability-Concept of responsible business, CERES (coalition for environmentally responsible economics)principles and blended value.
- Principles of sustainable development in business planning and management
- Triple Bottom Line approach in sustainable business planning and development,
- Green Business profiles- The Body Shop, General Electric, Toyota etc.
- Indicators for sustainability: introduction to Nature's Living Planet Index developed by WWF, Happy Planet Index developed by New Economics Foundation, Gross domestic product, Human development index, Dow Jones sustainability index.

- Sustainability reporting: Corporate social responsibility –Global reporting initiatives guidelines for sustainability reporting

Unit III:Sustainable urban development 15 L (1 Credit)

- Urbanization and its impact on Environment, Rural and Urban planning for sustainable development
- Green city challenges-Ecological footprint, Principles of creating eco cities with two examples.
- Architecture- Eco industrial parks, Urban farming, Green roofs, Green Building-LEED certification, with two examples, walkable Urbanism, Xeriscaping,
- Transportation: improved public transport, car free cities, emphasis on proximity, zero emission transport, Diversity in modes of transportation
- Green city solutions - bicycle city, car-free day campaign ,green belt, compact development, carpooling ,bus rapid transit, parks, greenways and open space, traffic calming

Unit IV:Sustainability in practice 15 L (1 Credit)

- Current environmental Issues in India, Narmada Dam, Tehri, Almetti Dam, waste land & their reclamation, desertification, water crises, wetland conservation.
- Watershed management: Definition, Concepts, principals and classification in watershed management.Rainfall and runoff, water balance approach, water budgeting, topographic surveying, water conservation and harvesting methods – importance and techniques, artificial recharge of groundwater
- NGOs – characteristics and role of NGOs in sustainable development, Principles for NGOs, NGO-Community relations, NGO-Government relations , Some Indian NGOs working for saving environment

TEXTS/REFERENCES

1. Our Common Future, Chapter 2: Towards Sustainable Development: *Report of the World Commission on Environment and Development*.
2. Edwards, Andres R., *The Sustainability Revolution: Portrait of a Paradigm Shift.* New Society Publishers, 2005.
3. Report of the Department for Policy Coordination and Sustainable Development (DPCSD), United Nations Division for Sustainable Development.
4. Sustainable development in India: Stocktaking in the run up to Rio+20: Report prepared by TERI for MoEF,2011.
5. World Resources Institute (1995) "Environmental Indicators: A Systematic Approach to Measuring & Reporting on Environmental Policy Performance in the Context of Sustainable Development", World Resources Institute, Washington, DC.
6. Adger, W.N., Brown, K., Fairbrass, J., Jordan, A., Paavola, J., Rosendo, S., Seyfang, G. (2003) Governance for sustainability: towards a 'thick' analysis of environmental decisionmaking. Environment and Planning A 35, 1095 –1110.

7. Connelly, J. and Smith, G. (2003). Politics and the Environment: from theory to practice. Routledge, London.
8. Carter, N. (2001) The politics of the environment. Cambridge University Press: Cambridge
9. Leach, M., Scoones, I., Wynne, B. (2005) Science and Citizens: Globalization and the Challenge of Engagement.Zed books, London.
10. Pearce, D.W., Barbier, E. (2000) Blueprint for a sustainable economy. Earthscan, London.

SEMESTER -IV

PSEVS404

Paper –ENVIRONMENTAL MANAGEMENT

Unit I: **Introduction to principles of Environment Management 15L (1 Credit)**

Resources and wealth-meaning, types of resources and its exploitation, Wealth-meaning, distinction between wealth and resources, optimum conversion of resources into wealth.Definition, Goals of Environment Management, significance of environmental management, scope of environmental management,Development and environmental linkages,Environmental concerns in India, Actions For Environmental ProtectionIndian initiatives- National committee on Environmental Planning and Coordination, The Tiwari committee, Department of Environment etc, Ministry of Environment & Forest,Changes in Environmental Management Practices, Introduction Environmental Management Tools

Unit II: **Environment Management Systems and Life Cycle Assessment15L (1 Credit)**

International Organization for Standardization (ISO), Plan -Do-Check-Act Cycle, EMS Certification ,ISO 14000 series, ISO 14001, Difference between ISO 14000 and ISO 14001 Environmental Policy, Plannng, Implementation and Operation, Checking, Management Review, ,Benefits of ISO 14001 certification,Evolution of Life Cycle Assessment (LCA), Cradle to grave approach. Different applications of LCA.

Procedure for LCA: Defining goal and scope, preparation of life cycle inventory, assessment of environmental impact, Areas for Improvement and Interpretaion. Methods to assess impact using methods like ecoindicator-95

Unit III: **Environmental Audit and Environmental Economics15L (1 Credit)**

Introduction to environmental audit, Types of environmental audits: objectives- based and client-driven types. General audit methodology and audit process: Introduction, the basic steps of an environmental audit program.Element of audit process, audit protocols (why, who, what and how).Waste audits and pollution prevention assessments, Waste minization audit examples. Site assessment and liability audit, Introduction to macro economics, microeconomics, environmental economics, difference between natural resource economics and environmental economics. Valuation of environment impacts: types of economic values, approach, valuation techniques, valuing environmental amenities. Environmental Costs and benefits analysis, examples of cost benefit analysis of technology or process,Introduction to Market based instruments and command control instrument for pollution control.

Unit IV: **Environmental Design(ED) and Modeling15L (1 Credit)**

Environmental Design: Principles of Environmental Design (ED). Benefits of environmental design, ED of manufactured products, ED considerations in products life stages-DfE concepts, tools for ED of products, Examples of environmental design: Concept of Ecolabel. Cleaner Production Programmes, Leadership in Energy and Environmental Design certification programmes.

Introduction to Environmental Monitoring and Modeling, Definition of model, Need of modeling, water quality models-surface and ground water, Air Quality Models-Dispersion and receptor models

TEXT / REFERENCES

- Vijay Kulkarni and T.V.Ramachandra, 2006. Environment Management, Common wealth of Learning, Canada, Centre for Ecological Sciences, Indian Institute of Science, Karnataka Environment ResearchFoundation.TERI press.
- Environmental Economics for Non-Economist, John Asafu-Adjaye,World scientific publishing Co Pvt Ltd, 1999
- Camborne D F, Environmental Life Cycle Analysis, Lewis Publishers, 1997
- Cattanach,R.E., Hodrieth J.M., Reinke D.P., Sibik L.K., Environmentally Conscious Manufacturing from Design to Production to Labelling and Recycling, National Centre for Manufacturing Sciences (NCMS), Irwin Publications,1995
- Fundamental concepts of Environmental chemistry,2009, G.S. Sodhi, Narosa Publishers
- Environment Management Systems-

http://www.iso.org/iso/home/standards/management-standards/iso14000.htm

PSEVSP401

Eco Technology

A. Minor Experiments

1. Determination ofRoot density
2. Determination ofFertility rejuvenation index
3. Determination of Translocation factor by phytoremediation.
4. Case study on Tehri project, Silent Valley Project , Narmada Dam Project, Biopiracy, Ecodisaster of deforestation

B. Major Experiments

1. Tracing of watershed and their morphological features from toposheets.
2. Interpretation of Aerial photographs/satellite imageries/GIS data.
3. Problems in water budgeting.
4. Designing structures for water conservation and harvesting based on field visits.

PSEVSP402

Environmental Biotechnology and Nanotechnology

Minor Experiments

1. Bioremediation of Heavy Metals by Green Plants in Aquatic/ Soil Environment.
2. Phytoremediation of Heavy Metals by Green Plants in Aquatic/ Soil Environment.
3. Development of Mycorrihzal Soil Using Pot Culture Technique.
4. Development of Compost from Organic Waste.

Major Experiments

1. Estimation of DNA by spectrophotometer
2. Determination of molecular weight of DNA by electrophoresis.
3. Determination of coliforms by Membrane Filter Technique
4. Determination of Streptococcus faecalis.

PSEVSP403

Sustainable Management

Minor Experiments

1. To perform Water/Energy audit in the house/college building /society/laboratory
2. To study sustainability report of major business groups/environment compliance report for a company.
3. Report on Visit to NGO/Biomedical waste management site/hazardous waste Management/Pollution control facility of any industry.
4. Report on Seminar/Conference attended.

Major Experiments

1. Report on study tour to the following places
    - Lakes/rivers/estuary/marine ecosystem.
    - National Park/Sanctuary
    - Mangrove Ecosystem/Open Cast Mining/Agricultural field.
    - Pollution Control Board/Research Institute/Meterology Department.

PSEVSP404
Environmental Management

Project work : 50 MARKS
Student will submit their independent project work at the end of semester IV. Assessment of the project and internship will be based on the submitted M. Sc. project report, seminar and viva-voice examination.

Report on Project work : 30 MARKS
The Internship/project report submitted by the student and the evaluation report by the externalexaminer.

Project Evaluations:20 MARKS
(Viva-voice + Presentation)

Texts/References:

1. Standard methods for examination of water and waste water , American Public Health Association.
2. A comprehensive laboratory manual for Environmental Sciences and Engineering By P.R. SreemahadevanPillai**.**New Age International Publishers.
3. Chemical and biological methods for water pollution studies By R.K. Trivedi
4. Handbook of water and waste water analysis By S.K. Maiti.
5. Soil and air analysis by S.K. Maiti.

1. The candidate is expected to submit a journal certified by the head of the department or institutionat the time of the practical examination.

2. A candidate will not be allowed to appear for the practical examination unless he or she producesa certified journal or a certificate from the head of the institution or department stating that thejournal is lost and the candidate has performed the required number of experiments satisfactorily.The list of the experiments performed by the candidate should be attached with such certificate

3. Use of non programmable calculators is allowed both at the theory and the practical examination.

Academic Council/07/2016
Item No: 4.51

UNIVERSITY OF MUMBAI

Syllabus for F.Y.B.Sc.

(Restructured)

Programme : B.Sc.

Course: Biotechnology

with effect from the academic year

2016 – 2017

Preamble:

Twenty First Century is known as the 'Century of Biotechnology'. Biotechnology is one of the youngest branches of Life Science, whichhas expanded and established as an advanced interdisciplinary applied science in last few years. Biotechnology at the core envisages the comprehensive study of Life and the Interdisciplinary potential of Biotechnology has led to aunique status for Biotechnology in Research and Industry.

The socio-economic potential of Biotechnology is well established which has almost become synonymous withmodern development. Biotechnology has its applications in almost every field touching practically every human activity. The applied aspect of Biotechnology is now getting established with its applications in Industry, Agriculture, Health and Environment, Biotechnology is the lead science expanding exponentially.

Biotechnology demands a trained, skilled human resource to establish the Industry and Research sectors. The field is novel and still expanding which demands inputs in Infrastructure and Technology. The global and local focus is on developing new technological applications isfast growing. Biotechnology sector in Research and Industry is expanding which is set to augur the next major revolution in the world.

The demand for trained workforce in Biotechnology is ever growing in Fundamental Research and Industry Sector. Academic and Research Sectors also require interdisciplinary trained manpower to further the Biotechnology Revolution.

The need of the hour is to design appropriate syllabi which keeps pace with changing times and technology with emphasizes on applications while elucidating technology in depth. The present Syllabi is Restructured anticipating the future needs of Biotechnology Sector with more emphasis on imparting *hands-on* skills. The main thrust is laid on making syllabus compatible with developments in Education, Research and Industrial sectors. The Theory and Practical course in new restructured course will lead to impart *skill-set* essentials to further Biotechnology Sector.

The restructured syllabus combines basic principals of Physical, Chemical and Biological sciences in light of advancements in technology. The curriculum aims to impart basic knowledge with emphasis on its applications to make the students industry ready.

Semester – I				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USBT101	Core Subject	**Basic Chemistry-I**	2	3
USBT102	Core Subject	**Basic Chemistry-II**	2	3
USBT103	Core Subject	**Basic Life Sciences-I : Biodiversity and Cell Biology**	2	3
USBT104	Core Subject	**Basic Life Sciences-II : Microbial Techniques**	2	3
USBT105	Core Subject	**Basic Biotechnology-I : Introduction to Biotechnology**	2	3
USBT106	Core Subject	**Basic Biotechnology-II : Molecular Biology**	2	3
USBT107	Ability Enhancement Course 1 (FC I)	**Societal Awareness**	2	3
USBTP101, USBTP102, USBTP103	Core Subject Practicals	Practicals of USBT101, USBT102, USBT103, USBT104, USBT105 and USBT106	6	18
Semester – II				
Course Code	**Course Type**	**Course Title**	**Credits**	**Lectures/Week**
USBT201	Core Subject	**Chemistry-I : Bioorganic Chemistry**	2	3
USBT202	Core Subject	**Chemistry-II : Physical Chemistry**	2	3
USBT203	Core Subject	**Life Sciences-I : Physiology and Ecology**	2	3
USBT204	Core Subject	**Life Sciences-II : Genetics**	2	3
USBT205	Core Subject	**Biotechnology-I : Tissue Culture & Scientific Writing and Communication Skills**	2	3
USBT206	Core Subject	**Biotechnology-II : Enzymology, Immunology and Biostatistics**	2	3
USBT207	Ability Enhancement Course 2 (FC II)	**Globalization, Ecology and Sustainable Development**	2	3
USBTP201, USBTP202, USBTP203	Core Subject Practicals	Practicals of USBT201, USBT202, USBT203, USBT204, USBT205 and USBT206	6	18

SEMESTER – I

THEORY

SEMESTER I

Basic Chemistry-I

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 101	**Basic Chemistry I**	**2**	
Course Objective : To aquaint the students with basic concepts of Chemistylike Classification and Nomenclature of Chemical compounds **Learning Outcome** : To impart hands-on skills in preparation of Bufferes and Solutions			
Unit I **Nomenclature and Classification**	**Nomenclature and Classification of Inorganic Compounds:** Oxides, Salts, Acids, Bases, Ionic, Molecular and Coordination Compounds **Nomenclature andClassification of Organic Compounds:** Alkanes,Alkenes, Alkynes, Cyclic Hydrocarbons, Aromatic Compounds, Alcohols and Ethers, Aldehydes and Ketones, Carboxylic Acids and its derivatives, Amines, Amides, Alkyl Halides and Heterocylic Compounds	15 Lectures	30 hrs
Unit II **Chemical Bonds**	**Chemical Bonds:** **Ionic Bond:** Nature of Ionic Bond, Structur eof NaCl, KCl and CsCl, factors influencing the formation of Ionic Bond. **Covalent Bond:** Nature of Covalent Bond, Structure of CH4, NH3, H2O, Shapes of $BeCl_2$, BF3 **Coordinate Bond:** Nature of Coordinate Bond **Non Covalent Bonds:** Van Der Waal's forces: dipole - dipole, dipole – induced dipole. **Hydrogen Bond**: Theory of Hydrogen Bonding and Types of Hydrogen Bonding (with examples of RCOOH, ROH, Salicylaldehyde, Amides and Polyamides).	15 Lectures	30 hrs
Unit III **Water and Buffers**	**Chemistry of Water:** Properties of Water, Interaction of Water with Solutes (Polar, Non-Polar, Charged), Non-Polar Compounds in Water – Change in its Structure and the Hydrophobic Effect, Role of Water in Biomolecular Structure and Function and Water as a Medium for Life	15 lectures	30 hrs

	Solutions: Normality, Molarity, Molality, Mole fraction, Mole concept, Solubility, Weight ratio, Volume ratio, Weight to Volume ratio, ppb, ppm, millimoles, milliequivalents (Numericals expected). **Primary and Secondary Standards**: Preparation of Standard Solutions, Principle of Volumetric Analysis. **Acids and Bases:** Lowry-Bronsted and Lewis Concepts. Strong and Weak Acids and Bases - Ionic Product of Water - *pH,pKa, pKb*. Hydrolysis of Salts. **Buffer solutions** –Concept of Buffers,Types of Buffers, Derivation of Henderson equation for Acidic and Basic buffers,Buffer action,Buffercapacity(Numericalsexpected.) pH of Buffer Solution.		

SEMESTER I

Basic Chemistry-II

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 102	**Basic Chemistry II**	**2**	
Course Objective : To aquaint students with Concepts of Steriochemisty **Learning Outcome** : To impart knowledge of Titrimetic and Volumetric Estimations and handling of basic Analytical Techniques like Chromatography and Colorimetry			
Unit I **Stereochemistry**	**Isomerism** – Types of Isomerism: Constitutional Isomerism (Chain, Position and Functional) and Stereoisomerism, Chirality. **Geometric Isomerism and Optical Isomerism:**Enantiomers, Diastereomers, and Racemic mixtures Cis-Trans, Threo, Erythro and Meso isomers.Diastereomerism (Cis-Trans Isomerism) in Alkenes and Cycloalkanes (3 and 4 membered ring) **Conformation**: Conformations of Ethane. Difference between Configuration and Conformation. **Configuration**, Asymmetric Carbon Atom, Stereogenic/ Chiral Centers, Chirality,	15 Lectures	30 hrs

	Representation of Configuration by "Flying Wedge Formula" **Projection formulae** – Fischer, Newman and Sawhorse. The Interconversion of the Formulae.		
Unit II **Titrimetry and Gravimetry**	**Titrimetric Analysis**: Titration, Titrant, Titrand, End Point, Equivalence Point, Titration Error, Indicator, Primary and Secondary Standards, Characteristics and examples Types of Titration –Acid –Base, Redox. Precipitation, Complexometric Titration. Acid – Base Titration.-Strong Acid *Vs* Strong Base -Theoretical aspects of Titration Curve and End Point Evaluation. Theory of Acid –Base Indicators, Choice and Suitability of Indicators. **Gravimetric Analysis:** Solubility and Precipitation, Factors affecting Solubility, Nucleation, Particle Size, Crystal Growth, Colloidal State, Ageing/Digestion of Precipitate. Co-Precipitation and Post-Precipitation. Washing, Drying and Ignition of Precipitate. (Numericals Expected).	15 Lectures	30 hrs
Unit III **Analytical Techniques**	**Methods of Seperation** Precipitation, Filtration, Distillation and Solvent Extraction. **Analytical Techniques** **Chromatography:** Definition, Principles, Types Introduction to Paper Chromatography, Thin Layer Chromatography, Column Chromatography and its Applications.**Colorimetry:** Principle, Beer-Lambert's Law, Measurement of Extinction, Derivation of E = kcl, Limitations of Beer-Lambart's Law, Filter Selection	15 Lectures	30 hrs

SEMESTER I

Basic Life Sciences-I : Biodiversity and Cell Biology

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 103	**Biodiversity and Cell Biology**	**2**	
Course Objectives : To aquint students with concept of Biodiversity and Cell Biology **Learning Outcome :** To impart skill in handling and culture of Microorganisms			
Unit I Origin of Life and Biodiversity (Animal,Plant, Microorganisms)	Origin of Life, Chemical and Biological Evolution, Origin of Eukaryotic Cell. Concept of Biodiversity, Taxonomical, Ecological and Genetic Diversity & its Significance **Introduction to Plant Diversity:** Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms (with one example each) **Introduction to Animal Diversity:**Non-Chordates and Chordates {with at least one representative example.) **Introduction to Microbial Diversity** Archaebacteria, Eubacteria, Blue-green Algae, Actinomycetes, Eumycota-Habitats, Examples and Applications.	15Lectures	30 hrs
Unit II Ultra Structure of Prokaryotic and Eukaryotic Cell.	**Ultrastructure of Prokaryotic Cell:** Concept of Cell Shape and Size.Detail Structure of Slime Layer, Capsule, Flagella, Pilli, Cell Wall(Gram Positive and Negative), Cell Membrane, Cytoplasm and Genetic Material Storage Bodies and Spores **Ultrastructure of Eukaryotic Cell:** Plasma membrane, Cytoplasmic Matrix, Microfilaments, Intermediate Filaments, and Microtubules Organelles of the Biosynthetic-Endoplasmic Reticulum & Golgi Apparatus. Lysosome, Endocytosis, Phagocytosis, Autophagy, Proteasome Eucaryotic Ribosomes, Mitochondria and Chloroplasts	15Lectures	30 hrs

	Nucleus –Nuclear Structure, Nucleolus External Cell Coverings: Cilia And Flagella Comparison of Prokaryotic And Eukaryotic Cells		
Unit III **Bacteria and Viruses**	**Bacteria** : Classification, Types, Morphology (Size, Shape and Arrangement) Cultivation of Bacteria. Reproduction and Growth (Binary Fission, Conjugation and Endospore formation) Growth Kinetics, Isolation and Preservation. Significance of Bacteria **Viruses** :General Characters, Classification (Plant, Animal and Bacterial Viruses) Structure and Characterization of Viruses and Significance	15Lectures	30 hrs

SEMESTER - I

Basic Life Sciences-II : Microbial Techniques

COURSE CODE	**TITLE**	**CREDITS**	**Notional Hours**
USBT 104	**Microbial Techniques**	**2**	
Course Objectives : To aquaint students with basic techniques in Staining and Sterilization **Learning Outcome :**To impart the knowledge of growth of microorganisms			
Unit I **Microscopy and Stains**	**Microscopy and Stains** Microscope- Simple and Compound: Principle. Parts, Functions and Applications. Dark Field and Phase Contrast Microscope Stains and Staining Solutions- Definition of Dye and Chromogen. Structure of Dye and Chromophore. Functions of Mordant and Fixative. Natural and Synthetic Dyes. Simple Staining, Differential Staining and Acid Fast Staining with specific examples	15 lectures	30 hrs
Unit II **Sterilization Techniques**	Definition : Sterilization and Disinfection. Types and Applications Dry Heat, Steam under pressure,	15 lectures	30 hrs

	Gases, Radiation and Filteration Chemical Agents and their Mode of Action - Aldehydes, Halogens, Quaternary Ammonium Compounds, Phenol and Phenolic Compounds, Heavy Metals, Alcohol, Dyes, and Detergents Ideal Disinfectant. Examples of Disinfectants and Evaluation of Disinfectant		
Unit III **Nutrition, Cultivation and Enumeration of Microorganisms**	**Nutrition and Cultivation of Microorganisms** Nutritional Requirements : Carbon, Oxygen, Hydrogen, Nitrogen, Phosphorus, Sulphur and Growth Factors. Classification of Different Nutritional Trypes of Organisms. Design and Types of Culture Media. Simple Medium, Differential, Selective and Enrichem Media Concept of Isolation and Methods of Isolation. Pure Culture Techniques **Growth and Enumeration** Growth Phases, Growth Curve. Arithmatic Growth and Growth Yield. Measurement of Growth. Chemostat and Turbidostat Enumeration of Microorganisms- Direct and Indirect Methods Preservation of Cultures- Principle and Methods. Cryogenic Preservation Advantages and Limitations	15 lectures	30 hrs

SEMESTER I

Basic Biotechnology-I : Introduction to Biotechnology

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 105	**Introduction to Biotechnology**	**2**	
Corse Objectives : To auaint students with various fields of Biotechnology and their applications **Learining Outcome :** To impart the knowledge of Food Technology and Fermetation Techniques			
Unit I **Scope and Introduction to Biotechnology**	History & Introduction toBiotechnology What is Biotechnology? Definition of Biotechnology, Traditional and Modern Biotechnology, Branches of Biotechnology-	15 lectures	30 hrs

	Plant, Animal Biotechnology, Marine Biotechnology, Agriculture, Healthcare, Industrial Biotechnology, Pharmaceuti cal Biotechnology, Environmental Biotechnology. Biotechnology Research in India. Biotechnology Institutions in India (Pub lic and Private Sector) Biotech Suceess Stories Biotech Policy Initiatives Biotechnology in context of Developing World Public Perception of Biotechnology		
Unit II **Applications Biotechnology**	Applications of Biotechnology in Agriculture : GM Food, GM Papaya, GM Tomato, Fungal and Insect Resistant Plants BT Crops, BT Cotton and BT Brinjal Pros and Cons Biotechnological applications in Crop and Livestock Improvements Modifications in Plant Quality Golden Rice, Molecular Pharming, Plant Based Vaccines Ethics in Biotechnology and IPR	15 lectures	30 hrs
Unit III **Food and Fermentation Biotechnology**	**Food Biotechnology** Biotechnological applicationsin enhancement of Food Quality Unit Operation in Food Processing Quality Factors in Preprocessed Food Food Deterioration and its Control Rheology of Food Products Microbial role in food products Yeast, Bacterial and other Microorganisms based process and products Modern Biotechnological Regulatory Aspects in Food Industries Biotechnology and Food - Social Appraisal **Fermentation Technology** Defination, Applications of Fermetation Technology Microbial Fermentations Overview of Industrial Production of Chemicals (Acetic Acid, Citric Acid and Ethanol), Antibiotics, Enzymes and Beverages	15 lectures	30 hrs

SEMESTER - I

Basic Biotechnology-II : Molecular Biology

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 106	**Molecular Biology**	**2**	
Corse Objectives : To aquint students with DNA Replication, Repair and Genetic Engineering **Learning Outcome :**Impart the knowledge of molecular Biology Techniques			
Unit I **Replication**	DNA Replication in Prokaryotes and Eukaryotes- Semi-conservative DNA replication, DNA Polymerases and its role, E.coli Chromosome Replication, BidirectionalReplication of Circular DNA molecules. Rolling Circle Replication, DNA Replication in Eukaryotes DNA Recombination – Holliday Model for Recombination Transformation	15 lectures	30 hrs
Unit II **Mutation and DNA Repair**	Definition and Types of Mutations. Mutagenesis and Mutagens.(Examples of Physical, Chemical and Biological Mutagens) Types of Point Mutations, DNA REPAIR Photoreversal, Base Excision Repair, Nucleotide Excision Repair, Mismatch Repair, SOS Repair and Recombination Repair.	15 lectures	30 hrs
Unit III **Genetic Engineering**	Experimental evidences forDNA and RNA as Genetic Material. Genetic Engineering in Ecoli and other Prokaryotes, Yeast, Fungi and Mammalian Cells Cloning Vectors-Plasmids (pBR 322, pUC) Vectors for Plant and Animal Cells, Shuttle Vectors, YAC Vectors, Expression Vectors Enzymes- DNA Polymerases, Restriction Endonucleases, Ligases, Reverse Transcriptases, Nucleases, Terminal Transferases, Phosphatases Isolation and Purification of DNA (Genomic, Plasmid) and RNA,, Identification of Recombinant Clones	15 lectures	30 hrs

Semester – I

Practicals

SEMESTER – I
Practicals
Basic Chemistry

COURSE CODE	TITLE	CREDITS	Notional Hours
USBTP 101	**Basic Chemistry**	**2**	**30 hrs**

1. Safety Measures and Practices in Chemistry Laboratory, Working and use of a Digital Balance, Functioning and Standardization of *pH* Meter, Optical Activity of a Chemical Compounds by Polarimeter
2. Preparation of Standard (Molar, Molal and Normal solutions) and Buffer Solutions Determination of strength of HCl in commercial sample
3. Qualitative Analysis of Inorganic Compounds - Three experiments
4. Characterization of Organic Compounds containing only C, H, O elements (no element test) - Compounds belonging to the following classes: Carboxylic Acid, Phenol, Aldehyde/Ketone, Ester, Alcohol, Hydrocarbon and Characterization of Organic Compounds containing C, H, O, N, S, Halogen Elements (element tests to be done) Compounds belonging to the following classes: Amine, Amide, Nitro Compounds, Thiamide, Haloalkane, Haloarene
5. To Standardize commercial sample of NaOH using KHP (Potassium hydrogen pthalate) and sample of HCl using borax.
6. Dissociation Constant of Weak Acids by Incomplete Titration Method using *pH* Meterand determination of Acetic acid in Vinegar by Titrimetric Method
7. Determination of the amount of Fe (II) present in the given solution Titrimetrically
8. Determination of amount of $NaHCO_3 + Na_2CO_3$ in the given solid mixture Titrimetrcially
9. Determination of the amount of Mg (II) present in the given solution complexometrically
10. Determination of percent composition of $BaSO_4$ and NH_4Cl in the given mixture Gravimetrically
11. Separation of Cu, Ni and Fe using Paper Chromatographyand amino acids - paper chromatography
12. Determination of fluoride ion using Colorimetry and Fe (III) by using Salicylic Acid by Colorimetric Titration

SEMESTER – I
Practicals
Basic Life Sciences

COURSE CODE	TITLE	CREDITS	Notional Hours
USBTP 102	**Basic Life Science**	**2**	**30 hrs**

1. Components and workingof Simple, Compound, Dark Field, Fluorescent and Phase Contrast Microscope
2. Staining of Plant and Animal Tissues using Single and Double Staining Techniques
3. Special Staining Technique for Cell Wall, Capsule and Endospores and Fungal Staining
4. Monochrome Staining, Differential Staining, Gram Staining, and Acid Fast Staining and Romonowsky Staining
5. Study of Plant, Animal and Microbial Groups with at least one examples from each x 3
6. Study of Photomicrographs of Cell Organelles
7. Sterilization of Laboratory Glassware and Media using Autoclave
8. Preparation of Media- Nutrient broth and Agar, MacConkey Agar, Sabourauds Agar
9. Isolation of Organisms : T-streak, Polygon method
10. Enumeration of microorganisms by Serial Dilution, Pour Plate, Spread Plate Method
11. Colony Characteristics of Microorganisms, Enumeration by Breed's count
12. Growth Curve of E.Coli

SEMESTER – I
Practicals
Basic Biotechnology

COURSE CODE	TITLE	CREDITS	Notional Hours
USBTP 103	**Basic Biotechnology**	**2**	**30 hrs**

1. Assignment- Study of any branch of biotechnology and its applications
2. Microbial examination of food and detection of Pathogenic Bacteria from Food Samples
3. Isolation of organisms causing Food Spoilage
4. Microscopic determination of Microbial flora from Yoghurt and Lactic Acid Determination
5. Analysis of Milk- Methylene Blue, Resazurin Test, Phosphatase Test
6. Extraction of Caesin from Milk
7. Meat Tenderization using Papain
8. Fermentative production of Alcohol
9. Determination of Alcohol content
10. Isolation and purification of DNA (genomic, plasmid)
11. Restriction Digestion
12. Agarose Gel Electrophoresis of the genomic and plasmid DNA

SEMESTER – II

THEORY

SEMESTER II

Chemistry-I : Bioorganic Chemistry

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 201	**Bioorganic Chemistry**	**2**	
Course Objectives : To aquint students with Bioorganic Molecules **Learning Outcome :** To impart the knowledge of Classification, Strucure and Characterization of Biomolecules			
Unit I **Biomolecules:** **Carbohydrates and Lipids**	**Carbohydrates**: Structure, Function, Classification, Characteristic Reactions, Physical and Chemical Properties, D & L Glyceraldehydes, structure of Monosaccharide, Disaccharides, and Polysaccharides. Isomers of Monosaccharides, Chemical/Physical Properties of Carbohydrate, Chemical Reactions for Detection of Mono., Di and Polysaccharides, **Lipids:**Classification of Lipids, Properties of Saturated, Unsaturated Fatty Acids, Rancidity, and Hydrogenation of Oils Phospholipids: Lecithin Cephalin, Plasmalogen Triacylglycerol-Structure and Functio n Sterols: Cholesterol: Structure and Fu nction , Lipoproteins: Structure and Fu nction, Storage Lipids, Structural Lipi ds, Action of Phospholipases, Steroids	15 lectures	30 hrs
Unit II **Biomolecules:** **Proteins and Amino Acids**	**Proteins and Amino Acids**: Classification, Preparation and Propert ies, Isoelectric Point, Peptide Synthesi s Proteins: Classification based on Struc ture and Functions, Primary Structure, N-terminal (Sanger and Edmans Meth od) and C-terminal Analysis (Enzyme) Reactions of Amino Acids, Sorenson' s Titration, Ninhydrin Test. Denaturation of protein Structure of Peptides. Titration Curve of Amino Acids. Concept of Isoelectric pH, Zwitter ion. Glycoproteins	15 lectures	30 hrs
Unit III	**Nucleic Acids:** Structure, Function of Nucleic Acids, Properties and Typesof	15 lectures	30 hrs

Biomolecules: Nucleic Acids	DNA, RNA. Structure of Purine and Pyrimidine Bases Hydrogen Bonding between Nitrogeneous Bases in DNA Differences between DNA and RNA, Structure of Nucleosides, Nucleotides and Polynucleotides.		

SEMESTER II

Chemistry-II : Physical Chemistry

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 202	**Physical Chemistry**	**2**	
Course Objectives : To aquaint students with concepts in Thermodynamics, Kinetics and Redox Reactions **Learning Outcome :** To impart skills in Kinetics and Chemical Reactions			
Unit I **Thermodynamics**	**Thermodynamics**: System, Surrounding, Boundaries Sign Conventions, State Functions, Internal Energy and Enthalpy: Significance, examples, (Numericals expected.) Laws of Thermodynamics and its Limitations, Mathematical expression. Qualitative discussion of Carnot Cycle for ideal Gas and Mechanical Efficiency. Laws of Thermodynamics as applied to Biochemical Systems. Concept of Entropy, Entropy for Isobaric, Isochoric and Isothermal Processes.	15 lectures	30 hrs
Unit II **Chemical Kinetics**	**Reaction Kinetics:** Rate of Reaction, Rate Constant, Measurement of Reaction Rates Order & Molecularity of Reaction, Integrated Rate Equation of First and Second order reactions (with equal initial concentration of reactants). (Numericals expected) Determination of Order of Reaction by a) Integration Method b) Graphical Method c) Ostwald's Isolation Method d) Half Time Method. (Numericals expected).	15 lectures	30 hrs
Unit III **Oxidation Reduction reactions**	**Principals of Oxidation & Reduction Reactions**– Oxidising and Reducing Agents, Oxidation Number, Rules to assign Oxidation Numbers with examples Ions like	15 lectures	30 hrs

	Oxalate, Permanganate and Dichromat e. Balancing Redox Reactions by Ion Electron Method Oxidation, Reduction, Addition and Substitution & Elimination Reactions.		

SEMESTER II

Life Sciences-I : Physiology and Ecology

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 203	**Physiology and Ecology**	**2**	
Course Objectives: To aquaint studetns with Physiological Processes in Plants and Animals **Learning Objectives :** To impart the knowledge of Physiology and Ecology			
Unit I **Plant Physiology**	Photosynthesis, Intracellular Organization of Photosynthetic System. Fundamental Reactions of Photosynthesis, Photosynthetic Pigments, Role of Light. Hill Reaction and its Significance, Light Reactions, Cyclic and Non-Cyclic Photo induced Electron Flow, Energetics of Photosynthesis, Photorespiration, Dark Phase of Photosynthesis, Calvin Cycle, C-3, C-4 pathways Plant hormones - Auxin ,Gibbrellins, Cytokinins, Ethylene, Abscissic acid Introduction to Secondary Metabolites	15 lectures	30 hrs
Unit II **Animal Physiology**	Physiology of Digestion Movement of Food and Absorption, Secretary functions of Alimentary Canal, Digestion and Absorption,assimilation in Gut of Mammals Anatomy of Mammalian Kidney, Structure of Nephron, Physiology of Urine Formation and Role of Kidney in Excretion and Osmoregulation Physiology of Respiration, Mechanism of Respiration Principles of Gaseous Exchange in the Blood and Body Fluids Blood and Circulation : Blood Composition, Structure and Function of its Constituents	15 lectures	30 hrs

	Blood Coagulation and Anti-Coagulants Hemoglobin and its Polymorphism Regulation of the Circulation Mechanism and working of Heart in Human.		
Unit III **Ecosystem and Interactions**	Ecology and Biogeography. Ecosystems, Definition and Components, Structure and Function of Ecosystems. Aquatic and Terrestrial Ecosystems, Biotic and Abiotic Factors, Trophic Levels, Food Chain and Food Web, Ecological Pyramids (Energy,Biomass and Number) Nutrient Cycle and Biogeochemical Cycles: Water, Carbon, Oxygen, Nitrogen and Sulphur. Interactions, Commensalism, Mutualism, Predation and Antibiosis, Parasitism.	15 lectures	30 hrs

SEMESTER – II

Life Sciences-II : Genetics

COURSE CODE	**TITLE**	**CREDITS**	**Notional Hours**
USBT 204	**Genetics**	**2**	
Course Objectives : To aquaint students with concepts in Genetics **Learning Objectives :** To impart skills in Techniques in Genetic Analysis and Population Genetics			
Unit I **Genetics Fundamentals**	Mendel's Laws of Heredity Monohybrid Cross: Principle of Dominance and Segregation. Dihybrid Cross: Principle of Independent Assortment. Application of Mendel's Principles Punnett Square. Mendel's Principle in Human Genetics. Incomplete Dominance and Co-dominance. Multiple Alleles.Allelic series. Variations among the effect of the Mutation. Genotype andPhenotype. Environmental effect on the expression of the Human Genes. Gene Interaction. Epistasis.	15 lectures	30 hrs

Unit II **Microbial Genetics**	Genetic analysis in Bacteria- Prototrophs, Auxotrophs. Bacteriophages: Lytic and Lysogenic Development of Phage. Mechanism of Genetic Exchange in Bacteria: Conjugation; Transformation; Transduction; (Generalized Transduction, Specialized Transduction) Bacterial Transposable Elements.	15 lectures	30 hrs
Unit III **Population Genetics**	Genetic Structure of Populations – Genotypic Frequencies and Allelic Frequencies, Hardy- Weinberg Law and its assumptions Genetic Variations in Populations- Measuring Genetic Variation at Protein Level and measuring Genetic Variations at DNA level Natural Selection. Genetic Drift Speciation Role of Population Genetics in Consevation Biology	15 lectures	30 hrs

SEMESTER II

Biotechnology-I : Tissue Culture &Scientific Writing and Communication Skills

COURSE CODE	**TITLE**	**CREDITS**	**Notional Hours**
USBT 205	**Tissue Culture & Scientific Writing and Communication Skills**	**2**	
Course Objectives : To aquaint students with Techniques of Plant and Animal Tissue Culture **Learning Outcome :**To impart the skills of PTC, ATC and Science Communication			
Unit I **Plant Tissue Culture**	Cell Theory, Concept of Cell Culture, Cellular Totipotency, Organization of Plant Tissue Culture Laboratory : Equipments and Instruments Aseptic Techniques: Washing of Glassware, Media Sterilization, Aseptic Workstation, Precautions to maintain Aseptic Conditions. Culture Medium: Nutritional requirements of the explants, PGR's and their *in-vitro* roles, Media Preparation Callus Culture Technique: Introduction, Principle and Protocols	15 lectures	30 hrs

Unit II **Animal Tissue Culture**	**Basics of Animal Tissue Culture** Introduction Cell Culture Techniques, Equipment and Sterilization Methodology. Introduction to Animal Cell Cultures:Nutritional and Physiological: Growth Factors and Growth Parameters. General Metabolism and Growth Kinetics Primary Cell Cultures : Establishment and Maintenance of Primary Cell Cultures of Adherent and Non-Adherent Cell Lines with examples. Application of Cell Cultures	15 lectures	30 hrs
Unit III **Scientific Writing and Communication Skills**	**Communication Skills** Introduction to Communication -- Elements, Definitions, Scope of Communication and Communication as part of Science Communication Elements --Verbal and Non-Verbal Communications. Principles of Effective Communication, Oral Presentations Scientific Reading, Writing & Presentation **Scientific Writing** Process of Scientific Writing: Thinking, Planning, Rough Drafts and Revising Contents. Introduction to Scientific Reports and Writings Compilation of Experimental Data, Communication Methods in Science, Examples of Scientific and Unscientific Writing. Writing Papers, Reviews, Bibliography Plagiarism--Introduction to Plagiarism , Examples of Plagiarism.	15 lectures	30 hrs

SEMESTER - II

Biotechnology-II : Enzymology, Immunology and Biostatistics

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 206	**Enzymology, Immunology and Biostatics**	**2**	
Course Objectives : To aquaint students with concepts in Enzymology, Immunology and Biostatistics **Learning Outcome :** To impart the skills in Enzyme Kinetics, Immunological Techniques and Biostatistics			

Unit I **Enzymes**	Definition, Classification, Nomenclature, Chemical Nature, Properties of Enzymes, Mechanism of Enzyme Action, Active Sites, Enzyme Specificity, Effect of pH, Temperature, Substrate Concentration on Enzyme Activity, Enzyme Kinetics, Michelis-Menten Equation, Types of Enzyme Inhibitions-Competitive, Uncompetitive, Non-Competitive Allosteric Modulators Co-Factors,Zymogens,	15 lectures	30 hrs
Unit II **Immunology**	Overview of Immune Systems, Cell and Organs involved, T and B cells. Innate Immunity, Acquired Immunity, Local and Herd Immunity, Humoral and Cellular Immunity - Factors Influencing and Mechanisms of each. Antigens and Antibodies: Types of Antigens, General Properties of Antigens, Haptens and Superantigens Discovery and Structure of Antibodies (Framework region) Classes of Immunoglobulins, Antigenic Determinants. Antigen-Antibody Interactions Monoclonal Antibodies, Vaccines (Live, Killed) and Toxoid. Problems with Traditional Vaccines, Impact of Biotechnology on Vaccine Development.	15 lectures	30 hrs
Unit III **Biostatistics**	Defination &Importance of Statistics in Biology Types of Data, Normal and Frequency Distribution Representation of Data and Graphs (Bar Diagrams, Pie Charts and Histogram, Polygon and Curve) Types of Population Sampling Measures of Central Tendency (For Raw,Ungroup & Group Data) Mean Median Mode Measures of Dispersion Range, Variance, Coefficient of Variance. Standard Derivation. Standard Error.	15 lectures	30 hrs

Semester – II

PRACTICALS

SEMESTER – II
Practicals
Chemistry

COURSE CODE	TITLE	CREDITS	Notional Hours
USBTP 201	**Chemistry**	**2**	**30 hrs**

1. Spot test for Carbohydrates, Fats and Proteins and Amino Acids and Nucleic Acids
2. Standardization of Colorimeter and Estimation of Reducing sugar by DNSA method
3. Estimation of Protein by Biuret method and Lowry method
4. Saponification of Fats, Saponification Value of Oil or Fat, Iodine value of Oiland determine the rate constant for the saponification reaction between ethyl acetate and NaOH by back titration method
5. To determine enthalpy of dissolution of salt like KNO3
6. Determine the rate constant for hydrolysis of ester using HCl as a catalyst
7. Study the kinetics of reaction between Thiosulphate ion and HCl
8. Study reaction between potassium Persulphate and Potassium Iodide kinetically and hence to determine order of reaction
9. Study the reaction between NaHSO3 and KMnO4 and balancing the reaction in acidic, alkaline and neutral medium
10. Study transfer of electrons (Titration of sodium thiosulphate with potassium dichromate)
11. Determination of the volume strength of hydrogen peroxide solution by titration with standardised potassium permagnate solution
12. Determination of amount of K oxalate and oxalic acid in the given solution Titrimetrcially

SEMESTER – II
Practicals
Life Sciences

COURSE CODE	TITLE	CREDITS	Notional Hours
USBTP 202	**Life Sciences**	**2**	**30 hrs**

1. Study of Hill's reaction
2. Colorimetric study of Absorption Spectrum of Photosynthetic Pigments
3. Movemnt of Food in Paramoecium
4. Activity of Salivary Amylase on Starch
5. Analysis of Urine
6. Study of Mammalian Blood, Blood count using Haemocytometer and estimation of Haemoglobin in Mammalian Blood
7. Study of Human Blood Groups
8. Study of Mammalian Kidney and Heart
9. Problems in Mandelian Genetics
10. Study of Mitosis and Meiosis
11. Study of Karyotypes – Normal Male and Normal Female
12. Study of Interactions Commensalism, Mutualism, Predation and Antibiosis, Parasitism.

SEMESTER – II
Practicals
Biotechnology

COURSE CODE	TITLE	CREDITS	Notional Hours
USBTP 203	**Biotechnology**	**2**	**30 hrs**

1. Working and use of various Instruments used in Biotechnology Laboratory (Autoclave, Hot air Oven, Centrifuge, Incubator, Rotary Shaker, Filter Assembly, LAF, *pH* meter and Colorimeter)

2. Laboratory Organization and Layout for Plant and Animal Tissue Culture Laboratory
3. Preparation of Stock Solutions and Preparation of Media for PTC
4. Aseptic Transfer Technique, Surface Sterilization and Innoculation for Callus Culture
5. Media Preparation and Sterilization (ATC)
6. Trypsinization of Tissue and Viability Count
7. Qualitative Assay of Enzyme Amylase. Lipase, Protease, Urease, Catalase and Dehydrogenease
8. Enzyme Kinetics : Study of the effect of *pH*, Temperature on activity of Enzyme
9. Study of Effect of Substrate Concentration on enzyme activity and determination of Vmax and Km
10. Study of antigen antibody interaction by Ouchterlony method
11. Biometric Analysis for Mean, Median, Mode and Standard Deviation and Data representation using frequency Polygon, Histogram and Pie Diagram
12. Preparation of review reports of 5 Scientific Papers and Presentation (last 5 years)

Semester – I and II

Ability Enhancement Course 1 (FC I)
Ability Enhancement Course 2 (FC II)

SEMESTER I

Ability Enhancement Course 1 (FC I)
Societal Awareness

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 107	**Societal Awareness**	**2**	
Course Objective : To aquaint the students with concepts of Societal Awarness **Learning Outcome** : To impart knowledge of Society and make students aware about the Problems in Society			
Unit I **Overview of Indian Society**	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference	15 Lectures	30 hrs
Unit II **Concept of Disparity**	**Concept of Disparity- I** Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities **Concept of Disparity-II** Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences	15 Lectures	30 hrs
Unit III **The Indian Constitution and Significant Aspects of Political Processes**	**The Indian Constitution** Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution **Significant Aspects of Political Processes** The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics	15 lectures	30 hrs

Topics for Project Guidance: Growing Social Problems in India:

- *Substance abuse- impact on youth & challenges for the future*
- *HIV/AIDS- awareness, prevention, treatment and services*
- *Problems of the elderly- causes, implications and response*
- *Issue of child labour- magnitude, causes, effects and response*
- *Child abuse- effects and ways to prevent*
- *Trafficking of women- causes, effects and response*

SEMESTER II

Ability Enhancement Course 2 (FC II)
Globalization, Ecology and Sustainable Development

COURSE CODE	TITLE	CREDITS	Notional Hours
USBT 207	**Globalization, Ecology and Sustainable Development**	**2**	
Course Objective : To aquaint the students with concepts of Globalization, Ecology and Environment **Learning Outcome** : To impart knowledge of Globalization make students aware about the Problems in Society			
Unit I **Globalisation and Indian Society and Human Rights**	**Globalisation and Indian Society** Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides. **Human Rights** Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution	15 Lectures	30 hrs
Unit II **Ecology and Sustainbale Development**	**Ecologyand Sustainbale Development** Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation causes and impact on human life; Sustainable development, concept and components; poverty and environment	15 Lectures	30 hrs
Unit III **Understanding and Managing Stress and Conflict in Contemporary Society**	**Understanding Stress and Conflict** Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict **Managing Stress and Conflict in Society** Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society	15 lectures	30 hrs

Topics for Project Guidance: Growing Social Problems in India:

- *Increasing urbanization, problems of housing, health and sanitation;*
- *Changing lifestyles and impact on culture.*
- *Farmers' suicides and agrarian distress.*
- *Debate regarding Genetically Modified Crops.*
- *Development projects and Human Rights violations.*
- *Increasing crime/suicides among youth.*

Evaluation Scheme

The performance of the learners shall be evaluated into TWO Parts.
The learner's performance shall be assessed by Internal Assessment with 25 marks & by conducting the Semester End Examinations with 75 marks .
Practical Training will have Practical Examination for 50 marks at the end of Semester.
The allocation of marks for the Internal Assessment and Semester End Examinations are as follows:-

I. Internal Exam-25 Marks

(i) *Test– 20 Marks*

(ii) *Activities - 5 Marks*

II. External Examination- 75 Marks

(i) Theory Question Paper Pattern:-

All questions areCompulsory.		
Question	Based on	Marks
Q.1	Unit I	20
Q.2	Unit II	20
Q.3	Unit III	20
Q.4	Unit I,II and III	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d &e, etc & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination – 300 marks (50 marks x 6 core papers)

Each Core Subject Carries 50 Marks

Chemistry : 30 marks + 10 marks (Journal)+ 10 marks(Viva-voce)

Life Sciences and Biotechnology : Major (20 marks), Minor (10 marks), Identification /Spots (10 marks), Viva-voce (5 marks), Journal (5 marks)

IV. Ability Enhancement Course

V. Internal Exam-25 Marks

(iii)*Project– 20 Marks*

(iv)*Activities - 5 Marks*

VI. External Examination- 75 Marks

Question Paper Pattern

Maximum Marks: 75, Questions to be set:04, Duration: 02 and 1/2 Hrs.
All Questions are Compulsory

Q-1 Objective Questions - 20Marks

A) Sub Questions to be asked 12 and to be answered any 10

B) Sub Questions to be asked 12 and to be answered any 10

(*Multiple choice / True or False / Match the columns/Fill in the blanks)

Q-2 Full Length Question – 20 Marks

OR

Full Length Question

Q-3 Full Length Question – 20 Marks

OR

Full Length Question

Q-4 Short Notes – 15 Marks (To be asked 06 To be answered 03)

Note: Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

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University of Mumbai

No. UG/ 47 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges, the Head of the University Departments and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office Circular No. UG/87 of 2017-18, dated 21st July, 2017 relating to the revised syllabus as per (CBCS) for Sem. I & II of M.Sc. programmme in the course of Bio-Technology.

They are hereby informed that the recommendations made by the Board of Studies in Bio-Technology at its meeting held on 11th April, 2019 have been accepted by the Academic Council at its meeting held on 15th April, 2019 **vide** item No. 4.40 and that in accordance therewith, the revised syllabus as per the (CBCS) for the M.Sc. First Year (Sem. I & II) in Bio-Technology has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Ajay Deshmukh)
REGISTRAR

MUMBAI – 400 032
10th July, 2019

To

The Principals of the affiliated Colleges, the Head of the University Departments and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.40/15/04/2019

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No. UG/47 -A of 2019 MUMBAI-400 032 10th July, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Bio-Technology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)
REGISTRAR

UNIVERSITY OF MUMBAI

Revised Syllabus for

Program- M.Sc.

Course- Biotechnology (PSBT)

(First Year – Sem. I & II)

(Choice Based Credit Grading System with effect

from the academic year 2019-2020)

Preamble

The biotechnology sector, now recognized as one of the key priority sectors under the various government initiatives like 'Make in India', 'Skill India' and 'Startup India', is expected to contribute towards invention, innovation and economic growth of the country. It has also highlighted importance of human resource development and the need for nurturing tailor-made human capital for advanced scientific research and entrepreneurship.

The post-graduate course in biotechnology started by the University of Mumbai in the late 1990's has gone through various phases of restructuring. The present *adhoc* Board of Studies in Biotechnology during its meeting on the 28th of Jan 2019, discussed and reviewed the existing syllabi of the Master's degree program in biotechnology of University of Mumbai with that of various National Universities as well as that of the revised curriculum of DBT-India. Also, keeping in view the National Biotechnology Development Strategy (2015 – 2020) released by DBT-India, that identifies a strategic roadmap for India's emergence as a global biotechnology innovation and manufacturing hub, it was deemed essential to revamp the existing syllabus in a manner that would not only interest students but also equip them for their future be it in research or in other areas.

It was decided during the board meeting that faculty, students, alumni, and experts from industry would be consulted whilst framing the syllabus for the Master's program in biotechnology. Subject-wise experts were identified, and the drafts communicated to them for their opinion and revision. Along with 3 members in the Board of Studies, 17 others actively participated in drafting the course contents. It was decided that the practical assessment pattern also needed to be revised to better assess the knowledge of the learner.

The draft was revised multiple times and finalized after collating inputs from students, alumni, staff of affiliated and autonomous colleges as well as experts from industry. The Board of Studies is now confident that the newly designed syllabus would equip students with basic as well as applied knowledge in the subject enabling them to compete at National as well as International level.

List of members who have contributed to the drafting and revising of the syllabus

Sr No	Name of the faculty	Affiliation
1	Dr. Kelkar Mane Varsha	Chairperson, Adhoc BOS in Biotechnology
2	Dr. Shembekar Vishwas	Member Adhoc BOS in Biotechnology
3	Dr. D'Souza Jacinta	Member Adhoc BOS in Biotechnology
4.	Dr. Rao G.K.	Retd Senior technical officer, Central Institute of Fisheries Education, Mumbai. Specialization: Biostatistics
5.	Dr. Karkhanis Deepali	Faculty and Head, Dept of Biotechnology, KET'z Vaze college, Mumbai
6	Dr. Tara Menon	Faculty and Head, Dept of Biotechnology, SIES college, Mumbai
7	Dr. Rao Chunduri Jayaprada	Faculty and Head, Dept of Biotechnology, Mithibai college, Mumbai, (Autonomous)
8	Dr. Sadani Geeta	Faculty, Dept of Biotechnology, Khalsa College
9	Dr. Kokitkar Seema	Head, Dept of Biotechnology, C K Thakur college, Panvel
10	Ms. Vaishampayan Madhuri	Faculty, Dept of Biotechnology, C K Thakur college, Panvel
11	Mr. Ghatge Sushil	Faculty, Dept of Biotechnology, C K Thakur college, Panvel
12	Ms. Raut Maithilee	Faculty, Dept of Biotechnology, Viva college
13	Ms. Fernandes Norine	Faculty, Dept of Biotechnology, St Xaviers college, Mumbai (Autonomous)
14	Ms. Bhave Rashmi	Faculty and Head Dept of Biotechnology, Gogate Joglekar College
15	Dr. Khadke Prashant	Commercial Head, Premas Life Sciences
16	Dr. Singh B B	Scientific Adviser-IPR and Advocate, High court
17	Dr. Toprani Sneh	Post Doc Harvard University, Chief learning officer, Startup India, USA and Alumni, Dept of Biotechnology University of Mumbai
18	Mr. Mirgal Swapnil	Team Manager, Biosimilar Business, Reliance Bio product Trials and Alumni, Dept of Biotechnology University of Mumbai
19	Mr. Kamble Dhiraj	Senior Officer, R&D Microbiology, Lupin and Alumni, Dept of Biotechnology University of Mumbai
20	Mr. Vartak Kaushal	Jr Research Associate, Advance biotech lab, IPCA, Mumbai and Alumni, Dept of Biotechnology University of Mumbai

Further to the suggestions and contribution from the faculty as listed above from various colleges, industry and alumni, major portion of the syllabus has been drawn from DBT's remodeled MSc Biotechnology Curriculum, May 2017, Dept of Biotechnology, Ministry of Science and Technology, Government of India.

MSc Biotechnology Course Structure

Semester I

Course code	Title	Theory /Practical	Marks	Credits	Nos of Lectures /week
PSBT 101	Biochemistry	Theory	100	4	1
PSBT 102	Immunology	Theory	100	4	1
PSBT 103	Cell Biology	Theory	100	4	1
PSBT 104	Emerging technologies and molecular diagnostics	Theory	100	4	1
PSBTP101	Practical I	Practical	50	2	4
PSBTP102	Practical II	Practical	50	2	4
PSBTP103	Practical III	Practical	50	2	4
PSBTP104	Practical IV	Practical	50	2	4
	TOTAL		**600**	**24**	

MSc Biotechnology Course Structure

Semester II

Course code	Title	Theory /Practical	Marks	Credits	Nos of Lectures/ week
PSBT 201	Bioinformatics and Biostatistics	Theory	100	4	1
PSBT 202	Plant and Animal Biotechnology	Theory	100	4	1
PSBT 203	Bioprocess Engineering and technology	Theory	100	4	1
PSBT 204	Intellectual property rights and Bioethics	Theory	100	4	1
PSBTP201	Practical I	Practical	50	2	4
PSBTP202	Practical II	Practical	50	2	4
PSBTP203	Practical III	Practical	50	2	4
PSBTP204	Practical IV	Practical	50	2	4
	TOTAL		**600**	**24**	

Teaching pattern:

One (01) Credit would be of thirty- forty (30-40) learning hours; of this more than fifty percent of the time will be spent on class room instructions including practical as prescribed by the University. Rest of the time spent invested for assignments, projects, journal writing, case studies, library work, industrial visits, attending seminars / workshops, preparations for examinations etc. would be considered as notional hours. The present syllabus considers (60L as class room teaching and 15 lectures as Notional hours/ paper). Each lecture duration would be for 60 min. The names of the reference books provided in the syllabus are for guidance purpose only. Students and faculty are encouraged to explore additional reference books, online lectures, videos, science journals for latest/ additional information.

Scheme of Examinations:

(a) Internal assessment of 40 marks per course per semester should be conducted.

(b) External assessment of 60 marks per course per semester at the end of every semester

(c) Practical examination of 200 marks should be conducted at the end of every semester.

A. Theory -Internal assessment (40%) -40 marks

Sr No	Evaluation type	Marks
1.	Assignments that can include article writing, report writing, preparation of a review, on any topic selected from each paper OR PowerPoint presentation on a topic from the syllabus or related to the syllabus Note: The student can submit only 2 assignments and give 2 PowerPoint presentations per semester. Respective college/department can decide the allocation.	30
2.	**a.** Active participation in routine class instructional deliveries	05
	b Overall conduct as a responsible student, w.r.t manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total Marks	40

B. Theory -External examination -60%

Semester End Theory Assessment- 60 marks

- The duration of these exam will be of 2.5 hours
- The theory question paper will have 5 questions each of 12 marks.
- For each unit there will be one question and the fifth will be based on all the four units.
- The fifth question will have 6 subquestions out of which the student has to attempt any 3.
- All questions shall be compulsory with internal choice within the questions such that each question will be set of 24 marks with options.

Practical Examination Evaluation scheme (50 marks per paper)

A Certified copy journal is essential to appear for the practical examination.

1.	Practical Question 1	25
2.	Practical Question 2	15
3.	Journal	5
4.	Viva Voce	5
OR		
1.	Practical Question	40
2.	Journal	5
3.	Viva Voce	5

Note:

- In case of any changes in the above-mentioned evaluation scheme, the chairperson of examinations would provide the necessary details and the format.
- The practical examinations at a center would be evaluated by one external assigned by the University and one internal examiner assigned by the college/department.

M.Sc. Biotechnology
Semester –I

Paper-I Biochemistry (PSBT 101)

Units	Topics	Credit	No of lectures
Unit-I Glycobiology & Membrane Biochemistry	Glycosylation of Biomolecules - Synthesis N-linked, O-linked, and GPI linked glycoproteins and role of glycosylation. Lipid aggregates: micelles, bilayers and liposomes- structure, types, preparation, characterization, and therapeutic applications of liposomes. Composition and Architecture of membrane: structural lipids in membranes, membrane bo und proteins - structure, properties, and function. Membrane Dynamics: lipid movements, flippase, FRAP, Lipid raft, Membrane fusion. Solubilization of the membrane by using different detergents.	1	15
Unit- II Protein Folding	Denaturation and Renaturation of proteins; Denaturants and their mode of action; Anfinsen's classical experiment; Folding curves and transitions; Types of protein folding and intermediates; Models of protein folding; Assisted protein folding (Chaperones); Misfolding and diseases. Protein degradation: Ubiquitin-proteasome pathway and lysosomal proteolysis.	1	15
Unit- III Biochemistry of Nucleic acids	Forces stabilizing nucleic acid structures, triple helix. Superhelix topology- linking number, Twist and writhing number, measurement of supercoiling and Topoisomerases. Nucleic acid binding protein – Leucine Zipper, Zinc fingers, OB fold, Beta Barrel, Helix-turn-helix, Helix-loop-helix. Biosynthesis of nucleic acids and inborn errors of nucleic acid Metabolism. Methodologies for detection: Protein –Protein and DNA – Protein interactions: Gel retardation assay, DNA foot printing, Yeast 2 Hybrid Method advantages and limitations, yeast split-hybrid and reverse two-hybrid systems, Co-Immunoprecipitation (Co-IP) and Far-Western Blot Analysis.	1	15

Unit- IV Bioenergetics and regulation of metabolism	Biosynthesis of Amino acids; phenylalanine, tyrosine, threonine and methionine. Bioenergetics- coupled interconnecting reactions in metabolism; oxidation of carbon fuels; recurring motifs in metabolism. Elucidation of metabolic pathways: Experimental approaches to the study of Metabolism. Integration of central metabolism; entry/ exit of various biomolecules from central pathways, principles of metabolic regulation. Strategies of energy Metabolism: organ specialization- Brain, Muscle, Adipose Tissue, Liver, Kidney. Metabolic Homeostasis: Regulation of Appetite, Energy Expenditure, and Body Weight; Metabolic Adaptation: Starve–Feed Cycles, insulin signaling and Diabetes Mellitus, target of rapamycin (TOR).	1	15

References:

1. Stryer, L. (2015). *Biochemistry*. (8th edition) New York: Freeman.
2. Lehninger, A. L. (2012). *Principles of Biochemistry* (6th edition). New York, NY: Worth.
3. Voet, D., & Voet, J. G. (2016). *Biochemistry* (5th edition). Hoboken, NJ: J. Wiley & Sons.
4. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2008).
5. Lodish, H. F. (2016). *Molecular Cell Biology* (8th Ed.). New York: W.H. Freeman.
6. Krebs, J. E., Lewin, B., Kilpatrick, S. T., & Goldstein, E. S. (2014).
7. *Lewin's Genes XI*. Burlington, MA: Jones & Bartlett Learning.
8. Cooper, G. M., & Hausman, R. E. (2013). *The Cell: a Molecular Approach* (6th Ed.). Washington: ASM; Sunderland.
9. Laouini et.al. Preparation, Characterization and Applications of Liposomes: State of the Art. journal of Colloid Science and Biotechnology Vol. 1, 147–168, 2012
10. Watson, James D., Baker, Tania A., Bell, Stephen P. & Gann, Alexander: Molecular biology of the gene. (6th ed.) New York. Pearson Education Inc., 2008. 0-321-50781-9

Paper II – Immunology (PSBT102)

Unit	Topics	Credit	No of Lectures
I Vaccinology	Active and passive immunization; live, killed, attenuated, subunit vaccines; vaccine technology: role and properties of adjuvants, recombinant DNA and protein based vaccines, plant-based vaccines, reverse vaccinology; peptide vaccines, conjugate vaccines; antibody genes and antibody engineering: chimeric, generation of monoclonal antibodies, hybrid monoclonal antibodies; catalytic antibodies and generation of immunoglobulin gene libraries, idiotypic vaccines and marker vaccines, viral-like particles (VLPs), dendritic cell based vaccines, vaccine against cancer, T cell based vaccine, edible vaccine and therapeutic vaccine.	1	15
II Clinical Immunology	Immunity to infection : bacteria, viral, fungal and parasitic infections (with examples from each group); hypersensitivity: Type I-IV; transplantation: immunological basis of graft rejection; clinical transplantation and immunosuppressive therapy; tumor immunology: tumor antigens; immune response to tumors and tumor evasion of the immune system, cancer immunotherapy; immunodeficiency: primary immunodeficiencies, acquired or secondary immunodeficiencies, autoimmune disorder, anaphylactic shock, immunosenescence, immune exhaustion in chronic viral infection, immune tolerance, NK cells in chronic viral infection and malignancy	1	15
III- Immunogenetics	Major histocompatibility complex genes and their role in autoimmune and infectious diseases, HLA typing, human major histocompatibility complex (MHC), Complement genes of the human major histocompatibility complex: implication for linkage disequilibrium and disease associations, genetic studies of autoimmunity; types of autoimmune diseases; mechanism and role of CD4+ T cells; MHC and TCR in autoimmunity; treatment of autoimmune diseases; rheumatoid arthritis, systemic lupus erythematosus and multiple sclerosis, genetics of human immunoglobulin, immunogenetics of spontaneous control of HIV, KIR complex.	1	15

IV: Antigen-antibody interactions	Precipitation, agglutination and complement mediated immune reactions; advanced immunological techniques: RIA, ELISA, Western blotting, ELISPOT assay, immunofluorescence microscopy, flow cytometry and immunoelectron microscopy; biosensor assays for assessing ligand –receptor interaction; CMI techniques: lymphoproliferation assay, mixed lymphocyte reaction, cell cytotoxicity assays, apoptosis, transgenic mice, gene knock outs.	1	15

References:

1. Kindt, T. J., Goldsby, R. A., Osborne, B. A., & Kuby, J. (2006). Kuby Immunology. New York: W.H. Freeman.
2. Brostoff, J., Seaddin, J. K., Male, D., & Roitt, I. M. (2002). Clinical Immunology. London: Gower Medical Pub.
3. Murphy, K., Travers, P., Walport, M., & Janeway, C. (2012). Janeway's Immunobiology. New York: Garland Science.
4. Paul, W. E. (2012). Fundamental Immunology. New York: Raven Press.
5. Goding, J. W. (1996). Monoclonal Antibodies: Principles and Practice: Production and Application of Monoclonal Antibodies in Cell Biology, Biochemistry, and Immunology. London: Academic Press.
6. Parham, P. (2005). The Immune System. New York: Garland Science
7. An introduction to Immunology C V Rao Narosa Publishing house
8. Immunology essential and fundamental, Second edition S Pathak & U Palan Parveen Publishing House
9. Text Book of Medical Biochemistry, Praful Godkar. Bahalani Publishers
10. Immunology, An introduction, fourth edition. Ian R Tizard Thomson
11. Immunology, sixth Ed Roitt, Brostoff, Male Mosby, An imprint of Elsevier science Ltd
12. Medical Microbiology, Anantnarayan

Paper III- Cell Biology (PSBT 103)

Unit	Topics	Credit	Number of lectures
I- Dynamics and organization of cell	Universal features of cells; cell chemistry and biosynthesis: chemical organization of cells; internal organization of the cell - cell membranes and cell organelle; dynamics of DNA and mechanisms based on central dogma; chromatin control: gene transcription and silencing by chromatin Writers,-Readers and –Erasers; replication, transcription and translation machineries mitochondrial genetic code translation product cleavage, modification and activation.	1	15
II- Cellular signaling, transport and trafficking	Cellular signaling Molecular mechanisms of membrane transport, nuclear transport, transport across mitochondria and chloroplasts; intracellular vesicular trafficking from endoplasmic reticulum through Golgi apparatus to lysosomes/cell exterior. Cell signaling- intercellular communications- nerve impulses, neurotransmitters; agonist and antagonist reactions	1	15
III- Cellular processes – manipulations	Cell cycle and its regulation; cell divisions and related machineries; cell differentiation: stem cells, their differentiation into different cell types and organization into specialized tissues; cell-ECM and cell-cell interactions; cell receptors and transmembrane signaling; cell motility and migration; cell death: different modes of cell death and their regulation. Isolation of cells and basics of cell culture; observing cells under a microscope, analyzing and manipulating DNA, RNA and proteins.	1	15
IV- Genome instability and cell transformation	Mutations, proto-oncogenes, oncogenes and tumor suppressor genes, physical, chemical and biological mutagens; types of mutations; Epigenetic mutations intra-genic and inter-genic suppression; transpositions-transposable genetic elements in prokaryotes and eukaryotes, role of transposons in genome; viral and cellular oncogenes; tumor suppressor genes; structure, function and mechanism of action; activation and suppression of tumor suppressor genes; oncogenes as transcriptional activators.	1	15

References:

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2002). Molecular Biology of the Cell. New York: Garland Science.

2. Lodish, H. F. (2000). Molecular Cell Biology. New York: W.H. Freeman.

3. Krebs, J. E., Lewin, B., Kilpatrick, S. T., & Goldstein, E. S. (2014). Lewin's Genes XI. Burlington, MA: Jones & Bartlett Learning.

4. Cooper, G. M., & Hausman, R. E. (2009). The Cell: a Molecular Approach. Washington: ASM; Sunderland.

5. Hardin, J., Bertoni, G., Kleinsmith, L. J., & Becker, W. M. (2012). Becker's World of the Cell. Boston: Benjamin Cummings.

6. Watson, J. D. (1987). Molecular Biology of the Gene (7th ed.). Menlo Park, CA: Benjamin/Cummings.

7.Ernst J M Helmreich The Biochemistry cell signaling. Oxford University Press (Indian Edition)

Paper IV Emerging technologies and molecular diagnostics (PSBT 104)

Unit	Topics	Credit	Lectures
Unit I- Functional genomics and proteomics	**Genomics** Gene expression by SAGE and Microarrays- Construction of microarrays – genomic arrays, cDNA arrays and oligo arrays and its applications, NGS platforms, high and low read sequences **Proteomics;** ***Separation and Identification of Proteins*** 2D-PAGE, isoelectric focusing, Edman reaction Protein tryptic digestion and peptide mass fingerprinting mass spectrometry, MALDI-TOF ***Protein Expression Profiling***; Protein Microarrays/ Protein chips: Types and applications **Gel-based quantitative proteomics:** DIGE (Difference in Gel Electrophoresis);**Gel-free based quantitative proteomic:** Surface plasmon resonance, MS based used with stable-isotope tagging, ***In vivo labelling***- SILAC, ***Invitro labelling***- ICAT: Clinical and biomedical applications of proteomics, Introduction to metabolomics, lipidomics, metagenomics and systems biology.	**1**	**15**
Unit II Basic and Advanced Microscopy:	Light Microscopy: lenses and microscopes, resolution: Rayleigh's Approach, Darkfield; Phase Contrast; Differential Interference Contrast; fluorescence and fluorescence microscopy: what is fluorescence, what makes a molecule fluorescent, fluorescence microscope; optical arrangement, light source; filter sets: excitation filter, dichroic mirror, and barrier, optical layout for image capture; CCD cameras; back illumination, binning; recording color; three CCD elements with dichroic beamsplitters, boosting the signal. Confocal microscopy. Advanced fluorescence techniques: FLIM, FRET, and FCS, Fluorescence Lifetime, Fluorescence Resonant Energy Transfer (FRET), Fluorescence Correlation Spectroscopy (FCS), Evanescent Wave Microscopy; Near-Field and Evanescent Waves, Total Internal Reflection Microscopy; Near-Field Microscopy; Beyond the Diffraction Limit: Stimulated Emission Depletion (STED), Super-Resolution Summary, Super-Resolution Imaging with Stochastic Optical Reconstruction Microscopy (STORM) and Photoactivated Localization Microscopy (PALM).	1	**15**

Unit III CRISPER CAS and Molecular cytogenetics	**CRISPER CAS**: History of its discovery, elucidation of the mechanism including introduction to all the molecular players development of applications for *in vivo* genome engineering for genetic studies, promise of the technology as a next generation therapeutic method Introduction to chromosomal abnormalities. **Advanced Cytogenetic techniques and applications** - FISH , M-FISH ,SKY, CGH, Microarrays principle, methodology. Molecular Approaches for Delineating, Marker Chromosomes, Prenatal Diagnosis of Common Aneuploidies, Preimplantation FISH Diagnosis of Aneuploidies, Molecular Cytogenetics in Reproductive Pathology Interphase FISH Studies of Chronic Myeloid Leukemia, FISH Detection of HER2 Amplification in Breast Cancer, Chromogenic In Situ Hybridization and FISH in Pathology,	1	**15**
Unit IV Diagnostic Microbiology	Techniques: Molecular amplification techniques • Target amplification systems • Probe amplification systems • Signal amplification PCR in molecular diagnostics; viral and bacterial detection Quantitation of organisms – internal controls, external standards, calibrators, absolute and relative quantification Identification and classification of organisms using molecular markers- 16S rRNA typing/sequencing Detection and identity of microbial diseases Direct detection and identification of pathogenic-organisms/ viruses E.g. TB and HIV Clinical utility of molecular diagnostics tests (NAAT) for Hepatitis and AIDS. Molecular identification of fungal pathogens Pharmacogenetics	1	**15**

References:

1. Campbell, I. D. (2012). *Biophysical Techniques*. Oxford: Oxford University Press.
2. Serdyuk, I. N., Zaccai, N. R., & Zaccai, G. (2007). *Methods in Molecular Biophysics: Structure, Dynamics, Function*. Cambridge: Cambridge University Press.
3. Phillips, R., Kondev, J., & Theriot, J. (2009). P*hysical Biology of the Cell*. New York: Garland Science.
4. Huang, B., Bates, M., & Zhuang, X. (2009). *Super-Resolution Fluorescence Microscopy.* Annual Review of Biochemistry, 78(1), 993-1016. doi:10.1146/annurev.biochem.77.061906.092014.
5. Mohanraju, P., Makarova, K. S., Zetsche, B., Zhang, F., Koonin, E. V., & Oost, J. V. (2016). *Diverse Evolutionary Roots and Mechanistic Variations of the CRISPR-Cas Systems.* Science, 353(6299). doi:10.1126/science.aad5147.

6. Lander, E. (2016). *The Heroes of CRISPR.* Cell, 164(1-2), 18-28. doi:10.1016/j. cell.2015.12.041.
7. Ledford, H. (2016). *The Unsung Heroes of CRISPR*. Nature, 535(7612), 342-344. doi:10.1038/535342a.
8. *Molecular Imaging* Theranostics, 4(4), 386-398. doi:10.7150/thno.8006 Coleman, W. B., & Tsongalis, G. J. (2010). *Molecular Diagnostics: for the Clinical Laboratorian*. Totowa, NJ: Humana Press.
9. Molecular biology of the cell by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Rafi, Keith Roberts, and Peter Walter. 5th ed. 2008
10. Molecular Microbiology Diagnostic Principles and practice third edition, David H. Persing and Fred C. Tenover Copyright _ 2016 by ASM Press
11. Methods in Molecular Biology, Vol. 204: Molecular Cytogenetics: Protocols and Applications, Edited by: Y. S. Fan © Humana Press Inc., Totowa, NJ 2001
12. Genome 3 TA Brown
13. Molecular Biotechnology – Principles and applications of recombinant technology, Glick 4th edition 2010
14. Microarray and Microplates: Applications in biomedical sciences Shu Ye, Ian Day, 2003, Bios Scientific Ltd, oxford.
15. Human Molecular Genetics. Tom Strachan and Andrew Read, 2004, 3rd Edition, Garland Science.
16. Introduction to human molecular genetics. Jack Pasternak, 2005, 2nd Edition, Wiley publication.
17. Microarray bioinformatics by Dov Sketel , Cambridge university press 2003

Practical I PSBTP101+ PSBTP104 **4 Credits**

1. To prepare an Acetate and Phosphate buffers using the Henderson-Hassel Bach equation.
2. To determine an unknown protein concentration by plotting a standard graph of BSA using UV-Vis Spectrophotometer and validating the Beer- Lambert's Law.
3. Protein gel staining techniques: silver staining, Activity staining: LDH, glycoprotein staining
4. Viscosity studies of proteins
5. Identification of sugars in fruit juices using thin layer chromatography.
6. Isolation of starch from potato and its estimation by anthrone method.
7. The isolation and assay of glycogen from liver and skeletal muscles of bird/mammal.
8. Antimicrobial sensitivity test and demonstration of drug resistance.
9. Operation and maintenance of light microscope – Write up
10. Microscopy types Confocal, Fluorescence, STORM – demonstrations/videos and pictures – Write up
11. Photo album of chromosomal abnormalities in normal and disease condition
    numerical detected by using different probes – centromeric, locus specific, telomeric Structural - Translocations and fusion genes
    Detection of inversions and interstitial deletions by SKY
    CGH for a disease or cancer
12. Demonstration/ video of 2D PAGE
13. Demonstration of Affinity chromatography

References

1. Principles and techniques of Biochemistry and molecular biology (7th Ed, 2010) Keith Wilson and John Walker, Cambridge university Press.
2. Biochemistry Laboratory (2nd Ed, 2012) Rodney Boyer, Pearson's Publication.
3. Biochemical Methods, Sadasivam and Manikam(3rd Ed, 2008)New age international publishers,2008.
4. An Introduction to Practical Biochemistry (3rd Edition), David T Plummer, Tata McGraw Hill Publishing Company Limited, 1992.

Practical II PSBTP102+PSBTP103 **4 credits**

1. Preparation of TAB and sterility testing
2. Demonstration of Western blotting
3. Perform serum electrophoresis (horizontal)
4. To perform the Dot blot assays
5. In-vitro demonstration of phagocytosis and calculating phagocytic index.
6. Latex bead agglutination / precipitation test for detection of rheumatoid factor (RF)
7. Separation of lymphocytes on Ficol Histopaque and viability count
8. Visit to a blood bank and preparation of report
9. Cell permeability testing- osmotic fragility
10. Isolation of cell organelle by differential centrifugation techniques from plant / animal sources
11. Isolation of mitochondrial DNA
12. Isolation of chloroplast DNA
13. Cell motility studies (bacteria, algae, cyanobacteria, protozoans,)
14. Cell death /apoptosis studies using flow-cytometry demonstration
15. Isolation and identification of mutagens of plant origin (demonstration/ video)

References

1. A Handbook of Practical Immunology – G P Talkwar
2. Practical immunology, Frank Hay, 4th Edition , Blackwell Science
3. Introduction to Practical Biochemistry, D.T. Plummer, Tata MacGraw Hill
4. Biochemical Methods, Sadasivam and Manikam(3rd Ed, 2008). New age international publishers,2008.
5. Laboratory Manual of Microbiology, Biochemistry and Molecular Biology, Jyoti Saxena Mamta Baunthiyal Indu Ravi , Scientific Publishers (India) 5 A, New Pali Road, P.O. Box 91 Jodhpur 342 001 (India)
6. Medical Laboratory Technology 2nd edition Authors Kanai, L Mukherjee and Swarajit Ghosh .McGraw Hill publications,2010.
7. Practical Immunology,Frank Hay,4thEdition,BlackwellScience
8. Medical Microbiology,Anantnarayan
9. An Introduction to Practical Biochemistry (3rd Edition), David T Plummer, Tata McGraw Hill Publishing Company Limited, 1992.
10. Nigam and Ayyagari. (2007). Lab Manual in Biochemistry, Immunology and Biotechnology. TATA McGraw Hill.
11. Cell Biology Lab Manual-http://www.ihcworld.com/_protocols/lab_protocols/cellbiology-lab-manual-heidcamp.htm
12. Text Book of Medical Biochemistry, Praful Godkar. Bahalani

MSc Biotechnology

Semester II

Paper I -Biostatistics and Bioinformatics (PSBT 201)

Unit	Topic	Credit	lectures
I Basics of Bioinformatics and DNA sequence analysis	Bioinformatics basics: Computers in biology and medicine; Introduction to Unix and Linux systems and basic commands; Database concepts; Protein and nucleic acid databases; Structural databases; Biological XML DTD's; pattern matching algorithm basics; databases and search tools: biological background for sequence analysis; Identification of protein sequence from DNA sequence; searching of databases similar sequence; NCBI; publicly available tools; resources at EBI; resources on web; database mining tools. DNA sequence analysis: gene bank sequence database; submitting DNA sequences to databases and database searching; sequence alignment; pairwise alignment techniques; motif discovery and gene prediction; local structural variants of DNA, their relevance in molecular level processes, and their identification; assembly of data from genome sequencing.	1	**15**
II Multiple sequence alignments and protein modelling	Multiple sequence analysis; multiple sequence alignment; flexible sequence similarity searching with the FASTA3 program package; use of CLUSTALW and CLUSTALX for multiple sequence alignment; submitting DNA protein sequence to databases: where and how to submit, SEQUIN, genome centres; submitting aligned sets of sequences, updating submitted sequences, methods of phylogenetic analysis. Protein modelling: introduction; force field methods; energy, buried and exposed residues; side chains and neighbours; fixed regions; hydrogen bonds; mapping properties onto surfaces; fitting monomers; RMS fit of conformers; assigning secondary structures; sequence alignment- methods, evaluation, scoring; protein completion: backbone construction and side chain addition; small peptide methodology; software accessibility; building peptides; protein displays; substructure manipulations, annealing.	**1**	**15**
III-Biostatistics	Introduction and scope of statistics in biological studies and basic concepts. Collection of data, by different sampling methods: Simple random sampling, stratifies random sampling and systemic sampling. Measures of central tendency; Mean, Median and Mode. Measures of	1	**15**

	Dispersion: Variance/ standard deviation, coefficient of variation and standard error. Confidence limits for mean and proportion. Probability and Basic concepts: Normal and binomial distribution. Correlation and regression analysis for a bivariate data: Scatter diagram		
IV- Biostatistics	Test of Hypothesis: Null hypothesis, alternate hypothesis, test statistics, Type I and Type II errors, level of significance and critical region. Z test: for a single sample, two samples and two sample proportion. t-test a single sample, two samples and testing the significance of the correlation. Coefficient: t paired test, x^2 test: As a goodness of fit and in 2x2 contingency test	1	15

References:

1. Lesk, A. M. (2002). Introduction to Bioinformatics. Oxford: Oxford University Press.
2. Mount, D. W. (2001). Bioinformatics: Sequence and Genome Analysis. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press.
3. Baxevanis, A. D., & Ouellette, B. F. (2001). Bioinformatics: a Practical Guide to the Analysis of Genes and Proteins. New York: Wiley-Interscience.
4. Pevsner, J. (2015). Bioinformatics and Functional Genomics. Hoboken, NJ.: Wiley-Blackwell.
5. Bourne, P. E., & Gu, J. (2009). Structural Bioinformatics. Hoboken, NJ: Wiley-Liss.
6. Lesk, A. M. (2004). Introduction to Protein Science: Architecture, Function, and Genomics. Oxford: Oxford University Press.
7. S. P. Gupta, Statistical Methods, (45th Revised Edition), Publisher SCHAND
8. William G. Cochran, Sampling Techniques (3th Edition), Wiley and sons
9. Boris V. Gnedenko, Theory of Probability (6th Edition), CRC Press, 13-May-1998
10. Oscar Kempthorne, Klaus Hinkelmann, Design and Analysis of Experiments, Volume1: Introduction to Experimental Design, 2nd Edition, ISBN: 978-0-471-72756-9 December 2007
11. Acheson Johnston Duncan, Quality Control and Industrial Statistics (5th Edition), Irwin; 5 edition January 1, 1986
12. BK Mahajan, Methods in Biostatistics (7th Edition), Published December 1st 2008 by JP Medical Ltd

Paper II-Plant and Animal Biotechnology (PSBT 202)

Unit	Topic	Credit	lectures
I Plant tissue culture and Animal cell culture	Plant tissue culture: historical perspective; totipotency; organogenesis; Somatic embryogenesis; establishment of cultures – callus culture, cell suspension culture, media preparation – nutrients and plant hormones; sterilization techniques; applications of tissue culture - micropropagation; somaclonal variation; androgenesis and its applications in genetics and plant breeding; germplasm conservation and cryopreservation; synthetic seed production; protoplast culture and somatic hybridization - protoplast isolation; culture and usage; somatic hybridization - methods and applications; cybrids and somatic cell genetics; plant cell cultures for secondary metabolite production. Animal cell culture: brief history of animal cell culture; cell culture media and reagents; culture of mammalian cells, tissues and organs; primary culture, secondary culture, continuous cell lines, suspension cultures; application of animal cell culture for virus isolation and *in vitro* testing of drugs, testing of toxicity of environmental pollutants in cell culture, application of cell culture technology in production of human and animal viral vaccines and pharmaceutical proteins.	1	15
II Plant Genetic manipulations	Genetic engineering: *Agrobacterium*-plant interaction; virulence; Ti and Ri plasmids; opines and their significance; T-DNA transfer; disarmed Ti plasmid; Genetic transformation - *Agrobacterium*-mediated gene delivery; cointegrate and binary vectors and their utility; direct gene transfer - PEG-mediated, electroporation, particle bombardment and alternative methods; screenable and selectable markers; characterization of transgenics; chloroplast transformation; marker-free methodologies; advanced methodologies - cisgenesis, intragenesis and genome editing; molecular pharming - concept of plants as biofactories, production of industrial enzymes and pharmaceutically important compounds.	1	15
III Animal reproductive biotechnology and Vaccinology	Animal reproductive biotechnology: structure of sperms and ovum; cryopreservation of sperms and ova of livestock; artificial insemination; super ovulation, embryo recovery and *in vitro* fertilization; culture of embryos; cryopreservation of embryos; embryo transfer technology; transgenic manipulation of animal embryos; applications of transgenic animal technology; animal cloning - basic concept, cloning for conservation for conservation endangered species; Vaccinology: history of development of vaccines, introduction to the concept of vaccines, conventional methods of animal vaccine	1	15

	production, recombinant approaches to vaccine production, modern vaccines.		
IV Molecular mapping and marker assisted selection	Molecular markers - hybridization and PCR based markers RFLP, RAPD, STS, SSR, AFLP, SNP markers; DNA fingerprinting-principles and applications; introduction to mapping of genes/QTLs; marker-assisted selection - strategies for Introducing genes of biotic and abiotic stress resistance in plants: genetic basis for disease resistance in animals; molecular diagnostics of pathogens in plants and animals; detection of meat adulteration using DNA based methods.	1	**15**

References

1. Biology of plant metabolomics, Robert Hall, Annual Plant Reviews, 43, Chichester, West Sussex; Ames, Iowa : Wiley-Blackwell, 2011
2. Plant Biotechnology. Umesha, S. (2013).
3. Glick, B. R., & Pasternak, J. J. (2010). Molecular Biotechnology: Principles and Applications of Recombinant DNA. Washington, D.C.: ASM Press.
4. Brown, T. A. (2006). Gene Cloning and DNA Analysis: An Introduction. Oxford: Blackwell Publishers.
5. Primrose, S. B., & Twyman, R. M. (2006). Principles of Gene Manipulation and Genomics. Malden, MA: Blackwell Pub.
6. Slater, A., Scott, N. W., & Fowler, M. R. (2003). Plant Biotechnology: The Genetic Manipulation of Plants. Oxford: Oxford University Press.
7. Gordon, I. (2005). Reproductive Techniques in Farm Animals. Oxford: CAB International.
8. Levine, M. M. (2004). New Generation Vaccines. New York: M. Dekker.
9. Pörtner, R. (2007). Animal Cell Biotechnology: Methods and Protocols. Totowa, NJ: Humana Press.
10. Chawla, H. S. (2000). Introduction to Plant Biotechnology. Enfield, NH: Science.
11. Razdan, M. K. (2003). Introduction to Plant Tissue Culture. Enfield, NH: Science.
12. Slater, A., Scott, N. W., & Fowler, M. R. (2008). Plant Biotechnology: n Introduction to Genetic Engineering. Oxford: Oxford University Press.
13. Buchanan, B. B., Gruissem, W., & Jones, R. L. (2015). Biochemistry & Molecular Biology of Plants, Wiley 2002

Paper III -Bioprocess engineering and technology (PSBT 203)

Unit	Topics	Credit	Lectures
I Basic principles of biochemical engineering	**Sources of Microorganisms Used in Biotechnology**- Literature search and culture collection supply, Isolation de novo of organisms producing metabolites of economic importance. **Strain Improvement**- Selection from naturally occurring variants, Manipulation of the genome of industrial organisms in strain improvement **Bioreactor design and analysis** Media formulation and optimization methods; sterilization of bioreactors aeration and agitation in bioreactors KLa value (factors affecting and methods of determination), heat transfer in bioprocess measurement and control of bioprocess parameters. **Bioprocess economics**	1	15
Unit II Production of proteins from recombinant microorganisms	**Principles of Microbial Growth** Batch Fermentation, Fed-Batch Fermentation Continuous Fermentation **Maximizing the Efficiency of the Fermentation Process** High-Density Cell Cultures, Increasing Plasmid Stability, Quiescent *E. coli* Cells, Protein Secretion and Reducing Acetate **Bioreactors** **Typical Large-Scale Fermentation Systems** Two-Stage Fermentation in Tandem Airlift Reactors, Two-Stage Fermentation in a Single Stirred-Tank Reactor, Batch versus Fed-Batch Fermentation **Harvesting Microbial Cells** **Disrupting Microbial Cells** **Downstream Processing** Protein Solubilization **Large-Scale Production of plasmid DNA** .	1	15
Unit III Applications of enzyme technology in food processing	**Introduction and scope** 1. Enzymes sourced from animals and plants used in food manufacturing technology 2. Enzyme usage in food applications. **Mechanism of enzyme function and reactions in food processes** 1 Starch-processing and related carbohydrates. 2. Lipases for the production of food components: interesterified fat Enzymes in protein modification: hydrolyzed protein 4., Enzymes in bread making - flavour, texture and keeping quality	1	15

	5. Enzymes in dairy product manufacture 6. Enzymes in fruit and vegetable processing and juice extraction 7.Enzymes in fish and meat processing 8. Beer Production using Immobilized Cell Technology.		
Unit IV Applications of microbial technology in food process operations and production, biofuels and biorefinery	1.Microbial biomass production: mushrooms, SCP 2.Fermented foods from: meat and fish, bread, Vegetables (sauerkraut, cucumber), Legumes and Oil Seeds soya bean fermentations 3. Beverages a) Stimulant Beverages -coffee, cocoa and tea fermentations b) Alcoholic beverages - Cider production 4.Food additives and supplements a) Lipids, Nucleosides, nucleotides and related compounds- Vitamins b) Natural food preservatives- bacteriocins from lactic acid bacteria – production and applications e.g. Nisin c) Microbial production of colours and flavours. d) Polyhydric alcohols: low-calorie sweetener particularly useful for sweetening food products for diabetics e) Microbial exopolysaccharides - Xanthan gum 5. Process Food wastes- for bioconversion to useful products (Compost, biofuels, biomass cheap source of raw material in fermentation etc).	1	15

References:

1. Shuler, M. L., & Kargi, F. (2002). Bioprocess Engineering: Basic Concepts. Upper Saddle River, NJ: Prentice Hall.
2. Stanbury, P. F., & Whitaker, A. (2010). Principles of Fermentation Technology. Oxford: Pergamon Press.
3. Bailey, J. E., & Ollis, D. F. (1986). Biochemical Engineering Fundamentals. New York: McGraw-Hill.
4. El-Mansi, M., & Bryce, C. F. (2007). Fermentation Microbiology and Biotechnology. Boca Raton: CRC/Taylor & Francis.
5. Lee, Y. K. (2013). Microbial Biotechnology: Principles and Applications. Hackensack, NJ: World Scientific.
6. Alexander N. Glazer and Hiroshi Nikaido -Microbial Biotechnology: Fundamentals of Applied Microbiology, 2nd Edition
7. Michael Waites and Morgan , Rockney and Highton -Industrial microbiology : An Introduction
8. Robert Whitehurst and Maarten Van Oort - Enzymes in food technology 2nd ed
9. Nduka Okafor Modern industrial microbiology and biotechnology Science Publishers, Enfield, NH, USA (2007)

Paper IV Intellectual property rights and Bioethics (PSBT 204)

Title	Details	Credits	Number of lectures
Unit 1 Introduction to IPR	Introduction to intellectual property; types of IP: patents, trademarks, trade secrets, copyright & related rights, industrial design, geographical indications, Biodiversity importance and legislation, International convention and treaties; plant variety protection and farmers rights act. , traditional knowledge.	1	**15**
Unit 2 Patents	Basics of patents: eligibility criteria, classification of patents, categories, special patents and patenting biological products. Patentable and Non-patentable inventions in India and abroad. Process of Patenting, Patent Search and Inventor's homework, drafting patent applications, patenting systems. Rights of the patent holder, assignment and licensing of patents and patent Infringement, case studies. Patent Agent.	1	**15**
Unit 3 Patentability of Biotechnology Inventions	Patentability of Biotechnology Inventions in India, Statutory Provisions Regarding Biotechnological Inventions Under the Current Patent Act 1970 (as Amended 2005). Biotechnological Inventions as Patentable Subject Matter, Territorial Nature of Patents,: From Territorial to Global Patent Regime, Interpreting TRIPS in the Light of Biotechnology Inventions, Feasibility of a Uniform Global Patent System, Merits and Demerits of Uniform Patent Law, Relevance of the Existing International Patent, Tentative Harmonisation Efforts, Implications of Setting up a Uniform World Patent System.	1	**15**
Unit 4 Bioethics	Introduction, bioethics in health care- euthanasia, artificial reproductive technologies, prenatal diagnosis, genetic screening, gene therapy, organ transplantation. Ethics of clinical research, Bioethics in research – cloning and stem cell research, Human and animal experimentation, Agricultural biotechnology - Genetically engineered food, environmental risk, labelling and public opinion. Bioterrorism.	1	**15**

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1. Ganguli, P. (2001). *Intellectual Property Rights: Unleashing the Knowledge Economy*. Tata McGraw-Hill Publishing Company.
2. Karen F. Greif, Jon F. Merz - Current Controversies in the Biological Sciences_ Case Studies of Policy Challenges from New Technologies (Basic Bioethics)-The MIT Press (2007)
3. V. Sreekrishna - Bioethics and Biosafety in Biotechnology-to New Age International Pvt Ltd Publishers (2007)
4. Padma Nambisan (Auth.) - An Introduction to Ethical, Safety and Intellectual Property Rights Issues in Biotechnology- Academic Press (2017)
5. Kshitij Kumar Singh (auth.) - Biotechnology and Intellectual Property Rights_ Legal and Social Implications-Springer India (2015)
6. David Castle - The Role of Intellectual Property Rights in Biotechnology Innovation (2011)
7. Goel, D., & Parashar, S. (2013). *IPR, Biosafety and Bioethics*. Pearson Education India.
8. Singh, S. S. (2004). The Law of Intellectual Property Rights. *Deep and Deep Publications, New Delhi*, 96.
9. Talwar Shabana; *Intellectual Property Rights in WTO and Developing Countries*, Edition 2010, Serials Publications, New Delhi.
10. Helga Kuhse_ Udo Schüklenk_ Peter Singer_ (eds.) - Bioethics_ An Anthology-Wiley-Blackwell (2016)
11. National Guidelines for Biomedical and Health Research on Human Participants (ICMR – 2017)
12. ICMR-DBT National Guidelines for Stem Cell Research - 2017

Practical III-PSBTP201+ PSBTP203 4 credits

1. Using NCBI and Uniprot web resources
2. Introduction and use of various genome databases.
3. Sequence information resource: Using NCBI, EMBL, Genbank, Entrez, Swissprot/ TrEMBL, UniProt.
4. Similarity searches using tools like BLAST and interpretation of results.
5. Multiple sequence alignment using ClustalW.
6. Phylogenetic analysis of protein and nucleotide sequences.
7. Use of gene prediction methods (GRAIL, Genscan, Glimmer).
8. Using RNA structure prediction tools.
9. Use of various primer designing and restriction site prediction tools.
10. Use of different protein structure prediction databases (PDB, SCOP, CATH).
    (Practicals in biostatistics could be clubbed into a test paper for 25M for the practical examinations/ problems could be asked for 5 / 10M)
11. Measures of central tendency: Mean, median and mode for grouped and ungrouped data
12. Measures of dispersion: Standard deviation for grouped and ungrouped data: standard value for the mean and proportion
    Confidence limits for the mean and proportion
13. Probability: Normal distribution and Binomial distribution use of normal tables
14. Correlation and Regression: Estimation of correlation coefficient, to fit regression equations from bivariate data
15. Test of hypothesis: a) Z-test, b) t-test c) x^2 test d) f-test
16. Use of microorganism to produce a product. Detect utilization of substrate and formation of product at time intervals. Attempt purification of product e.g. enzyme.
1. Immobilize an organism / enzyme and detect the conversion of substrate to product.
2. Microbial pigment:
    a. production – factors affecting – pH, temp, nutrients, static/ shaker conditions, submerged/ surface.
    b. extraction – soluble and insoluble pigments- organic solvent extraction and purification.
3. Demonstration of media optimization by Placket Burman test- demonstration
4. Methods for measurement of cell mass:
    a. Direct physical measurement of dry weight, wet weight, or volume of cells after centrifugation.
    b. Indirect measurement of chemical activity such as nutrient utilization and product synthesized.
    c. Turbidity measurements employ a variety of instruments to determine the amount of light scattered by a suspension of cells.
5. Analytical techniques like HPLC, FPLC, GC, GC-MS *etc.* for measurement of amounts of products/substrates. Demonstration
6. Quality Assurance in a food industry – Field visit and report
7. Method validation for any biochemical test (Accuracy, Limit of Detection, Limit of Quantitation, Specificity, Linearity and range, Ruggedness and Robustness) – Report writing

Practical IV PSBTP202 +PSBTP204 4 credits

Plant tissue culture

1. Prepare culture media with various supplements for plant tissue culture.
2. Prepare explants of *Valleriana wallichii* for inoculation under aseptic conditions.
3. Isolate plant protoplast by enzymatic and mechanical methods and attempt fusion by PEG (available material).
4. Culture *Agrobacterium tumefaciens* and attempt transformation of any dicot species.
5. Generate a RAPD and ISSR profile of *Eremurus persicus* and *Valleriana wallichii*.
6. Prepare karyotypes and study the morphology of somatic chromosomes of *Allium cepa, A. sativum, A. tuberosum* and compare them on the basis of karyotypes.
7. Undertake plant genomic DNA isolation by CTAB method and its quantitation by visual as well as spectrophotometric methods.
8. Study genetic fingerprinting profiles of plants and calculate polymorphic information content. Demonstration

Animal cell culture:

9. Count cells of an animal tissue and check their viability.
10. Prepare culture media with various supplements for plant and animal tissue culture.
11. Prepare single cell suspension from spleen and thymus.
12. Monitor and measure doubling time of animal cells.
13. Chromosome preparations from cultured animal cells
14. Isolate DNA from animal tissue by SDS method.
15. Attempt animal cell fusion using PEG.
16. To study a patent and to develop a patent application for a product or process.
17. To write SOPs of 4 laboratory equipment or instruments.
18. Journal club- a minimum 2 weeks activity of reading and discussing research papers preferably with a mentor and making a poster in a group of 3/2 for presentation in form of Microsoft PowerPoint /coral draw. Poster prepared to be appended in the journal. Teachers are requested to encourage students to participate/ attend conferences/ seminars/ avishkar. The group of students to be evaluated for the same for 5M each in the practical examinations
19. Compilation of information on recommended biosafety practices in a Biotechnology/ Biology laboratory. (demonstration by field visit or video)

University of Mumbai

No. UG/ 03 of 2020-21

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges, the Head of the University Departments and Directors of the recognized Institutions in Science & Technology Faculty is invited to the syllabus uploaded Academic Authority Unit which was accepted by the Academic Council at its meeting held on 27th February, 2013 **vide** item No.4.67 relating to the revised syllabus as per the (CBSGS) for the M.Sc.(Part-II) (Sem. III & IV) in Bio-Technology.

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in Bio-Technology at its meeting held on 6th May, 2020 and subsequently made by the Board of Deans at its meeting held on 20th July, 2020 have been accepted by the Academic Council at its meeting held on 23rd July, 2020 **vide** item No.4.104 and that in accordance therewith, the revised syllabus as per the (CBCS) of M.Sc. (Part II) (Sem. III & IV) in Bio-Technology has been brought into force with effect from the academic year 2020-21, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Vinod Patil)
I/c REGISTRAR

MUMBAI – 400 032
14th September, 2020

To

The Principals of the affiliated Colleges, the Head of the University Departments and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.104/23/07/2020

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No. UG/ 03 -A of 2020-21 MUMBAI-400 032 14th September, 2020

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Bio-Technology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development.
5) The Co-ordinator, University Computerization Centre,

(Dr. Vinod Patil)
I/c REGISTRAR

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Program : M.Sc. Biotechnology

Course : M.Sc. Biotechnology

Syllabus for Semester: III & IV

(Choice Based and Credit System with effect from the Academic year 2020-21)

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	M.Sc. (Biotechnology)
2	Eligibility for Admission	B.Sc. (Biotechnology)
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	--
5	No. of Years / Semesters	2 years/ Four semesters
6	Level	P.G. / ~~U.G./ Diploma / Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	~~New~~ / Revised **(Strike out which is not applicable)**
9	To be implemented from	From Academic Year 2020-2021

Date: Signature :

Name: **Dr. Anuradha Majumdar** (Dean, Science and Technology)
Dr. Archana Rath (Chairperson, Ad Hoc BOS in Biotechnology)

PREAMBLE

In recent years, there has been a paradigm shift in education in terms of course content and learning outcomes. In keeping with it, the Faculty of Science & Technology, University of Mumbai, has taken a progressive step to align various programs under its purview with the current Higher Education Policy of the Government of India. The present M.Sc. Biotechnology Second Year (Semester III and IV) syllabus has been designed with the idea of incorporating outcome-based-learning for fruitful engagement of learners. The syllabus has undergone several curriculum revision exercise based on the remodeled M.Sc. Biotechnology Curriculum, May 2017, Department of Biotechnology, Ministry of Science and Technology, Government of India. The revised syllabus is an outcome of several rounds of deliberations, discussions, feedback and multiple brainstorming sessions involving various contributors & stakeholders- academicians, researchers, industry experts and students. Course Objectives and Course Outcomes have been clearly defined for each paper in the syllabus to guide teachers in order to make learning process more effective. A lot of focus has been given in the syllabus to cover latest developments in the area of biotechnology and to equip students with necessary knowledge and skills. Relevant papers to make students industry ready have also been included. Attempts have been made to draft a robust, well defined syllabus keeping in view the best learning outcome which shall enable students to pursue high quality research or increase employability of the students. Online course component has been introduced in the curriculum in keeping with the digital initiatives of MHRD to provide good quality self-learning content through MOOCs under SWAYAM and allied platforms.

It is hoped that the revised syllabus shall serve its objective of promoting outcome-based learning to meet the changing needs of the biotechnology sector.

Dr. Anuradha Majumdar (Dean, Science and Technology)
Prof. Shivram Garje (Associate Dean, Science)
Dr. Archana Rath (Chairperson, Ad Hoc BOS in Biotechnology)
Dr. Deepali Karkhanis (Member)
Dr. Sneha Panvalkar (Member)
Dr. Seema Kokitkar (Member)
Dr. Tara Menon (Member)
Dr. Jayaprada R. Chunduri (Member)
Dr. Bhupendra Pushkar (Member)
Dr. Rajesh C. Patil (Member)

MSc Biotechnology Course Structure

Semester III

Course code	Title	Theory /Practical	Marks	Credits	Nos of Lectures /week
PSBT 301	Applied virology and microbiology	Theory	100	4	1
PSBT 302	Environmental Biotechnology	Theory	100	4	1
PSBT 303	Biologics and Regulatory Affairs	Theory	100	4	1
PSBT 304	Molecular Enzymology and Enzyme Technology	Theory	100	4	1
PSBTP301	Practical I	Practical	50	2	4
PSBTP302	Practical II	Practical	50	2	4
PSBTP303	Practical III	Practical	50	2	4
PSBTP304	Practical IV	Practical	50	2	4
	TOTAL		**600**	**24**	

MSc Biotechnology Course Structure

Semester IV

Course code	Title	Theory /Practical	Marks	Credits	No. of Lectures/ week
PSBT 401	Nanobiotechnology	Theory	100	4	1
PSBT 402	OMICS & Systems Biology	Theory	100	4	1
PSBT 403	Drug Discovery & Clinical Study	Theory	100	4	1
PSBT 404	Scientific Writing & Food Biotechnology	Theory	100	4	1
PSBTP401	Practical I	Practical	50	2	4
PSBTP402	Practical II	Practical	50	2	4
PSBTP403 & PSBTP404	Practical III & IV	Practical	100	4	8
	TOTAL		**600**	**24**	

Teaching pattern:

One (01) Credit would be of thirty-forty (30-40) learning hours; of this, more than fifty per cent of the time will be spent on classroom instructions including practical as prescribed by the University. Rest of the time would be invested for assignments, projects, journal writing, case studies, library work, industrial visits, attending seminars/workshops, preparations for examinations etc. would be considered as notional hours. The present syllabus considers (60L as classroom teaching and 15 lectures as Notional hours/ paper). Each lecture duration would be for 60 min. The names of the reference books provided in the syllabus are for guidance purpose only. Students and faculty are encouraged to explore additional reference books, online lectures, videos, science journals for latest/ additional information.

Scheme of Examinations:

(a) Internal assessment of 40 marks per course per semester should be conducted.

(b) External assessment of 60 marks per course per semester at the end of every semester

(c) Practical examination of 200 marks should be conducted at the end of every semester.

A. Semester III- Theory -Internal assessment (40%) -40 marks

Sr No	Evaluation type	Marks
1.	Assignments that can include article writing, report writing, preparation of a review, on any topic selected from each paper OR PowerPoint presentation on a topic from the syllabus or related to the syllabus *Note: The student can submit only 2 assignments and give 2 PowerPoint presentations per semester. Respective college/department can decide the allocation.*	30
2.	**a.** Active participation in routine class instructional deliveries	05
	b Overall conduct as a responsible student, w.r.t manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total Marks	40

Semester IV- Theory -Internal assessment (40%) -40 marks

Sr. No	Evaluation type	Marks
1.	**For PAPER 1 & 2** Assignments that can include article writing, report writing, preparation of a review, on any topic selected from each paper OR PowerPoint presentation on a topic from the syllabus or related to the syllabus *Note: The student can submit only 1 assignment and give 1 PowerPoint presentations per semester. Respective college/department can decide the allocation* **FOR PAPER 3:** The students have to present a clinical case/trial study report.	30
2.	**a.** Active participation in routine class instructional deliveries	05
	b Overall conduct as a responsible student, w.r.t manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05
	Total Marks	40

Sr. No	Evaluation type	Marks
3.	**FOR PAPER 4:** The internal assessment will comprise of the following: a. Online course: The student is expected to complete at least one online course relevant for the subject from any of the appropriate reputed online platforms. A proof of successful completion of the online course must be provided for the award of marks.	20
	b. Research Proposal: The student is expected to submit a research proposal relevant to the subject.	20
	Total Marks	40

B. Theory -External examination -60%

Semester End Theory Assessment- 60 marks

- The duration of this exam will be of 2.5 hours (150 minutes)
- The theory question paper will have 5 questions each of 12 marks.
- For each unit, there will be one question and the fifth will be based on all the four units.
- The fifth question will have 6 sub-questions out of which the student has to attempt any 3.
- All questions shall be compulsory with internal choice within the questions such that each question will be set of 24 marks with options.

Practical Examination Evaluation scheme (50 marks per paper)

1.	Practical Question 1	25
2.	Practical Question 2	15
3.	Journal	5
4.	Viva Voce	5
OR		
1.	Practical Question	40
2.	Journal	5
3.	Viva Voce	5
	Semester IV- Project Dissertation	100 Marks
	For semester IV it is mandatory for students to undergo Hands-on Project training in an established research laboratory or college laboratory for 4-6 months; This should involve one or more relevant instrumentation technique. Thesis on the same to be evaluated by the guide alternatively by an internal examiner for 50M based on the student's performance, written matter and experimentation. A certificate must be appended with the thesis. The external examiner will assess for 50M as a Presentation during practical exams. Marks allotted by Internal examiner would be scaled down if required as per university guidelines.	

A certified copy of the journal is essential to appear for the practical examination.

Note:

- In case of any changes in the above-mentioned evaluation scheme, the chairperson of examinations would provide the necessary details and the format.
- The practical examinations at a center would be evaluated by one external examiner assigned by the University and one internal examiner assigned by the college/department.

M.Sc. BIOTECHNOLOGY

SEMESTER- III

PSBT301- Applied Virology & Microbiology				
Course Objectives	Students will be exposed to pandemic diseases, significance of epidemiology in studying various diseases and societal & economic issues related to such diseases**.** Students will also learn details about emerging viral, bacterial, parasitic pathogens. Students will learn advanced, automated methods for determining antimicrobial susceptibility, drug resistance and various aspects of biofilms.			
Course Outcomes	Students will understand epidemiological principles in prevention, control and management of pandemic disease. They will acquire understanding of antimicrobial resistance for management of drug resistance in population. Students will understand the different aspects of biofilm and their management. They will also get insights into latest development of diagnostics & therapeutics for such diseases.			
Course Code	**Unit**	**Unit Details**	**Credits**	**Lectures**
PSBT302	I Pandemic diseases, pathogenesis, diagnosis and treatment	Introduction to Pandemic diseases and causative agent like H1N1, MERS, SARS, Swine flu, COVID-19, Nipah virus, Ebola virus. Structure of these viruse-coat and envelope protein, genome composition Pathogenesis (Mechanism of infection) and Acute Clinical manifestations (Signs and symptoms) of H1N1, MERS, SARS, Swine flu, COVID-19, Nipah virus, Ebola virus Diagnosis, and Treatment for H1N1, MERS, SARS, Swine flu, COVID-19, Nipah virus, Ebola virus Economic and Social loss due to t Viruses	1	15
	II Epidemiology of infectious diseases	Concept of Host, Reservoir, Source of infection, Carrier , Epidemic, Endemic, Pandemic, Outbreak History , Definition scope, importance of epidemiology Epidemiology, Health & Public Health Epidemiological principles in prevention & control of disease Measures of disease frequency – Concept of incidence, prevalence, Incidence rate, cumulative incidence, case fatality Epidemiological studies Organizations in disease control & Research – WHO, CDC, UNICEF, NACO, ICMR, NARI, NIV & NGOs	1	15

	III Medical Microbiology	Emerging Pathogens / Infections : Diseases caused by Bacteria / parasites/ viruses Name of causative agent, Name of disease caused, History, Antigenic structure, virulence factors, source of infection, Transmission, Pathogenesis, Clinical manifestations, Laboratory diagnosis, Treatment, Prophylaxis, vaccines , Current research and developments Bacteria as emerging pathogens / Diseases caused by bacteria : MOTT, Legionella, Conditions caused by *Helicobacter pylori* Viruses as emerging pathogens / Diseases caused by viruses : HIV (AIDS), Chikungunya, Dengue, Parasites as emerging pathogens / Diseases caused by parasites : Malaria , *Entamoeba histolytica* (Amoebic dysentery)	1	15
	IV Biofilms & Antimicrobial Activity	Structure of Biofilm – Extracellular polymeric substances, Biofilm architecture. Stages in formation of Biofilm. Microbial interactions in Biofilms (Quorum sensing) Need for formation of Biofilms by microorganisms Microorganisms commonly associated with biofilms on indwelling medical devices Response of biofilms to host defense mechanisms & antimicrobial agents Recent advances in biofilm management. Conventional methods of drug susceptibility testing (Kirby-Bauer disc diffusion, Stoke's method, E test) Advanced methods- Macro & Micro broth dilution methods, Time kill curves, serum killing curves, checker-board assays. Detection of drug resistance in Staphylococci, Streptococci, Enterococci. Automated methods of sensitivity testing. Concept of CLSI standards	1	15

PSBTP-301 Practicals

1. Viral Titering – Plaque Assay, Tissue Culture Infectious Dose (TCID), Chicken Embryo Infectious Dose (CEID)
2. Immunoassays: For detection of the virus antigens by ELISA / RIA
3. Detection techniques for COVID like RT- PCR and various RAPID tests
4. Diagnosis of dengue (kit method)
5. Diagnosis of Chikungunya (kit method)
6. Antibiotics susceptibility testing by broth Macro dilution method & Micro broth dilution method
7. Study of microbial biofilm formation on various surfaces & Biofilm visualization by staining
8. Demonstration of minimum biofilm inhibition concentration of antibiotics/disinfectants.

References

1	Microbiology An introduction 10th edition Gerald Tortora, Burdell Funke, Christine Case, pearson Education Inc. Publication 2010
2	Basic Epidemiology R. Bonita, Bealglehole, T. Kjellstrom, 2nd Edition, 2006, WHO
3	Principles of Epidemiology in Public Health Practice, Third edition, US Department of Health & Human Services, CDC, 2012
4	Martin Rusnák, Viera Rusnáková, Georges Kamtoh, RELATIONS BETWEEN EPIDEMIOLOGY AND PUBLIC HEALTH, 2018 https://www.researchgate.net/publication/323964710
5	Evaluation and use of Epidemiological evidence for environmental health risk assessment guideline document World Health Organization 2000 eur/00/5020369
6	Ananthanarayan and Paniker's Textbook of Microbiology, by Reba Kanungo, 10thedUniversities Press; Tenth edition, 2017
7	Koneman's Colour Atlas & Textbook of Diagnostic microbiology, 7th edition, 2017, Lippincott, Williams & Wilkins.
8	Mackie & McCartney Medical Microbiology, J. G. Collee, J. P.Duguid, A. G. Fraser, B. P. Marmion, Thirteenth edition, Churchill Liviingston
9	Bailey and Scotts Diagnostic Microbiology Forbes, Sahem et al 12th ed, Moshby

PSBT302-Environmental Biotechnology				
Course Objectives:		This course aims to introduce learners to latest concepts in environmental biotechnology, various types of pollutions, monitoring, latest mitigation strategies and management of the same. Health hazards of pollution and waste, solid waste management, biodiversity concepts and data management and environmental monitoring.		
Course Outcomes:		At the end of the course, students will be able to understand various concepts of environmental biotechnology, latest development in the area and use of microbiological, molecular and analytical methods in environmental biotechnology.		
Course Code	**Unit**	**Unit Details**	**Credits**	**Lectures**
PSBT 302	I Air	Air pollution & air Quality Monitoring, Sampling, Source Apportionment. Air Pollution Management in Urban Settlement & Rural Areas, Integrated Air Pollution Management, Green Belt. Biofilters/ Bioscrubber. Catalytic Systems. Green Technology. Ozone Layer Depletion Atmospheric Brown Cloud Impact on Flora and Fauna Impact on Crop Yield, concept of carbon credit, footprint.	1	**15**
	II Soil	Causes of soil salinity; Chemical and metallic pollution of agricultural soil; Mining and soil pollution; Soil pollution and air quality; Bioleaching of metals, bioaugmentation & biomagnifcation for soil remediation. Phytostabilization - Contaminant removal, Soil cover, Rhizosphere modification, Geotextile capping solid waste; Industrial solid waste; Domestic solid waste; Agricultural solid waste; Municipal solid waste; Major sources of solid wastes; Effects of solid waste generation on quality of air, water and public health; solid waste management, Disposal of organic and medical waste; Recovery and recycling of metallic waste; Disposal of plastic waste and hazardous wastes.	1	15
	III Water	Biofilms in treatment of waste water; Biofilm development and biofilm Kinetics; Aerobic Biofilms. Marine pollution-major pollutants (heavy metal, pesticide, oil, thermal, radioactive, plastics, litter and microbial, microplastics); Biological indicators (Marine microbes, algae and crustaceans) and accumulators: Biotechnological application of hazardous waste management of water; Use of microbial systems, Phytoremediation strategies in constructed wetlands, Designing constructed wetlands, Substrate, Hydraulic loading rate, Hydraulic retention time, The selection of plant species, Surface area of	1	15

		wetland, Mechanisms to remove pollutants from constructed wetlands		
	IV Biodiversity & Environment Monitoring	Introducing biodiversity informatics, Global patterns of distribution of biodiversity, biomes, Composition and distribution of biodiversity in India, Taxonomic Database Working Group (TDWG) standards, compatibility and interoperatability, taxonomically intelligent systems, Global biodiversity information system-Overview of the UNEP/GEF biodiversity data management project (BDM), Biosensors in Environmental Monitoring – Working & its application for monitoring environment pollutants, Application of protein biomarkers ; Biosensors and biochips. IOT for water quality monitoring – General working, Application, water Parameters	1	15

PSBTP 302-PRACTICALS

1. Soil and water quality assessment (temp, pH, salinity, water holding capacity of soil etc.)
2. Study of metal tolerance of microorganisms isolated from soil/water
3. Soil ecosystem analysis/ analysis of microorganisms of soil
4. Analysis of compost

5. Detection of heavy metals concentration in soil/ water
6. Study and comparison of different air samplers
7. Growth curve of metal tolerant organism isolated from soil/ water.

REFERENCES

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2. Karl B. Schnelle & Charles A. Brown, (2002) Air pollution control technology Handbook. CRC Press
3. Singh, R. L. (Ed.). (2017). *Principles and applications of environmental biotechnology for a sustainable future*. Springer Singapore.
4. Enger, E. D., Smith, B. F., & Bockarie, A. T. (2000). *Environmental science: A study of interrelationships* (p. 434). Boston, MA: McGraw-Hill.
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heavy metals bioremediation. In *Environmental Microbial Biotechnology* (pp. 91-104). Springer.

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21. Rastogi, S. C., Rastogi, S. C., Mendriratta, N., & Rastogi, P. (2006). *Bioinformatics: Concepts, Skills & Applications*. CBS Publishers & Distributors Pvt. Limited.
22. Sensen, C. W. (2005). *Handbook of genome research: genomics, proteomics, metabolomics, bioinformatics, ethics and legal issues; Vol. 1 und 2*. Wiley-VCH Verlag GmbH & Co. KGaA.

<table>
<tr><th colspan="5">PSBT303- Biologics & Regulatory Affairs</th></tr>
<tr><td colspan="2">Course Objectives:</td><td colspan="3">To introduce learner to the basic concept of Biologics and Biosimilars, and its therapeutic uses
To expose learner to the methodologies/steps involved in the production of Biologics/Biosimilars
To educate learner with the nuances of characterization of Biosimilars with emphasis on Reference Biologic
To familiarize learner with the regulatory aspects of approval of a Biologic/Biosimilar</td></tr>
<tr><td colspan="2">Course Outcomes:</td><td colspan="3">At the end of the course, the learner will be:

Familiar with the basic concepts and significance of Biologics/Biosimilar in addition to having knowledge about its therapeutic applications
Knowledgeable in the steps involved in the production of Biologics/Biosimilars
Aware of the protocols/techniques required for characterization of the Biosimilar relative to the Reference Biologic
Acquainted with the regulatory aspects of approval of a Biosimilars.</td></tr>
<tr><th>Course Code</th><th>Unit</th><th>Paper 3:
Biologics & Regulatory Affairs</th><th>Credits</th><th>Lectures</th></tr>
<tr><td>PSBT 303</td><td>Unit 1

Introduction to Biologics and Biosimilars</td><td>Definition: Drugs, Small molecules, Large molecules/Biologics Categories of Biologics: protein-based hormones, enzymes, monoclonal antibodies, vaccines, blood products, and gene/ cellular therapies.
Similarities and Differences: Small molecules versus generics, Biologics versus Biosimilars.
USFDA Approved Small Molecules and USFDA Approved Generics
USFDA Approved Biologics and USFDA Approved Biosimilars
Indian Regulatory Scenario in relation to Small Molecules and Biologics
Therapeutic uses of some of the Biologics/Biosimilars
Acceptable quality differences between approved Biosimilar and innovator’s product</td><td>1</td><td>15</td></tr>
</table>

	Unit 2 **Production of Biologics and Biosimilars**	Reference Biologic and its significance, Choice of expression system/s and stability of cell lines Development of upstream and downstream processes and scale up to manufacturing Major factors contributing to the maintenance of product quality: raw materials and manufacturing conditions, virus filtration, mycoplasma removal, ultrafiltration Example: Production of Monoclonal antibody, downstream processing of Mab Introduction to the concept of Biobetters vs Biosimilars	1	15
	Unit 3 Characterization of Biologics and Biosimilars	Appearance, particulates, pH, osmolality, particle size Molecular Weight, Protein Sequence and/or amino acid composition Glycosylation, Sialylation, Phosphorylation, Acetylation, and Myristoylation, if any Sulfhydryl groups(s) and di-sulphide bridges. Size and Purity on HPLC/ MALDI Isoform pattern. Gel electrophoresis (IEF, SDS PAGE and Native PAGE), Western blot Fluorescence spectrum FTIR spectrum and NMR spectrum Bioassays, characterization using Monoclonal Antibody as an example	1	15
	Unit 4 Quality assurance & regulatory affairs of Biologics and Biosimilars	Introduction to Regulatory Affairs and approvals of Biosimilars, Products approved under the FD&C .PHS/BCPI Act 2009: Innovator Biologics Approval, Biosimilar Pathway, Totality of Evidence, Information required to demonstrate biosimilarity, Interchangeability, Product Switching, Product Naming Global regulatory framework	1	15

PSBT303- Practicals:

1) Electrophoresis {PAGE (native, SDS, reducing, non- reducing)} to characterize the protein with regard to its molecular weight, structure/subunits/SS bonds etc., or for detection of impurities in the product
2) Concentration of protein with Folin Lowry
3) Western blot/dot blot for purity of product demonstration/ dummy sandwich preparation of semi-dry or wet western blot sandwich.
4) HPLC /FTIR/NMR spectrum based theory questions may be asked for interpretation
5) Visit to a facility manufacturing Biosimilar

1. **Biosimilars:** Regulatory, Clinical and Biopharmaceutical Development, Editors: Hiten J. Gutka • Harry Yang • Shefali Kakar, AAPS Advances in the Pharmaceutical, Sciences Series, Volume 34.

2. https://www.fda.gov/drugs/drug-approvals-and-databases/approved-drug-products-therapeutic-equivalence-evaluations-orange-book.

3. https://www.fda.gov/drugs/therapeutic-biologics-applications-bla/purple-book-lists-licensed-biological-products-reference-product-exclusivity-and-biosimilarity.

4. http://nib.gov.in/ NIB-DBT2016.pdf.

5. Biosimilars of Monoclonal Antibodies, A Practical Guide to Manufacturing, Preclinical, and Clinical Development. *Edited by Cheng Liu, Ph.D.,K. John Morrow, Jr., Ph.D.*, Copyright c 2017 by John Wiley & Sons, Inc. All rights reserved. Published by John Wiley & Sons, Inc., Hoboken, New Jersey.

6. Introduction to Biologic and Biosimilar Product Development and Analysis, Karen M. Nagel, AAPS Introductions in the Pharmaceutical Sciences, Editor-in-Chief: Robin M. Zavod, Midwestern University, Downers Grove, IL, USA.

7. Regulatory Requirements of 'Similar Biologics' for Marketing Authorization in India. Review Article. Sharmila *et al.,* International Journal of Drug Regualtory Affairs; 2017, 5(1), 20-24.

8. Introduction to Biosimilars and Regulatory Requirements. Fact Sheet 3. International Federation of Pharmaceutical Manufacturers & Association (Geneva) & International Alliance of Patients Organization (UK).

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PSBT304- Molecular Enzymology and Enzyme Technology	
Course Objectives	To get familiarity with the basic concepts of enzymes like enzyme kinetics, catalytic power of enzymes, active site and transition sate, regulatory and allosteric enzymes, on protein enzymes.

	Techniques of enzyme purification and its importance. Need for enzyme engineering and its benefits and applications. Role of enzymes as a diagnostic tool and for industrial applications. Use of enzymes as Biosensors.
Course Outcomes	Enzyme deficiencies and use of enzymes as therapeutics. At the end of the course the student will be aware of the enzyme kinetics, the catalytic power of an enzyme, changes in the active site, and the importance of the transition state. The importance of obtaining enzymes in their pure form and the ways it can be achieved. The need for and methods for enzyme engineering to enhance its activity or half life. The significance of enzymes as diagnostic tools, in therapy, industrial application and as biosensors; and the outcome of enzyme deficiencies.

Course code	**Unit**	**Molecular Enzymology and Enzyme Technology**	**Credits**	**Lectures**
PSBT304	I **Basic concepts -**	Brief history and introduction; chemical nature and properties of enzymes; **how enzymes work**-mechanism of action; **catalytic power** and specificity of enzymes; types of catalysis; **active site**; **transition state** and evidence for enzyme transition state complementarity; enzyme kinetics – **factors affecting enzyme activity**; enzyme inhibition; enzyme specificity; **regulatory enzymes**, regulation of enzyme activity; **allosteric enzymes** and their kinetic properties; units of enzymes; non protein enzymes; coenzymes and cofactors; isoenzymes; enzyme pattern in diseases.	4	15
	II **Techniques of Enzyme purification and studies/enzyme engineering**	Based on molecular size (Dialysis/ ultrafiltration, density gradient centrifugation, size exclusion chromatography); based on solubility of proteins (Isoelectric precipitation, salting out); based on electric charge (Ion exchange chromatography, Electrophoresis-capillary electrophoresis, 2D electrophoresis); based on adsorption properties (Adsorption and Affinity chromatography). Other techniques: Immobilized metal ion affinity chromatography, Hydrophobic interaction chromatography, Reversed phase chromatography and		15

		Chromatofocusing. Enzyme engineering – Introduction, Objectives, Principles, Examples and Steps involved in enzymes engineering. Random mutagenesis and molecular breeding of DNA. Recent advances in Rational approaches for Enzyme engineering. Applications of enzyme engineering.		
	III **Industrial & medical application of enzymes**	Textile Industry, Detergent Industry , Pulp and Paper Industry , Animal Feed Industry: Enzyme Technology for Detoxification of Mycotoxins in Animal Feed , Phytases for Feed Applications and Leather Industry. Enzyme Applications for Human and Animal Nutrition. Biosensors – Introduction, instrumentation, Types and examples. Enzymes based sensors as diagnostic tools- Biosensors for Blood Glucose, Biosensors for Urea in Blood and Urine, Biosensors for Uric Acid, Biosensors for Arginine, Biosensors for Asparagine, Biosensors for Creatinine, Biosensors for Cholesterol, Allosteric enzyme-based biosensors.		15
	IV **Enzyme deficiencies/diagnostic enzymes/ therapeutics**	Disorders of amino acid metabolism- Phenylketonuria, Alkaptonuria, Homocystinuria. Disorders of carbohydrate metabolism – Galactosemia, Hereditary fructose intolerance, Hereditary lactose intolerance. Disorder of lipid metabolism - Gaucher disease, Fabry disease. Disorders of purine and pyrimidine metabolism- HGPRT deficiency, Adenosine deaminase deficiency, Orotic aciduria. Enzymes in diagnosis of diseases- Liver disorders, Cancer, Cardiac disorders. Role of Other enzymes- Lysozyme, Butyrylcholinesterase and Lipases. Therapeutic uses of enzymes - enzymes in replacement therapy,		15

		enzymes in cancer treatment, enzymes for fibrinolysis, enzymes used for various treatments and enzyme gene therapy.		

PSBTP 304-PRACTICALS

1. Microbial Enzyme production:
   a. Partial purification using ammonium sulphate precipitation.
   b. Dialysis of the salt-precipitated protein.
   c. Assessing the enzyme activity and the protein content.
2. Effect of inhibitors/ chemicals on enzyme activity.
3. Extraction of enzymes from plant sources.
4. Measurement of Enzymatic Activity by Using a Colorimetric Assay.
5. Purification of Acid Phosphatase from Wheat Germ.
6. Enzyme Immunoassays.
   a. Methods for Enzyme Immunoassays.
   b. Non-competitive Solid-phase Enzyme Immunoassay.
   c. Competitive, Solid-phase Enzyme Immunoassay.
7. Determining of Alkaline Phosphatase (ALP) Concentration in Blood Plasma.
8. Measuring Lactase Enzymatic Activity.
9. Screening of new microbial strains for production of enzymes and perform its activity staining (zymogram).
10. To determine Specific activity of α Amylase from different sources.

REFERENCES:

1. Lehninger Principles of Biochemistry (4th Ed. Nelson, D., and Cox, M.; W.H. Freeman and Company, New York, 2005.

2. Satyanarayan and Chakrapani, Biochemistry. New Delhi, Elsevier Health Sciences APAC, 2013.

3. Berg JM, Tymoczko JL, Stryer L (2002): Biochemistry, 5th ed., Freeman WH and Co., New York.
4. https://shodhganga.inflibnet.ac.in/ bitstream/10603/100595/7/07_chapter%201.pdf General Introduction to enzymes.
5. https://iopscience.iop.org/ book/978-0-7503-1302-5/chapter/bk978-0-7503-1302-5ch1 Introduction to enzymes and their applications.
6. Biochemistry by Lehninger, 2nd Ed, Kalyani publication 2008.
7. Understanding enzymes (3rd edition). Edited by Trevor Palmer, Ellis Horwood, Chichester, 1991.
8. Protein purification principles, High Resolution Methods, and Applications, 3rd Edition, Jan-Christer Janson, John Wiley & Sons, Inc., Hoboken, New Jersey.
9. https://www.biotecharticles.com/ Applications-Article/Methods-of-Purification-of-Enzymes-583.html
10. https://www.creative-enzymes.com/service/enzyme-purification_307.html Enzyme Purification
11. http://web.sungshin.ac.kr/~spark/class/enzchem/EnzChem_ch02.pdf Chapter 2 - purification of enzymes
12. https://www.labome.com/method/Protein-Purification.html
13. http://www1.lsbu.ac.uk/water/enztech/index.html Chapter 6 Enzyme preparation and use

14. https://docplayer.net/20937505- Protein-purification-nison-sattayasai-khon-kaen-university-thailand-1-introduction-2-extraction-of-protein.html
15. http://www.processdevelopmentforum.com/ppts/posters/ Protein_purification_methods-_overview,_29155460.pdf
16. https://www.researchgate.net/publication/281102215_ How_to_purify_proteins.
17. Fundamentals of Enzyme Engineering, Young Je Yoo, Yan Feng, Yong-Hwan Kim, Camila Flor J. Yagonia, : Springer Netherlands 2017.

M.Sc. BIOTECHNOLOGY

SEMESTER- IV

PSBT401- Nanobiotechnology				
Course Objectives	The course aims at providing a general and broad introduction to multi-disciplinary field of nanotechnology. It will familiarize students with the synthesis and applications of nanomaterials in the field of medicine. The course will also give an insight into complete systems where nanotechnology can be used to improve our everyday life.			
Course Outcomes	Students should be able to understand the basic science behind the properties of nanomaterials and the principles behind advanced experimental techniques for studying nanomaterials. Also understand the different aspects and applications of nanomaterials.			
Course Code	**UNIT**	**Unit Details**	**Credits**	**Lectures**
PSBT401	I Introduction to nanotechnology and nanomaterials	Introduction: Nanotechnology, Nature's biological pathway, Examples of nanomaterials and nanostructures found in nature. Nanometer-scale materials: Nanometer-Scale Metals Nano Metal Oxides, Nanopolymers, Quantum Dots, Carbon nanostructures. Nanorobotiocs devices of nature ATP synthase, the kinesin, myosin, dynein, flagella modulated motion.	1	15
	II Synthesis of Nanomaterials	Synthesis of nanometer-scale materials- Top down and Bottom up approaches. Self-Assembly of nanoparticles and its mechanism. Bio-directed synthesis and assembly of nanomaterials Synthesis and Assembly of Nanoparticles and Nanostructures Using Bio-Derived Templates	1	15
	III Nanotechnology in drug delivery	Biological Barriers to Nanocarrier-Mediated Delivery of Therapeutic and Imaging Agents, Nano-Sized Carriers for Drug Delivery, nano enabled drug delivery system, nanorobotics in medicine, Nanomedicine: biopharmaceutics, implantable materials, implantable chemicals, surgical aids	1	15
	IV	Applications of Nanomaterials.	1	15

	Applications of nanotechnology and Nanotoxicology	Nanotoxicology: Unique Properties, Toxicity of Nanomaterials, Factors Responsible for the Nanomaterial Toxicity, Routes of Exposure, Mechanisms of Nanoparticle Toxicity, In Vitro Testing Methods for Nanomaterials, Ecotoxicity Analyses of Nanomaterials		

PSBTP 401-Practicals:

1. Biosynthesis and characterization of eco-friendly silver nanoparticles by using plant/leaf extracts/green tea
2. Synthesis and characterization of zinc sulfide nanoparticles by A reverse micelle method
3. Synthesis and characterization of Fluorescent Carbon Nanoparticles from Candle Soot and its separation of using the Thin-Layer Chromatographic Method
4. Synthesis of alginate beads and investigation of citric acid release from a nanoshell coating of polymer
5. Antimicrobial activity testing of Nanoparticles/nanocomposites

References:

1. Poinern, Gerrard Eddy Jai. A laboratory course in nanoscience and nanotechnology. CRC Press, 2014.
2. Guozhong, Cao. Nanostructures and nanomaterials: synthesis, properties and applications. World scientific, 2004.
3. Sulabha K. Kulkarni (auth.) - Nanotechnology_ Principles and Practices-Springer International Publishing (2015)
4. Crookes-Goodson, W. J., Slocik, J. M., & Naik, R. R. (2008). Bio-directed synthesis and assembly of nanomaterials. Chemical Society Reviews, 37(11), 2403-2412
5. Chad A. Mirkin, Christof M. Niemeyer - Nanobiotechnology II_ More Concepts and Applications-Wiley-VCH (2007)
6. Christof M. Niemeyer, Chad A. Mirkin (Editors) - Nanobiotechnology_ Concepts, Applications and Perspectives-Wiley-VCH (2004)
7. Chad A. Mirkin, Christof M. Niemeyer - Nanobiotechnology II_ More Concepts and Applications-Wiley-VCH (2007)
8. Oded Shoseyov, Ilan Levy NanoBioTechnology_ BioInspired Devices and Materials of the Future (2008, Humana Press)
9. Textbook of Nanoscience and Nanotechnology by B.S. Murty, P. Shankar, Baldev Raj, B B Rath, James Murday
10. Arun Kumar - Nanomedicine in drug delivery-CRC Press _ Taylor & Francis (2013).
11. Yuliang Zhao, Zhiyong Zhang, and Weiyue Feng - Toxicology of Nanomaterials-Wiley-VCH (2016)
12. Diwan, Parag, and Ashish Bharadwaj, eds. The Nanoscope: Encyclopedia of Nanoscience and Nanotechnology. Pentagon Press, 2005. (Vol 1-6)

PSBT 402-OMICS AND SYSTEMS BIOLOGY	
Course objective:	Bring awareness of the emerging fields of OMICS and Systems Biology, biological systems as a whole and how parts of a systems interact with each other To introduce the techniques involved in Genomics, Proteomics, transcriptomics, Lipidomics and Metabolomics. To describe the key features of human genome project To understand the applications of the different OMICS technology to screening, testing and treatment of human diseases . Perturbation of biological systems to study various responses in the biological systems using high throughput techniques. Introduction to the modellling systems , databases ,computational tools used in systems biology Data mining: The unit aims at introducing the concept of knowledge discovery process, data mining methods and various scientific application of data mining. The unit also explores application of systems biology in different field of health care.
Course outcome:	**At the end of the course learners will be able to** Understand how the data is generated by OMICS technologies to contribute to different databases. Understand , compare and contrast the techniques involved in Genomics, Proteomics, transcriptomics, Lipidomics and Metabolomics. Will be able to apply the different technologies of OMICS to the screening, testing and treatment of human diseases . Understand the structure and dynamics of a systems as a whole . Apply the different approaches to study systems biology by top down and bottom up approach. Introduction to concepts of knowledge discovery process and data mining methods. Understand the application of data mining in genomics , proteomics and development of tools in bioinformatics. Have the knowledge of applications of systems biology in development of personalized medicine, drug development.

Course Code	**UNIT**	**OMICS AND SYSTEMS BIOLOGY**	**credits**	**lectures (hours)**
PSBT 402	I OMICS- the OMICS technology , a broad outlook	Tools of Omics. Introduction to Epigenomics Human genome project- goals, conclusions and application. Structural and functional proteomics- protein- protein interaction and identification of interactions by various methods. Application of Proteomics and Genomics in human diseases –screening, testing and treatment of diseases. Metagenomics: concept, strategies, and applications in environmental biotechnology, agriculture and health	1	15
	II Transcriptomics, Lipidomics And Metabolomics	Introduction to Transcriptomics, Lipidomics And Metabolomics, Glycomics, Pharmacogenomics Techniques used in Lipidomics- Mass Spectroscopy, TLC, HPLC, GC and Capillary electrophoresis, MALDI. Technique used in Metabolomics- Mass Spectroscopy, Electrophoresis, chromatography- GC, LC & NMR. Technique used in Transcriptomics- next generation sequencing, northern blotting, DDRT-PCR, microarrays, gel free assays like biolayer interference, SPR. Applications of transcriptomics metabolomics and lipidomics in human diseases –screening, testing and treatment of diseases.(in clinical applications, personalised medicine, infectious diseases)	1	15
	III Introduction to systems biology	Systems biology towards systems level understanding of biological systemsSystems structure, systems dynamics,systems design and control, systems project Models and Modelling systems in systems biology What is a model? Key properties of models,Basic of computational models, networks, data integration, standards, and model organism Perturbation of biological systemsand 'Omics' as Quantitative high throughput experimental tools for systems biology Standards and formats for systems biologyComputational Databases and software	1	15

		tools in systems biology. Biological networks: metabolic networks, gene regulatory networks, PPI networks, genetic interaction (GI) networks, and signaling networks	1	
	IV Data mining and application of systems biology	Introduction to Knowledge of discovery in databases (KDD) What is knowledge, need for KDD,KDD process outline, concept and goals. Data Mining methods: Statistics – classification, correlation, association analysis, regression, and clustering Machine learning –Symbolic and statistical approaches. Text mining, and Pattern evaluation. Data mining in scientific applicationsApplication of systems biology : 1. Systems biology to systems medicine. 2. Application of systems biology in drug discovery and development 3. Systems biology and synthetic biology		15

PSBTP 402-PRACTICALS :

1. Gel electrophoresis of lipids (lipoproteins exrtacted from various sources) to separate and identify the lipid fraction
2. Preparation of report based on -Databases and data repositories used in systems Biology
3. Detection assay for gene expression using micro array and qRT –PCR (demonstration)
4. Identification of protein using analytical technique Mass spectroscopy (demonstration)

REFERENCES-

Sr no	Title of the book	Author	Publisher
1.	Bioinformatics and functional genomics (2003)	Jonathan Pevsner	John wiley & sons Publications
2.	Integration of omics approaches and systems biology for clinical applications	Antonia Vlahou, Harald Mischak, Jerome Zoidakis, Fulvio Magni.	Wiley publications
3.	Omic technologies : genomics, transcriptomics, proteomics and metabolomics.	Richard P. Horgan And Louise C. Kenny	Scientific advisory committee (sac) , the obstetrician and gynaecologist.
4.	Bioinformatics and functional	Jonathan Pevsner.	Wiley blackwell

	genomics, *third edition*		publications
5.	Concepts and techniques in genomics and proteomics-	Nachimuthu Saraswathy And Ponnusamy Ramalingam.	Biohealthcare publishing (oxford) limited
6.	Intrduction to proteomics- *tools for the new biology- by*	Daniel C. Liebler,	Humana press totowa, nj
7.	Introduction to proteomics principles and applications	By Nawinmishra	John wiley & sons, inc., publication
8.	Multi-omics approaches to disease	Hasin et.,Al;	Genome biology (2017)
9.	The new science of metagenomics	Committee On Metagenomics: Challenges And Functional Applications, National Research Council, Board On Life Sciences	The national academies press. www.nap.edu
10.	Human molecular genetics 4th edition	Tom Strachan And Andrew Read	Garland science
11.	Systems biology a textbook, second edition	Edda Klipp, Wolfram Liebermeister, Christoph Wierling Axel Kowald	Wiley-vch publication
12.	Lipidomics-technologies and applications (2012)	Dr. Kim Ekroos	Wiley wch publications
13.	Topics in current genetics-metabolomics-a powerful tool in systems biology	Jens Nielsen · Michael C. Jewett (Eds)	Springer publications
14.	Foundations of systems biology. First edition	Hiraokikitano(2001)	MIT press, Cambridge
15.	Systems biology	Karthik Raman and Nagasuma Chandra,	Resonance □ February 2010
16.	A new approach to decoding life: systems biology	Trey Ideker	Article *in* annual review of genomics and human genetics · february 2001
17.	systems biology and synthetic biology (2009)	Pengcheng Fu, Sven Panke	Wiley publication
18.	Analysis of biological networks (2008)	Bjorn .Junker, Falk Schreiber	Wiley Interscience
19.	Knowledge discovery and data mining in biological databases	Vladimir Brus I C	The knowledge engineering review, vol. 14:3, 1999
20.	Computational systems biology	Andrieskreite, Roland Eils	Elsevier academic press
21.	Introduction To Biological Networks	Alpan Ravaland Animesh Ray	CRC press(2013)
22.	Advanced systems biology methods in drug discovery and translational biomedicine	Jun Zou	Biomed research international volume 2013

PSBT 403- Drug Discovery and Clinical Studies				
Course Objectives:	The objective of this course is to have a firm foundation in Drug Discovery and Clinical Studies. To provide students knowledge about Clinical Trial Design and Indian Regulations, Pharmacovigilance and Clinical Data Science.			
Course Outcomes:	By the end of the course the student will: Able to learn about drug discovery-design pathway using some in-silico tools. Able to understand the clinical trial design set up as well as they will gain information on rules-regulation and responsibilities in clinical studies.			
Course Code	**Unit**	**Drug Discovery and Clinical Studies**	**Credit**	**Lectures**
PSBT403	**I** **Clinical Research Informatics in Drug Discovery**	Introduction to the drug discovery & development • Source of drugs • Structural effects on drug action • Drugs derived from natural products • General principles of pharmacology • Drug development and testing process **Approaches to new drug discovery** • Computer-aided drug design • Identification of novel drug candidates and drug targets • Construction the signaling network of a drug using integer linear programming • Identification for druggable targets of a disease	1	15
	II **Clinical Trial Design And Indian Regulations**	**Clinical Trial Design** • Basic framework of clinical trial • Randomized clinical trials and different phases • Adaptive randomization methods • Seamless design • Internal pilot design • Design selection factors **Regulations** • The national regulatory body • Key documents in clinical research • Regulatory requirements for the conduct of clinical trials in India **The Roles and Responsibilities of Stakeholders in the Sharing of Clinical Trial Data** • Participants in clinical trials,	1	15

		• Investigators, • Research institutions and universities • Journals and Professional societies		
	III **Pharmacovigilance**	• Scope and purposes of pharmacovigilance • Adverse Drug Reactions (ADR) • ADR classification • Nature and mechanism of ADR • Concept of safety • Phases and types of DATA **The process of Pharmacovigilance** • Signal detection, evaluation and investigation, • Communication **Methods of evaluating effectiveness of action** **International regulatory collaboration** • WHO, CIOMS, ICH, ISoP, ISPE	1	15
	IV **Clinical Data Science**	• Data management in clinical research: An overview • Data Sources and Data Types • Standards in Healthcare Data • Research Data Stewardship for Healthcare Professionals • Preparing Data for Prediction Model Development • Prediction Modeling Methodology • Clinical Decision Support System	1	15

PSBTP 403-PRACTICALS:

1. A finding of a drug-gene interaction or potentially druggable category using The Drug Gene Interaction Database (DGIdb)
2. Recognition of binding patterns common to set of protein structures using ProBiS
3. Recognition of common spatial chemical binding patterns to a Set of Protein Structures using **Multi**ple Alignment of Protein **Bind**ing Sites (MultiBind) tool and analysis using RasMol/Jmol
4. Computational protein-ligand docking using AutoDock (DEMO)

REFERENCES

Sr No	Title	Author	Print Details
1	Introduction to Basics of Pharmacology and Toxicology, Volume 1: General and Molecular Pharmacology: Principles of Drug Action, Chapter 3	Gerard Marshall Raj Ramasamy Raveendran, Editors	ISBN 978-981-32-9778-4 ISBN 978-981-32-9779-1 (eBook) https:oi.org/10.1007/978-981-32-9779-1
2	Basic & Clinical Pharmacology, 2017, Fourteenth Edition, Section I, Chapter 1.	Bertram G. Katzung, Editor	ISBN 978-1-259-64115-2 MHID 1-259-64115-5 ISSN 0891-2033
3	Software based approaches for drug designing and development: A systematic review on commonly used software and its applications, Bulletin of Faculty of Pharmacy, Cairo University 55 (2017) 203–210	Prasad G. Jamkhande, Mahavir H. Ghante, Balaji R. Ajgunde	http://dx.doi.org/10.1016/j.bfopcu.2017.10.001
4	Bioinformatics and Drug Discovery, Third Edition, (A Computational Platform and Guide for Acceleration of Novel Medicines and Personalized Medicine, Chapter 10)	Richard S. Larson, Tudor I. Oprea	https://doi.org/10.1007/978-1-4939-9089-4
5	Molecular docking studies, Chapter 5, Shodhganga		
6	Clinical Trial Designs, Indian Dermatol Online J. 2019 Mar-Apr; 10(2): 193–201.	Brijesh Nair	doi: 10.4103/idoj.IDOJ_475_18 PMCID: PMC6434767 PMID: 30984604
7	Experimental designs for small randomised clinical trials: an algorithm for choice,	Catherine Cornu et. al.,	doi: 10.1186/1750-1172-8-48 PMCID: PMC3635911 PMID: 23531234

	Orphanet J Rare Dis. 2013; 8: 48.		
8	Regulatory requirements for clinical trials in India: What academicians need to know, Indian J Anaesth 2017;61:192-9	Nithya J Gogtay, Renju Ravi, Urmila M Thatte	DOI: 10.4103/ija.IJA_143_17
9	Regulatory environment for clinical research: Recent past and expected future, Perspect Clin Res 2017;8:11-6.	Bhave A, Menon S	DOI: 10.4103/2229-3485.198551
10	National Academy Press, Committee on Strategies for Responsible Sharing of Clinical Trial Data; (Chapter 3, The Roles and Responsibilities of Stakeholders in the Sharing of Clinical Trial) Data, Board on Health Sciences Policy; Institute of Medicine. Washington (DC): National Academies Press (US); 2015 Apr 20.	The National Academies Press	International Standard Book Number-13: 978-0-309-31629-3
11	An Introduction to Pharmacovigilance, Second Edition	*Patrick Waller and* Mira *Harrison-Woolrych*	ISBN 9781119289753 (Adobe PDF)
12	Data management in clinical research: An overview, Indian J Pharmacol. 2012 Mar-Apr; 44(2): 168–172.	Binny Krishnankutty, Shantala Bellary, and Latha S. Moodahadu	doi: 10.4103/0253-7613.93842 PMCID: PMC3326906 PMID: 22529469
13	Fundamentals of Clinical Data Science	Pieter Kubben, Michel Dumontier Andre Dekker	ISBN 978-3-319-99712-4 ISBN 978-3-319-99713-1 (eBook) https://doi.org/10.1007/978-3-319-99713-1

PSBT 404-Scientific Writing and Food Biotechnology	
Course Objectives:	The objective of this course is: • To develop skills for the processing and analysis of scientific data. • To enable students to present their research results in the format of oral or poster presentations at conferences, to write scientific publications (theses, articles) and to prepare applications for scientific grants (research proposals). • To inculcate good scientific writing practices.
Course Outcomes:	On completion of the course students will be able to: • Think critically, organize and analyze scientific data. • Develop advanced scientific writing skills to write research articles, reviews, thesis, and proposals and to make oral, poster or powerpoint presentations. Understand the best practices of scientific writing by adhering to research ethics and by avoiding plagiarism.

course code		Scientific Writing and Food Biotechnology	credits	lectures
PSBT 404	**Unit I: Basic Scientific Writing and Plagiarism**	Introduction to scientific writing. Basic scientific writing skills: style and language, spelling, grammar, syntax, jargon and sentence structure. Elements of a scientific paper: abstract, introduction, materials & methods, results, discussion, references and drafting titles. Scientific writing process: thinking, planning, rough draft, revision of content. Processing data & application of statistics Displaying data: text, table, graph and defining terms and abbreviations. Statistical analysis and tools for experimental data. Referencing software: Mendeley, Endnote. Plagiarism: Definition, Common types of plagiarism, Intentional and Unintentional plagiarism, Detection of plagiarism by anti-plagiarism tools (Turnitin, Duplichecker, Viper, Copyleaks), Penalties for plagiarism, Avoiding plagiarism.	**1**	**15**
	Unit II: Advanced Scientific Writing	Guidelines for Medical writing. Scientific writing skills: Writing a research paper for biomedical journal, Writing science research papers and articles, Writing a research proposal, Writing a research report, Writing popular reports, Writing thesis and dissertation, Writing clinical study reports. Presentation skills: Oral presentation, Poster Preparation & presentation, Powerpoint presentations. Research ethics, Scientific misconduct.	**1**	**15**
	Unit III: Food Biotechnology- Nutraceuticals	Nutraceuticals and functional foods Definition, characteristic features, and classification, phytonutraceuticals, Prebiotics and Probiotics, Sources (with examples e.g. microbes, plants, algae, animals), blue biotechnology , food security, food preservation, Chemopreservation Food	**1**	**15**

		processing (animal and sea food), food packaging		
	Unit IV: Food biotechnology in management of health and disease	Applications of nutraceuticals in human health and nutrition- health effects of commonly used nutraceuticals and functional foods (case studies), Safety and Regulatory guidelines Nutraceuitcals in management of health and disease Development of designer foods for specific chronic diseases Nutraceutical adjuvants	**1**	**15**

PSBT 404-Practicals

A) Practical: Scientific writing

1. Exploration of various learning platforms in online courses listed below：

a. Online courses in fundamentals of Neuroscience from Harvard University https://online-learning.harvard.edu/course/fundamentals-neuroscience-part-1-electrical-properties-neuron?delta=0

b. Molecular Biology from MIT https://ocw.mit.edu/courses/biology/7-28-molecular-biology-spring-2005/

c. Introduction to Bioethics from Georgetown https://bioethicsarchive.georgetown.edu/phlx101-02/course.html#units/introduction

2. Write a research proposal on any topic of your interest from the MSc syllabus. For research proposal contents and format refer to NSF guidelines.
https://www.nsf.gov/pubs/policydocs/pappg19_1/nsf19_1.pdf
For reference work use Mendeley Desktop.
https://www.mendeley.com/guides/desktop

3. Complete an online course (Minimum 1 week) on the topic related to the biotechnology. Write a comprehensive report on the studied course contents.
a. Swayam https://swayam.gov.in/
b. NPTEL https://nptel.ac.in/noc/
c. MOOC https://www.it.iitb.ac.in/frg/wiki/images/7/7b/Demo-PPT.pdf
d. E-learning https://www.bellevuecollege.edu/elearning/start/intro/

B) Practical: (Food Technology - Nutraceuticals)

1. Estimation of total sugars from food products (dairy, fruit juices, bakery)
2. Determination of acid value of natural fats and oils.
3. Determination of iodine number of fats and oils.

4. Estimation of vitamin B by HPLC (demonstration)
5. Study of nutraceuticals important plants like Zinziber, Curcuma, Alovera, Asparagus, Ocimum etc.
6. Estimation of antioxidant property of phytochemical by DPPH.
7. Qualitative test for tannins, phenols, isoflavones, alkaloids using TLC.
8. Estimation of food preservatives/additives (Parabens) from food sample by HPLC (demonstration).
9. Estimate Cholesterol contents in given sample by Zak's methods.
10. Estimation of bio-burden by viable counts.
11. Estimation of gluten from food sample.
12. To study nutritional components (protein, carbohydrate, secondary metabolites, lipids, vitamin C) of following: Bee honey, Mushrooms, Lentils, Soya, Dairy product, Amla, Papaya, Spinach

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1. Thomas, C George. (2019). Research Methodology and Scientific Writing 2nd edition.
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Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group A. Finance Electives

1. Basics of Financial Services

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Financial System	14
2	Commercial Banks, RBI And Development Banks	16
3	Insurance	15
4	Mutual Funds	15
	Total	**60**

Objectives

SN	Objectives
1	The course aims at explaining the core concepts of business finance and its importance in managing a business
2	The objectives of develop a conceptual frame work of finance function and to acquaint the participants with the tools, types, instruments of financial system in the realm of Indian Financial Market.

Sr. No.	Modules / Units
1	**Financial System:**
	• An overview of Financial System, Financial Markets, Structure of Financial Market (Organised and Unorganized Market), Components of Financial System, Major Financial Intermediaries, Financial Products, Function of Financial System, Regulatory Framework of Indian Financial System(Overview of SEBI and RBI-Role and Importance as regulators).
2	**Commercial Banks, RBI And Development Banks**
	• **Concept of Commercial Banks-** Functions, Investment Policy of Commercial Banks, Liquidity in Banks, Asset Structure of Commercial Banks, Non-Performing Assets, Interest Rate reforms, Capital Adequacy Norms. • **Reserve Bank of India-**Organisation &Management, Role And Functions • **Development Banks-**Characteristics of Development Banks, Need And Emergence of Development Financial Institutions In India, Function of Development Banks.
3	**Insurance:**
	• Concept, Basic Characteristics of Insurance, Insurance Company Operations, Principles of Insurance, Reinsurance, Purpose And Need Of Insurance, Different Kinds of Life Insurance Products, Basic Idea About Fire And Marine Insurance and Bancassurance
4	**Mutual Funds:**
	• Concept of Mutual Funds, Growth of Mutual Funds in India, Features and Importance of Mutual Fund. Mutual Fund Schemes, Money Market Mutual Funds, Private Sector Mutual Funds, Evaluation of the Performance Of Mutual Funds, Functioning of Mutual Funds In India.

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group A. Finance Electives

2. Introduction to Cost Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	15
2	Elements of Cost	20
3	Cost Projection	15
4	Emerging Cost Concepts	10
	Total	**60**

Objectives

SN	Objectives
1	This course exposes the students to the basic concepts and the tools used in Cost Accounting
2	To enable the students to understand the principles and procedure of cost accounting and to apply them to different practical situations

Sr. No.	Modules / Units
1	**Introduction**
	• Meaning, Nature and scope-Objective of Cost Accounting-Financial Accounting v/s Cost Accounting- Advantages and disadvantages of Cost Accounting-Elements of Costs-Cost classification (concept only)- - Installation of Cost Accounting System, Process (Simple and Inter process) and Job Costing (Practical Problems)
2	**Elements of Cost**
	• **Material Costing**- Stock valuation (FIFO & weighted average method), EOQ, EOQ with discounts, Calculation of Stock levels (Practical Problems) • **Labour Costing** – (Bonus and Incentive Plans) (Practical Problems) • **Overhead Costing** (Primary and Secondary Distribution)
3	**Cost Projection**
	• Cost Sheet (Current and Estimated)) (Practical Problems) • Reconciliation of financial accounts and cost accounting (Practical Problems)
4	**Emerging Cost Concepts**
	Uniform Costing and Interfirm Comparison, Emerging Concepts – Target Costing, Benchmarking, JIT, The Balanced Scorecard; Strategic Based Control; concept, process, implementation of Balanced Scorecard, Challenges in implementation of Balanced Scorecard

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group A. Finance Electives

3. Equity and Debt Market

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Financial Market	15
2	Dynamics of Equity Market	15
3	Players in Debt Markets	15
4	Valuation of Equity & Bonds	15
	Total	**60**

Objectives

SN	Objectives
1	This paper will enable the students to understand the evolution of various aspects of financial markets which in turn will help them in framing the financial policies, development of financial instruments and processes and evolving the strategies during crisis. The teaching will be done mainly through materials available on internet and published research papers

Sr. No.	Modules / Units
1	**Introduction to Financial Market**
	• **Equity market** – meaning & definitions of equity share; Growth of Corporate sector & simultaneous growth of equity shareholders; divorce between ownership and management in companies; development of Equity culture in India & current position. • **Debt market** – Evolution of Debt markets in India; Money market & Debt markets in India; Regulatory framework in the Indian Debt market.
2	**Dynamics of Equity Market**
	• **Primary:** 1)IPO – methods followed (simple numerical) 2) Book building 3)Role of merchant bankers in fixing the price 4)Red herring prospectus – unique features 5)Numerical on sweat equity, ESOP & Rights issue of shares • **Secondary:** 1)Definition & functions of stock exchanges 2)Evolution & growth of stock exchanges 3)Stock exchanges in India 4)NSE, BSE OTCEI & overseas stock exchanges 5)Recent developments in stock exchanges 6)Stock market Indices
3	**Players in debt markets:**
	• **Players in debt markets:** 1)Govt. securities 2)Public sector bonds & corporate bonds 3)open market operations 4)Security trading corp. of India 5)Primary dealers in Govt. securities • **Bonds:** 1)Features of bonds 2)Types of bonds
4	**Valuation of Equity & Bonds**
	• **Valuation of equity**: 1. Balance sheet valuation 2. Dividend discount model(zero growth, constant growth & multiple growth) 3. Price earning model • **Valuation of bonds** 1. Determinants of the value of bonds 2. Yield to Maturity 3. Interest rate risk 4. Determinants of Interest Rate Risk

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group A. Finance Electives

4. Corporate Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	15
2	Capital Structure and Leverage	15
3	Time Value of Money	15
4	Mobilisation of Funds	15
	Total	**60**

Objectives

SN	Objectives
1	The objectives of develop a conceptual frame work of finance function and to acquaint the participants with the tools techniques and process of financial management in the realm of financial decision making
2	The course aims at explaining the core concepts of corporate finance and its importance in managing a business
3	To providing understanding of nature, importance, structure of corporate finance related areas and to impart knowledge regarding source of finance for a business

Sr. No.	Modules / Units
1	**Introduction**
	• **Introduction To Corporate Finance:** Meaning, Principles of Corporate Finance, Significance of Corporate Finance, Amount of Capitalisation, Over Capitalisation and Under Capitalisation, Fixed capital and Working Capital funds. • **Introduction to ownership securities**– Ordinary Shares, Reference Shares, Creditor Ship Securities, Debtors and Bonds, Convertible Debentures, Concept of Private Placement of Securities.
2	**Capital Structure and Leverage**
	• Introduction to Capital Structure theories, EBIT – EPS analysis for Capital Structure decision. • Cost of Capital – Cost of Debt, Cost of Preference Shares, Cost of Equity Shares and Cost of Retained Earnings, Calculation of Weighted Cost of Capital. • Introduction to concept of Leverage - Operating Leverage, Financial Leverage and Combined Leverage.
3	**Time Value of Money**
	• Introduction to Time Value of Money – compounding and discounting • Introduction to basics of Capital Budgeting (time value of money based methods) – NPV and IRR (Net Present Value and Internal Rate of Return) • Importance of Risk and Return analysis in Corporate Finance
4	**Mobilisation of Funds**
	Public deposits and RBI regulations, Company deposits and SEBI regulations, Protection of depositors, RBI and public deposits with NBFC's. Foreign capital and collaborations, Foreign direct Investment (FDI) Emerging trends in FDI Global Depositary Receipts, Policy development, Capital flows and Equity Debt. Brief introduction & sources of short term Finance Bank Overdraft, Cash Credit, Factoring

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group B. Marketing Electives

1. Consumer Behaviour

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction To Consumer Behaviour:	14
2	Individual- Determinants of Consumer Behaviour	16
3	Environmental Determinants of Consumer Behaviour	15
4	Consumer decision making models and New Trends	15
	Total	**60**

Objectives

SN	Objectives
1	The basic objective of this course is to develop an understanding about the consumer decision making process and its applications in marketing function of firms
2	This course is meant to equip undergraduate students with basic knowledge about issues and dimensions of Consumer Behaviour. Students are expected to develop the skill of understanding and analysing consumer information and using it to create consumer- oriented marketing strategies.

Sr. No.	Modules / Units
1	**Introduction To Consumer Behaviour:**
	• Meaning of Consumer Behaviour, Features and Importance • Types of Consumer (Institutional & Retail), Diversity of consumers and their behaviour- Types Of Consumer Behaviour • Profiling the consumer and understanding their needs • Consumer Involvement • Application of Consumer Behaviour knowledge in Marketing • Consumer Decision Making Process and Determinants of Buyer • Behaviour, factors affecting each stage, and Need recognition.
2	**Individual- Determinants of Consumer Behaviour**
	• Consumer Needs &Motivation (Theories - Maslow, Mc Cleland). • Personality – Concept, Nature of personality, Freudian, non - Freudian and Trait theories, Personality Traits and it's Marketing significance, Product personality and brand personification. • Self Concept – Concept • Consumer Perception • Learning - Theory, Nature of Consumer Attitudes, Consumer Attitude • Formation &Change. • Attitude - Concept of attitude
3	**Environmental Determinants of Consumer Behaviour**
	• Family Influences on Buyer Behaviour, • Roles of different members, needs perceived and evaluation rules. • Factors affecting the need of the family, family life cycle stage and size. • Social Class and Influences. • Group Dynamics & Consumer Reference Groups, Social Class & Consumer Behaviour - Reference Groups, Opinion Leaders and Social Influences In-group versus out-group influences, role of opinion leaders in diffusion of innovation and in purchase process. • Cultural Influences on Consumer Behaviour Understanding cultural and sub-cultural influences on individual, norms and their role, customs, traditions and value system.
4	**Consumer decision making models and NewTrends**
	• Consumer Decision making models: Howard Sheth Model, Engel Blackwell, Miniard Model, Nicosia Models of Consumer Decision Making • Diffusion of innovations Process of Diffusion and Adoption, Innovation, Decision process, Innovator profiles • E-Buying behaviour The E-buyer vis-a vis the Brick and Mortar buyer, Influences on E-buying

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group B. Marketing Electives

2. Product Innovations Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Innovations Management	15
2	Managerial Aspects of Innovations functions	15
3	Product innovations, Process Innovations and Innovations Diffusion	15
4	New Product Development Strategy	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concept of innovations and relevance of innovations in the present day scenario.
2	To understand the importance of protecting innovations and legal aspects related to innovations
3	To study product innovations, process innovations and innovations diffusion
4	To acquaint the students with stages in new product development

Sr. No.	Modules / Units
1	**Innovations Management**
	• **Introduction -Innovations Management** Innovations: Concept; Features; Types of Innovations; Innovations management; Features of Innovations Management; Significance of innovations; Principles of innovations. • **Thinking Tools for Innovations** Left and right brain thinking; Creative thinking; Traditional V/S Creative thinking; Intuition; Introduction to creativity; Process of creativity; Creativity methods • **Legal Aspects of innovations** Safeguarding innovations; Concept of Intellectual Property Rights; Patents; Patenting trends; trademarks; Industrial designs; Copyrights ;Trade secrets
2	**Managerial Aspects of Innovations functions**
	• **Organizing for Innovations** Introduction; Concepts; Organizational theories and structures; Traits of innovative organization; Factors influencing organizational design and Size decision. • **Strategizing Innovations** Introduction; Innovations as a strategy component; Developing innovation strategy; Innovation strategies; Market standing based strategies. • **Managing Innovations Functions** Introduction; Style at the top; Planning; Organizing; Staffing; Controlling; Characteristics of good management • **Climate and culture for innovations** Introduction; Need for creative organizations; Characteristics of creative organizations; Creating creative organizations – 7s framework; Fostering innovations climate and culture.
3	**Product innovations, Process Innovations and Innovations Diffusion**
	• **Introduction to product innovations** Types of new products; Technology strategy for product innovation; New product development process; Packaging innovations; Positioning innovations; New product failures; Cases of Innovating companies. • **Process Innovations** Introduction; Concept of Process; Features of process; Types of process innovations; Process Management; Process improvement methods; Business process reengineering; Benchmarking. • **Innovations Diffusion** Introduction; Concept of diffusion and adoption; Impact of innovations; Diffusion as an integral part of innovation strategy; Innovations diffusion theories; Factors influencing diffusion strategy; Internalization of innovations.
4	**New Product Development Strategy**
	• **New Product Development and Product specifications** Concept of new product development, specifications: Establishment of specifications, Establishing Target specifications; Setting the final specifications. • **Concept Generation, Selection and Testing** 5 step methods of concept generation, Methods for selecting a concept; Benefits of choosing a structured method; Concept screening; Concept scoring, 7- Test method of concept testing. • **Product testing** Introduction, Purpose of product testing; Overriding concerns of product testing; Major decision in constructing a product test.

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Elective Courses (EC)

Group B. Marketing Electives

3. Advertising

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Advertising	15
2	Strategy and Planning Process in Advertising	15
3	Creativity in Advertising	15
4	Budget, Evaluation, Current trends and careers in Advertising	15
	Total	**60**

Objectives

SN	Objectives
1	To understand and examine the growing importance of advertising
2	To understand the construction of an effective advertisement
3	To understand the role of advertising in contemporary scenario
4	To understand the future and career in advertising

Sr. No.	Modules / Units
1	**Introduction to Advertising**
	• Definition, Evolution of Advertising, Importance, Scope, Features, Benefits, Five M's of Advertising • Types of Advertising –consumer advertising, industrial advertising, institutional advertising, classified advertising, national advertising, generic advertising • Theories of Advertising : Stimulus Theory, AIDA, Hierarchy Effects Model, Means – End Theory, Visual Verbal Imaging, Cognitive Dissonance • Ethics and Laws in Advertising : Puffery, Shock Ads, Subliminal Advertising, Weasel Claim, Surrogate Advertising, Comparative Advertising Code of Ethics, Regulatory Bodies, Laws and Regulation – CSR, Public Service Advertising, Corporate Advertising, Advocacy Advertising • Social, cultural and Economic Impact of Advertising, the impact of ads on Kids, Women and Advertising
2	**Strategy and Planning Process in Advertising**
	• Advertising Planning process & Strategy : Introduction to Marketing Plan, Advertising Plan- Background, situational analysis related to Advertising issues, Marketing Objectives, Advertising Objectives, Target Audience, Brand Positioning (equity, image personality), creative Strategy, message strategy, media strategy, Integration of advertising with other communication tools • Role of Advertising in Marketing Mix : Product planning, product brand policy, price, packaging, distribution, Elements of Promotion, Role of Advertising in PLC • Advertising Agencies – Functions – structure – types - Selection criteria for Advertising agency – Maintaining Agency–client relationship, Agency Compensation.
3	**Creativity in Advertising**
	• Introduction to Creativity – definition, importance, creative process , Creative strategy development – Advertising Campaign – determining the message theme/major selling ideas – introduction to USP – positioning strategies – persuasion and types of advertising appeals – role of source in ads and celebrities as source in Indian ads – execution styles of presenting ads. • Role of different elements of ads – logo, company signature, slogan, tagline, jingle, illustrations, etc – • Creating the TV commercial – Visual Techniques, Writing script, developing storyboard, other elements (Optical, Soundtrack, Music) • Creating Radio Commercial – words, sound, music – scriptwriting the commercial – clarity, coherence, pleasantness, believability, interest, distinctiveness • Copywriting: Elements of Advertisement copy – Headline, sub-headline, Layout, Body copy, slogans. Signature, closing idea, Principles of Copywriting for print, OOH, essentials of good copy, Types of Copy, Copy Research

Sr. No.	Modules / Units
4	**Budget, Evaluation, Current trends and careers in Advertising**
	• Advertising Budget – Definition of Advertising Budget, Features, Methods of Budgeting • Evaluation of Advertising Effectiveness – Pre-testing and Post testing Objectives, Testing process for Advertising effectiveness, Methods of Pre-testing and Post-testing, Concept testing v/s Copy testing • Current Trends in Advertising : Rural and Urban Advertising, Digital Advertising, Content Marketing (Advertorials), retail advertising, lifestyle advertising, Ambush Advertising, Global Advertising – scope and challenges – current global trends • Careers in Advertising : careers in Media and supporting firms, freelancing options for career in advertising, role of Advertising Account Executives, campaign Agency family tree – topmost advertising agencies and the famous advertisements designed by them

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Elective Courses (EC)

Group B. Marketing Electives

4. Social Marketing

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Social Marketing & Its Environment	15
2	Social Marketing Plan, STP and Marketing Mix	15
3	Managing Behaviour for Social Change & NPO & CSR	15
4	Social marketing – A Sectoral Overview & Careers	15
	Total	**60**

Objectives

SN	Objectives
1	Understand the concept of social marketing, compare and contrast marketing in a profit-oriented corporate and a nonprofit social environment.
2	Analyze the impact of environment on social marketing & study the various behavior models/frameworks/theories for social change.
3	To study the basis of Segmentation, Targeting and Positioning and identify marketing mix of social marketing.
4	To provide an overview of the Not for Profit Sector (NPO) and comment on the CSR provision in the companies act of 2013.
5	To study overview of social marketing in various key sectors and Identify basic ethical issues in Social marketing and appreciate the careers in Social Marketing

Sr. No.	Modules / Units
1	**Introduction to Social Marketing & Its Environment**
	Definition of Social Marketing, Features, Need for Social Marketing, Evolution of Social Marketing, Social Marketing v/s Commercial Marketing, Challenges of Social Marketing. Social Marketing Unique Value Preposition, Relevance of Social marketing. Environment in Social Marketing, Components, Impact of Environment on Social Marketing.
2	**Social Marketing Plan, STP and Marketing Mix**
	• **Social Marketing Plan, Segmentation, Targeting & Positioning** Social Marketing Plan, Steps in developing social marketing plan, importance of planning. Segmentation, Basis of Segmentation, Criteria for evaluating segments, Targeting, Selecting Target Audience for Social Marketing, Positioning and Types of positioning. • **Social Marketing Mix** 1. Product: Social Product, Level of Product, Social Product Branding Decision. 2. Price: Monetary and non-monetary incentives for desired behavior, Pricing Objectives, Pricing Strategies. 3. Place: 5 A's of Distribution of Product in social marketing, Types of distribution channel 4. Promotion: Developing a Promotion Mix for social product, Message Strategy, Messenger Strategy, Creativity Strategy, selecting communication channel.
3	**Managing Behaviour for Social Change & NPO & CSR**
	• **Managing Behaviour for Social Change** Types of Behaviour Objectives, Knowledge objectives and belief objectives, Behaviour Change Models, Theories and Frameworks: Social Norm Theory, The diffusion of innovation model, The health belief model, The ecological model, Theory of reasoned action and theory of planned behaviour. Social Cognitive theory/social learning, The behavioural economics framework and the nudge factor, the science of habit framing, • **Not for Profit Organization (NPO) & CSR** Meaning, NGO, Voluntary Organization, Third Sector, NPO Sector. Status of Voluntary sector in India. Starting a Voluntary Organization in India: Trust, Society, Section 8 Company under the Companies Act of 2013. CSR, Meaning, Overview of CSR in India, Overview of CSR rules for corporation under Companies Act of 2013, CSR Impact Evaluation. Need for Governance in Not for Profit Sector, Ethics in Social Marketing
4	**Social Marketing – A Sectoral Overview & Careers**
	• Marketing Health • Marketing Education • Marketing Medicare • Marketing Sanitation • Marketing Financial Literacy & Savings • Marketing Digital Literacy • Marketing of Social Issues of Youth. • Social Work as a profession and Social Entrepreneurship,Careers in Social Marketing.

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Elective Courses (EC)

Group C. Human Resource Electives

1. Recruitment & Selection

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Recruitment	18
2	Selection	15
3	Induction	15
4	Soft Skills	12
	Total	**60**

Objectives

SN	Objectives
1	The objective is to familiarize the students with concepts and principles, procedure of Recruitment and Selection in an organization.
2	To give an in depth insight into various aspects of Human Resource management and make them acquainted with practical aspect of the subject.

Sr. No.	Modules / Units
1	**Recruitment**
	• **Concepts of Recruitment**- -Meaning, Objectives, Scope & Definition, Importance and relevance of Recruitment. • **Job Analysis**--Concept, Specifications, Description, Process And Methods, Uses of Job Analysis • **Job Design**--Introduction, Definition, Modern Techniques, Factors affecting Job Design, Contemporary Issues in Job Designing. • **Source or Type of Recruitment**– a) Direct/Indirect, b)Internal/ External. Internal-Notification, Promotion– Types, Transfer –Types, Reference External-Campus Recruitment, Advertisement, Job Boards Website/Portals, Internship, Placement Consultancies-Traditional (In-House, Internal Recruitment, On Campus, Employment And Traditional Agency). Modern (Recruitment Books, Niche Recruitments, Internet Recruitment, Service Recruitment, Website and Job, Search Engine, Social Recruiting and Candidate Paid Recruiters). • **Technique of Recruitment**-Traditional Vs Modern Recruitment • **Evaluation of Recruitment**-Outsourcing Programme
2	**Selection**
	• **Selection**-Concept of Selection, Criteria for Selection, Process, Advertisement and Application (Blank Format). • **Screening**-Pre and Post Criteria for Selection, Steps of Selection • **Interviewing**-Types and Guidelines for Interviewer & Interviewee, Types of Selection Tests, Effective Interviewing Techniques. • **Selection Hurdles** and Ways to Overcome Them
3	**Induction**
	• **Induction-**Concept, Types-Formal /Informal, Advantages of Induction ,How to make Induction Effective • **Orientation & On boarding**-Programme and Types, Process. • **Socialisation**-Types-Anticipatory, Encounter, Setting in, Socialisation Tactics • **Current trends** in Recruitment and Selection Strategies– with respect to Service, Finance, I.T., Law And Media Industry
4	**Soft Skills**
	• Preparing Bio-data and C.V. • Social and Soft Skills – Group Discussion &Personal Interview, Video and Tele Conferencing Skills, • Presentation and Negotiation Skills, Aesthetic Skills, • Etiquettes-Different Types and Quitting Techniques. • Exit Interview-Meaning, importance.

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Elective Courses (EC)

Group C. Human Resource Electives

2. Motivation & Leadership

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Motivation -I	12
2	Motivation-II	15
3	Leadership-I	17
4	Leadership-II	16
	Total	**60**

Objectives

SN	Objectives
1	To gain knowledge of the leadership strategies for motivating people and changing organizations
2	To study how leaders facilitate group development and problem solving and work through problems and issues as well as transcend differences
3	To acquaint the students about practical approaches to Motivation and Leadership & its application in the Indian context

Sr. No.	Modules / Units
1	**Motivation-I**
	• Concept of motivation, Importance, Tools of Motivation. • Theory Z, Equity theory. • Process Theories-Vroom's Expectancy Theory, Valency-Four drive model.
2	**Motivation-II**
	• East v/s West, motivating workers (in context to Indian workers) • The Indian scene – basic differences. • Work –Life balance – concept, differences, generation and tips on work life balance.
3	**Leadership-I**
	• Leadership– Meaning, Traits and Motives of an Effective Leader, Styles of Leadership. • Theories –Trait Theory, Behavioural Theory, Path Goal Theory. • Transactional v/s Transformational leaders. • Strategic leaders– meaning, qualities. • Charismatic Leaders– meaning of charisma, Qualities, characteristics, types of charismatic leaders (socialized, personalized, office-holder, personal, divine)
4	**Leadership-II**
	• Great leaders, their style, activities and skills (Ratan Tata, Narayan Murthy, Dhirubhai Ambani, Bill Gates, Mark Zuckerberg, Donald Trump) • Characteristics of creative leaders and organization methods to enhance creativity (Andrew Dubrein). • Contemporary issues in leadership–Leadership roles, team leadership, mentoring, self leadership, online leadership, finding and creating effective leader.

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Elective Courses (EC)

Group C. Human Resource Electives

3. Employees Relations & Welfare

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Employee Relations and Collective Bargaining	15
2	Overview of Employee Welfare	15
3	Welfare and Work Environment Management	15
4	Workers Participation and Employee Grievance	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the nature and importance of employee relations in an organization
2	To understand the importance of collective bargaining and Workers participation
3	To understand the causes and effects of employee grievances as well as the procedure to solve the same

Sr. No.	Modules / Units
1	**Overview of Employee Relations and Collective Bargaining**
	• **Employee Relations** - Meaning, Scope, Elements of Employee Relations, Role of HR in Employee Relations • **Employee Relation Policies** – Meaning and Scope. • **Ways to Improve Employee Relations** • **Collective Bargaining** – Meaning, Characteristics, Need and Importance, Classification of collective bargaining - Distributive bargaining, Integrative bargaining, Attitudinal structuring and Intra-organizational bargaining; Principles of Collective Bargaining, Process, Causes for Failure of Collective Bargaining, Conditions for Successful Collective Bargaining • **Collective Bargaining Strategies** - Parallel or Pattern Bargaining, Multi-employer or Coalition Bargaining, Multi-unit or Coordinated Bargaining, and Single-unit Bargaining • **Current Trends** in Collective Bargaining
2	**Overview of Employee Welfare**
	• Meaning, Need for Employee Welfare, Principles of Employee/ Labour Welfare, Scope for Employee/ Labour Welfare in India, Types of Welfare Services – Individual and Group. • **Historical Development of Employee/ Labour Welfare in India** – Pre and Post-Independence, Employee/ Labour Welfare Practices in India • **Approaches to Employee/ Labour Welfare** – Paternalistic, Atomistic, Mechanistic, Humanistic approach • **Theories of Employee Welfare**–Policing Theory, Religion Theory, Philanthropic Theory, Trusteeship Theory, Public Relations Theory, Functional Theory • **Administration of Welfare Facilities** – Welfare Policy, Organisation of Welfare, Assessment of Effectiveness.
3	**Welfare and Work Environment Management**
	• **Agencies for Labour Welfare** – Central Government, State Government, Employers, Trade Union • **Women Welfare** - Meaning, Need for women welfare, Provision of Factories Act as applicable for women welfare • **Responsibility of Employers towards labour welfare** • **Work Environment Management** – Meaning, Need for healthy work environment, measures for providing healthy work, Fatigue at work – Meaning, Causes and Symptoms of Fatigue, Boredom at Workplace – Meaning, Hazards at Workplace – Meaning, Types of Hazards – Physical and Social, Hazard Management – Meaning and Process, Hazard Audit - Concept • **Accidents and Safety Issues at Workplace** – Safety, Safety Culture
4	**Workers Participation and Employee Grievance**
	• **Workers Participation in Management** – Concept, Pre-requisites, forms & levels of participation, Benefit of Workers Participation in Management, Importance of employee stock option plans as a method of participation. • **Employee Grievance** – Meaning, Features, Causes and Effects of Employee Grievances, Employee Grievance Handling Procedure, Effective Ways of Handling Grievance • Role of Industrial Relations Manager in Promoting & Establishing Peaceful Employee Relations

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

Elective Courses (EC)

Group C. Human Resource Electives

4. Organisation Behaviour & HRM

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Organisational Behaviour I	12
2	Organisational Behaviour II	13
3	Human Resource Management-I	17
4	Human Resource Management-II	18
	Total	**60**

Objectives

SN	Objectives
1	The objective of this course is to familiarize the student with the fundamental aspects of Various issues associated with Human Resource Management as a whole.
2	The course aims to give a comprehensive overview of Organization Behaviour as a separate area of management.
3	To introduce the basic concepts, functions and processes & create an awareness of the role, functions and functioning of Human Resource Management & OB.

Sr. No.	Modules / Units
1	**Organisational Behaviour-I**
	• Introduction to Organizational Behaviour-Concept, definitions, Evolution of OB • Importance of Organizational Behaviour-Cross Cultural Dynamics, Creating Ethical Organizational Culture& Climate • Individual and Group Behaviour-OB models–Autocratic, Custodial, Supportive, Collegial & SOBC in context with Indian OB • Human Relations and Organizational Behaviour
2	**Organisational Behaviour-II**
	• Managing Communication: Conflict management techniques. • Time management strategies. • Learning Organization and Organizational Design • Rewards and Punishments-Termination, layoffs, Attrition, Retrenchment, Separations, Downsizing
3	**Human Resource Management-I**
	• HRM-Meaning, objectives, scope and functions • HRP-Definition, objectives, importance, factors affecting HRP, Process of HRP, Strategies of HRM , Global HR Strategies • HRD-Concept ,meaning, objectives, HRD functions
4	**Human Resource Management-II**
	• Performance Appraisal: concept, process, methods and problems, KRA'S • Compensation-concept, components of Pay Structure, Wage and salary administration, Incentives and Employee benefits. • Career planning-concept of career Planning, Career stages and carrier planning

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester III with Effect from the Academic Year 2017-2018

2. Ability Enhancement Courses (AEC)
2A.Ability Enhancement Compulsory Course

3. Information Technology in Business Management-I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to IT Support in Management	15
2	Office Automation using MS-Office	15
3	Email, Internet and its Applications	15
4	E-Security	15
	Total	**60**

Objectives

SN	Objectives
1	To learn basic concepts of Information Technology, its support and role in Management, for managers
2	Module II comprises of practical hands on training required for office automation. It is expected to have practical sessions of latest MS-Office software
3	To understand basic concepts of Email, Internet and websites, domains and security therein
4	To recognize security aspects of IT in business, highlighting electronic transactions, advanced security features

Sr. No.	Modules / Units
1	**Introduction to IT Support in Management**
	• **Information Technology concepts** Concept of Data, Information and Knowledge Concept of Database • **Introduction to Information Systems and its major components**. Types and Levels of Information systems. Main types of IT Support systems Computer based Information Systems (CBIS) ▪ Types of CBIS - brief descriptions and their interrelationships/hierarchies ▪ Office Automation System(OAS) ▪ Transaction Processing System(TPS) ▪ Management Information System(MIS) ▪ Decision Support Systems (DSS) ▪ Executive Information System(EIS) ▪ Knowledge based system, Expert system • **Success and Failure of Information Technology.** Failures of Nike and AT&T • **IT Development Trends**. Major areas of IT Applications in Management • **Concept of Digital Economy and Digital Organization**. • **IT Resources** Open Source Software - Concept and Applications. Study of Different Operating Systems. (Windows / Linux/ DOS)
2	**Office Automation using MS Office**
	• **Learn Word:** Creating/Saving of Document Editing and Formatting Features Designing a title page, Preparing Index, Use of SmartArt Cross Reference, Bookmark and Hyperlink. Mail Merge Feature. • **Spreadsheet application (e.g. MS-Excel/openoffice.org)** Creating/Saving and editing spreadsheets Drawing charts. Using Basic Functions: text, math & trig, statistical, date & time, database, financial, logical Using Advanced Functions : Use of VLookup/HLookup Data analysis – sorting data, filtering data (AutoFilter , Advanced Filter), data validation, what-if analysis (using data tables/scenarios), creating sub-totals and grand totals, pivot table/chart, goal seek/solver, • **Presentation Software** Creating a presentation with minimum 20 slides with a script. Presenting in different views, Inserting Pictures, Videos, Creating animation effects on them Slide Transitions, Timed Presentations Rehearsal of presentation

Sr. No.	Modules / Units
3	**Email, Internet and its Applications**
	• **Introduction to Email** Writing professional emails Creating digitally signed documents. • **Use of Outlook** : Configuring Outlook, Creating and Managing profile in outlook, Sending and Receiving Emails through outlook Emailing the merged documents. Introduction to Bulk Email software • **Internet** Understanding Internet Technology Concepts of Internet, Intranet, Extranet Networking Basics, Different types of networks. Concepts (Hubs, Bridges, Routers, IP addresses) Study of LAN, MAN, WAN • **DNS Basics**. Domain Name Registration, Hosting Basics. • **Emergence of E-commerce and M-Commerce** Concept of E-commerce and M-Commerce Definition of E-commerce and M-Commerce Business models of e-commerce: models based on transaction party (B2B, B2C,B2G, C2B, C2C, E-Governance) Models based on revenue models, Electronics Funds Transfer, Electronic Data Interchange.
4	**E-Security Systems**
	• **Threats to Computer systems and control measures**. Types of threats- Virus, hacking, phishing, spyware, spam, physical threats (fire, flood, earthquake, vandalism) Threat Management • **IT Risk** Definition, Measuring IT Risk, Risk Mitigation and Management • **Information Systems Security** • **Security on the internet** Network and website security risks Website Hacking and Issues therein. Security and Email • **E-Business Risk Management Issues** Firewall concept and component, Benefits of Firewall • **Understanding and defining Enterprise wide security framework** • **Information Security Environment in India with respect to real Time Application in Business** Types of Real Time Systems, Distinction between Real Time, On – line and Batch Processing System. Real Time Applications viz. Railway / Airway / Hotel Reservation System, ATMs, EDI Transactions - definition, advantages, examples;E-Cash, Security requirements for Safe E-Payments Security measures in International and Cross Border financial transactions • **Threat Hunting Software**

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester III with Effect from the Academic Year 2017-2018

2. Ability Enhancement Courses (AEC)

2B. Skill Enhancement Courses (SEC)

4. Foundation Course –III
Environmental Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Environmental Concepts	12
2	Environment degradation	11
3	Sustainability and role of business	11
4	Innovations in business- an environmental Perspective	11
	Total	**45**

Sr. No.	Modules / Units
1	**Environmental Concepts:**
	• **Environment:** Definition and composition, Lithosphere, Atmosphere, Hydrosphere, Biosphere • **Biogeochemical cycles** - Concept and water cycle • Ecosystem & Ecology; Food chain, food web & Energy flow pyramid • **Resources:** Meaning, classification(Renewable & non-renewable), types & Exploitation of Natural resources in sustainable manner
2	**Environment degradation**
	• **Degradation**-Meaning and causes, degradation of land, forest and agricultural land and its remedies • **Pollution** – meaning, types, causes and remedies (land, air, water and others) • **Global warming**: meaning, causes and effects. • **Disaster Management**: meaning, disaster management cycle. • **Waste Management**: Definition and types -solid waste management anthropogenic waste, e-waste & biomedical waste (consumerism as a cause of waste)
3	**Sustainability and role of business**
	• Sustainability: Definition, importance and Environment Conservation. • Environmental clearance for establishing and operating Industries in India. • EIA, Environmental auditing, ISO 14001 • Salient features of Water Act, Air Act and Wildlife Protection Act. • Carbon bank & Kyoto protocol
4	**Innovations in business- an environmental perspective**
	Non-Conventional energy sources- Wind, Bio-fuel, Solar, Tidal and Nuclear Energy. Innovative Business Models: Eco-tourism, Green marketing, Organic farming, Eco-friendly packaging, Waste management projects for profits ,other business projects for greener future

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester III with Effect from the Academic Year 2017-2018

2. Ability Enhancement Courses (AEC)

2B. Skill Enhancement Courses (SEC)

Foundation Course- Contemporary Issues- III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Human Rights Provisions, Violations and Redressal	12
2	Dealing With Environmental Concerns	11
3	Science and Technology I	11
4	Soft Skills for Effective Interpersonal Communication	11
	Total	**45**

Sr. No.	Modules / Units
1	**Human Rights Violations and Redressal**
	A. Scheduled Castes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **B.** Scheduled tribes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **C.** Women- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **D.** Children- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **E.** People with Disabilities, Minorities, and the Elderly population- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(4 Lectures)**
2	**Dealing With Environmental Concerns**
	A. Concept of Disaster and general effects of Disasters on human life- physical, psychological, economic and social effects. **(3 Lectures)** **B.** Some locally relevant case studies of environmental disasters. **(2 Lectures)** **C.** Dealing with Disasters - Factors to be considered in Prevention, Mitigation (Relief and Rehabilitation) and disaster Preparedness. **(3 Lectures)** **D.** Human Rights issues in addressing disasters- issues related to compensation, equitable and fair distribution of relief and humanitarian approach to resettlement and rehabilitation. **(3 Lectures)**
3	**Science and Technology – I**
	A. Development of Science- the ancient cultures, the Classical era, the Middle Ages, the Renaissance, the Age of Reason and Enlightenment. **(3 Lectures)** **B. Nature of science**- its principles and characteristics; Science as empirical, practical, theoretical, validated knowledge. **(2 Lectures)** **C. Science and Superstition**- the role of science in exploding myths, blind beliefs and prejudices; Science and scientific temper- scientific temper as a fundamental duty of the Indian citizen. **(3 Lectures)** **D. Science in everyday life**- technology, its meaning and role in development; Interrelation and distinction between science and technology. **(3 Lectures)**
4	**Soft Skills for Effective Interpersonal Communication**
	Part A **(4 Lectures)** I) Effective Listening - Importance and Features. II) Verbal and Non-Verbal Communication; Public-Speaking and Presentation Skills. III) Barriers to Effective Communication; Importance of Self-Awareness and Body Language. **Part B** **(4 Lectures)** I) Formal and Informal Communication - Purpose and Types. II) Writing Formal Applications, Statement of Purpose (SOP) and Resume. III) Preparing for Group Discussions, Interviews and Presentations. **Part C** **(3 Lectures)** I) Leadership Skills and Self-Improvement - Characteristics of Effective Leadership. II) Styles of Leadership and Team-Building.

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11. Sathe, Satyaranjan P., *Judicial Activism in India*, Oxford University Press, New Delhi, 2003.
12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.

Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester III with Effect from the Academic Year 2017-2018

2. Ability Enhancement Courses (AEC)

2B. Skill Enhancement Courses (SEC)

4. Foundation Course in NSS - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Value System & Gender sensitivity	12
2	Disaster preparedness & Disaster management	10
3	Health, hygiene & Diseases	13
4	Environment & Energy conservation	10
	Total	**45**

Sr. No.	Modules / Units
1	**Value System & Gender sensitivity**
	UNIT - I – Value System Meaning of value, Types of values- human values and social responsibilities- Indian value system- the concepts and its features **UNIT - II - Gender sensitivity and woman empowerment** Concept of gender- causes behind gender related problems- measures Meaning of woman empowerment- schemes for woman empowerment in India
2	**Disaster preparedness & Disaster management**
	UNIT - I - Basics of Disaster preparedness Disaster- its meaning and types Disaster preparedness- its meaning and methods **UNIT - II - Disaster management** Disaster management- concept- disaster cycle - role of technology in disaster response- role of as first responder – the study of 'Avhan' Model
3	**Health, hygiene & Diseases**
	UNIT - I - Health and hygiene Concept of complete health and maintenance of hygiene **UNIT - II - Diseases and disorders- preventive campaigning** Diseases and disorders- preventive campaigning in Malaria, Tuberculosis, Dengue, Cancer, HIV/AIDS, Diabetes
4	**Environment & Energy conservation**
	UNIT - I Environment and Environment enrichment program Environment- meaning, features , issues, conservation of natural resources and sustainability in environment **UNIT - II Energy and Energy conservation program** Energy- the concept, features- conventional and non- conventional energy Energy conservation- the meaning and importance

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester III with Effect from the Academic Year 2017-2018

2. Ability Enhancement Courses (AEC)

2B. Skill Enhancement Courses (SEC)

4. Foundation Course in NCC - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training and Environment Awareness and Conservation	05
4	Personality Development and Leadership	10
5	Specialized subject (ARMY)	10
	Total	**45**

Sr. No.	Modules / Units
1	**National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. The students shall enrich themselves about the history of our beloved country and will look forward for the solutions based on strengths to the challenges to the country for its development. • Freedom Struggle and nationalist movement in India. • National interests, Objectives, Threats and Opportunities. • Problems/ Challenges of National Integration. • Unity in Diversity
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Side pace, pace forward and to the rear • Turning on the march and whiling • Saluting on the march • Marking time, forward march and halt in quick time • Changing step • Formation of squad and squad drill
3	**Adventure Training, Environment Awareness and Conservation**
3A	**Adventure Training**
	Desired outcome: The students will overcome fear & inculcate within them the sense of adventure, sportsmanship, espirit-d-corp and develop confidence, courage, determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing, Scuba Diving etc.
3B	**Environment Awareness and Conservation**
	Desired outcome: The student will be made aware of the modern techniques of waste management and pollution control. • Waste management • Pollution control, water, Air, Noise and Soil
4	**Personality Development and Leadership**
	Desired outcome: The student will inculcate officer like qualities with desired ability to take right decisions. • Time management • Effect of Leadership with historical examples • Interview Skills • Conflict Motives- Resolution

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** It will acquaint, expose & provide knowledge about Army/ Navy/ Air force and to acquire information about expanse of Armed Forces ,service subjects and important battles **A. Armed Force** • Task and Role of Fighting Arms • Modes of Entry to Army • Honors and Awards **B. Introduction to Infantry and weapons and equipments** • Characteristics of 5.56mm INSAS Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning • Organization of Infantry Battalion. **C. Military history** • Study of battles of Indo-Pak War 1965,1971 and Kargil • War Movies **D. Communication** • Characteristics of Walkie-Talkies • Basic RT Procedure • Latest trends and Development (Multi Media, Video Conferencing, IT) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • Organization of Ship- Introduction on Onboard Organization • Naval Customs and Traditions • Mode of Entry into Indian Navy • Branches of the Navy and their functions • Naval Campaign (Battle of Atlantic, Pearl Harbour, Falkland War/Fleet Review/ PFR/ IFR)s **B. Ship and Boat Modelling** • Types of Models • Introduction of Ship Model- Competition Types of Model Prepare in NSC and RDC • Care and handling of power-tools used- maintenance and purpose of tools

Sr. No.	Modules / Units
	C. Search and Rescue • Role of Indian Coast Guard related to SAR **D. Swimming** • Floating and Breathing Techniques- Precautions while Swimming ***OR*** **AIR** **A. General Service Knowledge** • Organization Of Air Force • Branches of the IAF. **B. Principles of Flight** • Venturi Effect • Aerofoil • Forces on an Aircraft • Lift and Drag **C. Airmanship** • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Types of Engines • Piston Engines • Jet Engines • Turboprop Engines

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester III with Effect from the Academic Year 2017-2018

2. Ability Enhancement Courses (AEC)

2B. Skill Enhancement Courses (SEC)

4. Foundation Course in Physical Education - III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Nutrition	10
2	Evaluation of Health, Fitness and Wellness	10
3	Prevention and Care of Exercise Injuries	10
4	Sports Training	15
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Nutrition**
	• Introduction to nutrition & its principles • Role of Nutrition in promotion of health • Dietary Guidelines for Good Health • Regulation of water in body and factors influencing body temperature.
2	**Evaluation of Health, Fitness and Wellness**
	• Meaning & Concept of holistic health • Evaluating Personal health-basic parameters • Evaluating Fitness Activities – Walking & Jogging • Myths &mis-conceptions of Personal fitness
3	**Prevention and Care of Exercise Injuries**
	• Types of Exercise Injuries • First Aid- Importance & application in Exercise Injuries • Management of Soft tissues injuries • Management of bone injuries
4	**Sports Training**
	• Definition, aims & objectives of Sports training • Importance of Sports training • Principles of Sports training • Drug abuse & its effects

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III
With Effect from the Academic Year 2017-2018

3. Core Courses (CC)

5.Business Planning & Entrepreneurial Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Foundations of Entrepreneurship Development	15
2	Types & Classification Of Entrepreneurs	15
3	Entrepreneur Project Development & Business Plan	15
4	Venture Development	15
	Total	**60**

Objectives

SN	Objectives
1	Entrepreneurship is one of the major focus areas of the discipline of Management. This course introduces Entrepreneurship to budding managers.
2	To develop entrepreneurs &to prepare students to take the responsibility of full line of management function of a company with special reference to SME sector.

Sr. No.	Modules / Units
1	**Foundations of Entrepreneurship Development:**
	• **Foundations of Entrepreneurship Development:** Concept and Need of Entrepreneurship Development Definition of Entrepreneur, Entrepreneurship, Importance and significance of growth of entrepreneurial activities Characteristics and qualities of entrepreneur • **Theories of Entrepreneurship**: Innovation Theory by Schumpeter &Imitating Theory of High Achievement by McClelland X-Efficiency Theory by Leibenstein Theory of Profit by Knight Theory of Social change by Everett Hagen • **External Influences on Entrepreneurship Development**: Socio-Cultural, Political, Economical, Personal. Role of Entrepreneurial culture in Entrepreneurship Development.
2	**Types & Classification Of Entrepreneurs**
	• Intrapreneur –Concept and Development of Intrapreneurship • Women Entrepreneur – concept, development and problems faced by Women Entrepreneurs, Development of Women Entrepreneurs with reference to Self Help Group • Social entrepreneurship–concept, development of Social entrepreneurship in India. Importance and Social responsibility of NGO's. • Entrepreneurial development Program (EDP)– concept, factor influencing EDP. Option available to Entrepreneur. (Ancillarisation, BPO, Franchise, M&A)
3	**Entrepreneur Project Development &Business Plan**
	• Innovation, Invention, Creativity, Business Idea, Opportunities through change. • Idea generation– Sources-Development of product /idea, • Environmental scanning and SWOT analysis • Creating Entrepreneurial Venture-Entrepreneurship Development Cycle • Business Planning Process-The business plan as an Entrepreneurial tool, scope and value of Business plan. • Elements of Business Plan, Objectives, Market and Feasibility Analysis, Marketing, Finance, Organization &Management, Ownership, • Critical Risk Contingencies of the proposal, Scheduling and milestones.
4	**Venture Development**
	• Steps involved in starting of Venture • Institutional support to an Entrepreneur • Venture funding, requirements of Capital (Fixed and working) Sources of finance, problem of Venture set-up and prospects • Marketing: Methods, Channel of Marketing, Marketing Institutions and Assistance. • New trends in entrepreneurship

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

3. Core Courses (CC)

6. Accounting for Managerial Decisions

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Analysis and Interpretation of Financial statements	15
2	Ratio analysis and Interpretation	15
3	Cash flow statement	15
4	Working capital	15
	Total	**60**

Objectives

SN	Objectives
1	To acquaint management learners with basic accounting fundamentals.
2	To develop financial analysis skills among learners.
3	The course aims at explaining the core concepts of business finance and its importance in managing a business

Sr. No.	Modules / Units
1	**Analysis and Interpretation of Financial statements**
	• Study of balance sheet of limited companies. Study of Manufacturing, Trading, Profit and Loss A/c of Limited Companies • Vertical Form of Balance Sheet and Profit & Loss A/c-Trend Analysis, Comparative Statement &Common Size.
2	**Ratio analysis and Interpretation**
	• **Ratio analysis and Interpretation**(based on vertical form of financial statements)including conventional and functional classification restricted to: • **Balance sheet ratios**: Current ratio, Liquid Ratio, Stock Working capital ratio, Proprietory ratio, Debt Equity Ratio, Capital Gearing Ratio. • **Revenue statement ratios:** Gross profit ratio**,** Expenses ratio, Operating ratio, Net profit ratio, Net Operating Profit Ratio, Stock turnover Ratio, Debtors Turnover , Creditors Turnover Ratio • **Combined ratios:** Return on capital Employed (including Long term borrowings), Return on Proprietors fund (Shareholder fund and Preference Capital), Return on Equity Capital, Dividend Payout Ratio, Debt Service Ratio, • **Different modes of expressing ratios**:-Rate, Ratio, Percentage, Number. Limitations of the use of Ratios.
3	**Cash flow statement**
	Preparation of cash flow statement(AccountingStandard-3(revised)
4	**Working capital**
	• **Working capital-**Concept, Estimation of requirements in case of Trading & Manufacturing Organizations. • **Receivables management-**Meaning &Importance, Credit Policy Variables, methods of Credit Evaluation(Traditional and Numerical- Credit Scoring); Monitoring the Debtors Techniques [DSO, Ageing Schedule]

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester III with Effect from the Academic Year 2017-2018

3. Core Courses (CC)

7. Strategic Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	12
2	Strategy Formulation	16
3	Strategic Implementation	18
4	Strategic Evaluation & Control	14
	Total	**60**

Objectives

SN	Objectives
1	The objective of this course is to learn the management policies and strategies at every Level to develop conceptual skills in this area as well as their application in the corporate world.
2	The focus is to critically examine the management of the entire enterprise from the Top Management view points.
3	This course deals with corporate level Policy & Strategy formulation areas. This course aims to developing conceptual skills in this area as well as their application in the corporate world.

Sr. No.	Modules / Units
1	**Introduction**
	• **Business Policy**-Meaning, Nature, Importance • **Strategy**-Meaning, Definition • **Strategic Management**-Meaning, Definition, Importance, Strategic management • Process & Levels of Strategy and Concept and importance of Strategic Business Units (SBU's) • **Strategic Intent**-Mission, Vision, Goals, Objective, Plans
2	**Strategy Formulation**
	• Environment Analysis and Scanning(SWOT) • Corporate Level Strategy (Stability, Growth, Retrenchment, Integration and Internationalization) • Business Level Strategy(Cost Leadership, Differentiation, Focus) • Functional Level Strategy(R&D, HR, Finance, Marketing, Production)
3	**Strategic Implementation**
	• Models of Strategy making. • Strategic Analysis& Choices &Implementation: BCG Matrix, GE 9Cell, Porter5 Forces, 7S Frame Work • Implementation: Meaning, Steps and implementation at Project, Process, Structural ,Behavioural ,Functional level.
4	**Strategic Evaluation & Control**
	Strategic Evaluation & Control– Meaning, Steps of Evaluation & Techniques of Control Synergy: Concept , Types , evaluation of Synergy. Synergy as a Component of Strategy & its Relevance. Change Management– Elementary Concept

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses
of
Bachelor of Management Studies (BMS) Programme at Third Year
Semester V and VI

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year- 2018-2019)

Board of Studies-in-Business Management, University of Mumbai

Bachelor of Management Studies (BMS) Programme

Under Choice Based Credit, Grading and Semester System

TYBMS

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Course (CC)***		***2***	***Core Course (CC)***	
5	Logistics & Supply Chain Management	**04**	5	Operation Research	**04**
3	**Ability Enhancement Course (AEC)**		**3**	**Ability Enhancement Course (AEC)**	
6	Corporate Communication & Public Relations	**04**	6	Project Work	**04**
	Total Credits	**20**		**Total Credits**	**20**

✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/analysing/exploring a real life situation/ difficult problem. Project work would be of 04 credits. A project work may be undertaken in any area of Elective Courses/ study area selected*

****List of group of Elective Courses(EC) for Semester V (Any Four)***		***** List of group of Elective Courses(EC) for Semester VI (Any Four)***	
Group A: Finance Electives			
1	Investment Analysis& Portfolio Management	1	International Finance
2	Commodity & Derivatives Market	2	Innovative Financial Services
3	Wealth Management	3	Project Management
4	Financial Accounting	4	Strategic Financial Management
5	Risk Management	5	Financing Rural Development
6	Direct Taxes	6	Indirect Taxes
Group B:Marketing Electives			
1	Services Marketing	1	Brand Management
2	E-Commerce & Digital Marketing	2	Retail Management
3	Sales & Distribution Management	3	International Marketing
4	Customer Relationship Management	4	Media Planning & Management
5	Industrial Marketing	5	Sports Marketing
6	Strategic Marketing Management	6	Marketing of Non Profit Organisation
Group C: Human Resource Electives			
1	Finance for HR Professionals & Compensation Management	1	HRM in Global Perspective
2	Strategic Human Resource Management & HR Policies	2	Organisational Development
3	Performance Management & Career Planning	3	HRM in Service Sector Management
4	Industrial Relations	4	Workforce Diversity
5	Talent & Competency Management	5	Human Resource Accounting & Audit
6	Stress Management	6	Indian Ethos in Management
Note: Group selected in Semester III will continue in Semester V &Semester VI			

Bachelor of Management Studies (BMS) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2018-2019)

Semester V

No. of Courses	Semester V	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Course (CC)***	
5	Logistics & Supply Chain Management	**04**
3	**Ability Enhancement Course (AEC)**	
6	Corporate Communication & Public Relations	**04**
	Total Credits	**20**

****List of group of Elective Courses(EC)for Semester V (Any Four)***	
Group A: Finance Electives	
1	Investment Analysis & Portfolio Management
2	Commodity & Derivatives Market
3	Wealth Management
4	Financial Accounting
5	Risk Management
6	Direct Taxes
Group B:Marketing Electives	
1	Services Marketing
2	E-Commerce & Digital Marketing
3	Sales & Distribution Management
4	Customer Relationship Management
5	Industrial Marketing
6	Strategic Marketing Management
Group C: Human Resource Electives	
1	Finance for HR Professionals & Compensation Management
2	Strategic Human Resource Management & HR Policies
3	Performance Management & Career Planning
4	Industrial Relations
5	Talent & Competency Management
6	Stress Management

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

1. Investment Analysis and Portfolio Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Investment Environment	15
2	Risk - Return Relationship	15
3	Portfolio Management and Security Analysis	15
4	Theories, Capital Asset Pricing Model and Portfolio Performance Measurement	15
	Total	**60**

Objectives

SN	Objectives
1	To acquaint the learners with various concepts of finance
2	To understand the terms which are often confronted while reading newspaper, magazines etc for better correlation with the practical world
3	To understand various models and techniques of security and portfolio analysis

SN	Modules/ Units
1	**Introduction to Investment Environment**
	a) Introduction to Investment Environment • Introduction, Investment Process, Criteria for Investment, Types of Investors, Investment V/s Speculation V/s Gambling, Investment Avenues, Factors Influencing Selection of Investment Alternatives **b) Capital Market in India** • Introduction, Concepts of Investment Banks its Role and Functions, Stock Market Index, The NASDAQ, SDL, NSDL, Benefits of Depository Settlement, Online Share Trading and its Advantages, Concepts of Small cap, Large cap, Midcap and Penny stocks
2	**Risk - Return Relationship**
	a) Meaning, Types of Risk- Systematic and Unsystematic risk, Measurement of Beta, Standard Deviation, Variance, Reduction of Risk through Diversification. Practical Problems on Calculation of Standard Deviation, Variance and Beta.
3	**Portfolio Management and Security Analysis**
	a) Portfolio Management: • Meaning and Concept, Portfolio Management Process, Objectives, Basic Principles, Factors affecting Investment Decisions in Portfolio Management, Portfolio Strategy Mix. **b) Security Analysis:** • Fundamental Analysis, Economic Analysis, Industry Analysis, Company Analysis, Technical Analysis - Basic Principles of Technical Analysis., Uses of Charts: Line Chart, Bar Chart, Candlestick Chart, Mathematical Indicators: Moving Averages, Oscillators.
4	**Theories, Capital Asset Pricing Model and Portfolio Performance Measurement**
	a) Theories: • Dow Jones Theory, Elloit Wave Theory, Efficient Market Theory **b) Capital Asset Pricing Model:** • Assumptions of CAPM, CAPM Equation, Capital Market Line, Security Market Line **c) Portfolio Performance Measurement:** • Meaning of Portfolio Evaluation, Sharpe's Ratio (Basic Problems), Treynor's Ratio (Basic Problems), Jensen's Differential Returns (Basic Problems)

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

2. Commodity and Derivatives Market

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Commodities Market and Derivatives Market	15
2	Futures and Hedging	15
3	Options and Option Pricing Models	15
4	Trading, Clearing & Settlement In Derivatives Market and Types of Risk	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concepts related to Commodities and Derivatives market
2	To study the various aspects related to options and futures
3	To acquaint learners with the trading, clearing and settlement mechanism in derivates market.

SN	Modules/ Units
1	**Introduction to Commodities Market and Derivatives Market**
	a) Introduction to Commodities Market : • Meaning, History & Origin, Types of Commodities Traded, Structure of Commodities Market in India, Participants in Commodities Market, Trading in Commodities in India(Cash & Derivative Segment), Commodity Exchanges in India & Abroad, Reasons for Investing in Commodities **b) Introduction to Derivatives Market:** • Meaning, History & Origin, Elements of a Derivative Contract, Factors Driving Growth of Derivatives Market, Types of Derivatives, Types of Underlying Assets, Participants in Derivatives Market, Advantages & Disadvantages of Trading in Derivatives Market, Current Volumes of Derivative Trade in India, Difference between Forwards & Futures.
2	**Futures and Hedging**
	a) Futures: • Futures Contract Specification, Terminologies, Concept of Convergence, Relationship between Futures Price & Expected Spot Price, Basis & Basis Risk, Pricing of Futures Contract, Cost of Carry Model **b) Hedging:** • Speculation & Arbitrage using Futures, Long Hedge – Short Hedge, Cash & Carry Arbitrage, Reverse Cash & Carry Arbitrage, Payoff Charts & Diagrams for Futures Contract, Perfect & Imperfect Hedge
3	**Options and Option Pricing Models**
	a) Options: • Options Contract Specifications, Terminologies, Call Option, Put Option, Difference between Futures & Options, Trading of Options, Valuation of Options Contract, Factors affecting Option Premium, Payoff Charts & Diagrams for Options Contract, Basic Understanding of Option Strategies **b) Options Pricing Models:** • Binomial Option Pricing Model, Black - Scholes Option Pricing Model
4	**Trading, Clearing & Settlement In Derivatives Market and Types of Risk**
	a) Trading, Clearing & Settlement In Derivatives Market: • Meaning and Concept, SEBI Guidelines, Trading Mechanism – Types of Orders, Clearing Mechanism – NSCCL – its Objectives & Functions, Settlement Mechanism – Types of Settlement **b) Types of Risk:** • Value at Risk, Methods of calculating VaR, Risk Management Measures , Types of Margins, SPAN Margin

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

3. Wealth Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	15
2	Insurance Planning and Investment Planning	15
3	Financial Mathematics/ Tax and Estate Planning	15
4	Retirement Planning/ Income Streams & Tax Savings Schemes	15
	Total	**60**

Objectives

SN	Objectives
1	To provide an overview of various aspects related to wealth management
2	To study the relevance and importance of Insurance in wealth management
3	To acquaint the learners with issues related to taxation in wealth management
4	To understand various components of retirement planning

SN	Modules/ Units
1	**Introduction**
	a) Introduction To Wealth Management: • Meaning of WM, Scope of WM, Components of WM, Process of WM, WM Needs & Expectation of Clients,Code of Ethics for Wealth Manager **b) Personal Financial Statement Analysis:** • Financial Literacy, Financial Goals and Planning, Cash Flow Analysis, Building Financial Plans, Life Cycle Management. **c) Economic Environment Analysis:** • Interest Rate, Yield Curves, Real Return, Key Indicators-Leading, Lagging, Concurrent
2	**Insurance Planning and Investment Planning**
	a) Insurance Planning: • Meaning, Basic Principles of Insurance, Functions and Characteristics of Insurance, Rights and Responsibilities of Insurer and Insured, Types of life Insurance Policies, Types of General Insurance Policies, Health Insurance – Mediclaim – Calculation of Human Life Value - Belth Method/CPT **b) Investment Planning:** • Types of Investment Risk, Risk Profiling of Investors & Asset Allocation (Life Cycle Model), Asset Allocation Strategies(Strategic, Tactical, Life-Cycle based), Goal-based Financial Planning, Active & Passive Investment Strategies
3	**Financial Mathematics/ Tax and Estate Planning**
	a) Financial Mathematics: • Calculation of Returns (CAGR ,Post-tax Returns etc.), Total Assets, Net Worth Calculations, Financial Ratios **b) Tax and Estate Planning:** • Tax Planning Concepts, Assessment Year, Financial Year, Income Tax Slabs, TDS, Advance Tax, LTCG, STCG, Carry Forward & Set-off, Estate Planning Concepts –Types of Will – Requirements of a Valid Will– Trust – Deductions - Exemptions
4	**Retirement Planning/ Income Streams & Tax Savings Schemes**
	a) Retirement Planning: • Understanding of different Salary Components, Introduction to Retirement Planning, Purpose & Need, Life Cycle Planning, Financial Objectives in Retirement Planning, Wealth Creation (Factors and Principles), Retirement (Evaluation & Planning), Pre & Post-Retirement Strategies - Tax Treatment **b) Income Streams & Tax Savings Schemes:** • Pension Schemes, Annuities- Types of Annuities, Various Income Tax Savings Schemes

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

4. Financial Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Preparation of Final Accounts of Companies	15
2	Underwriting of Shares & Debentures	12
3	Accounting of Transactions of Foreign Currency	15
4	Investment Accounting (w.r.t. Accounting Standard- 13)	10
5	Ethical Behaviour and Implications for Accountants	08
Total		**60**

Objectives

SN	Objectives
01	To acquaint the learners in preparation of final accounts of companies
02	To study provisions relating to underwriting of shares and debentures
03	To study accounting of foreign currency and investment
04	To understand the need of ethical behaviour in accountancy

Sr. No.	Modules / Units
1	**Preparation of Final Accounts of Companies**
	Relevant provisions of Companies Act related to preparation of Final Accounts (excluding cash flow statement) Preparation of financial statements as per Companies Act (excluding cash flow statement) AS 1 in relation to final accounts of companies (disclosure of accounting policies)
2	**Underwriting of Shares & Debentures**
	Introduction, Underwriting, Underwriting Commission Provision of Companies Act with respect to Payment of underwriting commission Underwriters, Sub-Underwriters, Brokers and Manager to Issues Types of underwriting, Abatement Clause Marked, Unmarked and Firm-underwriting applications, Liability of the underwriters in respect of underwriting contract- Practical problems
3	**Accounting of Transactions of Foreign Currency**
	In relation to purchase and sale of goods, services, assets, loan and credit transactions. Computation and treatment of exchange rate differences.
4	**Investment Accounting (w.r.t. Accounting Standard- 13)**
	For shares (variable income bearing securities) For Debentures/Preference shares (fixed income bearing securities) Accounting for transactions of purchase and sale of investments with ex and cum interest prices and finding cost of investment sold and carrying cost as per weighted average method (Excl. brokerage). Columnar format for investment account.
5	**Ethical Behaviour and Implications for Accountants**
	Introduction, Meaning of ethical behavior Financial Reports – link between law, corporate governance, corporate social responsibility and ethics. Need of ethical behavior in accounting profession . Implications of ethical values for the principles versus rule based approaches to accounting standards The principal based approach and ethics The accounting standard setting process and ethics The IFAC Code of Ethics for Professional Accountants Contents of Research Report in Ethical Practices Implications of unethical behavior for financial reports Company Codes of Ethics The increasing role of Whistle – Blowing

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

5. Risk Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction, Risk Measurement and Control	15
2	Risk Avoidance and ERM	15
3	Risk Governance and Assurance	15
4	Risk Management in Insurance	15
	Total	**60**

Objectives

SN	Objectives
1	To familiarize the student with the fundamental aspects of risk management and control
2	To give a comprehensive overview of risk governance and assurance with special reference to insurance sector
3	To introduce the basic concepts, functions, process, techniques of risk management

SN	Modules/ Units
1	**Introduction, Risk Measurement and Control**
	a) Introduction, Risk Measurement and Control • Definition, Risk Process, Risk Organization, Key Risks –Interest, Market, Credit, Currency, Liquidity, Legal, Operational • Risk Management V/s Risk Measurement – Managing Risk, Diversification, Investment Strategies and Introduction to Quantitative Risk Measurement and its Limitations • Principals of Risk - Alpha, Beta, R squared, Standard Deviation, Risk Exposure Analysis, Risk Immunization, Risk and Summary Measures –Simulation Method, Duration Analysis, Linear and other Statistical Techniques for Internal Control
2	**Risk Avoidance and ERM**
	a) Risk Hedging Instruments and Mechanism: • Forwards, Futures, Options, Swaps and Arbitrage Techniques, Risk Return Trade off, Markowitz Risk Return Model, Arbitrage Theory, System Audit Significance in Risk Mitigation **b) Enterprise Risk Management:** • Risk Management V/s Enterprise Risk Management, Integrated Enterprise Risk Management, ERM Framework, ERM Process, ERM Matrix, SWOT Analysis, Sample Risk Register
3	**Risk Governance and Assurance**
	a) Risk Governance: • Importance and Scope of Risk Governance, Risk and Three Lines of Defense, Risk Management and Corporate Governance **b) Risk Assurance:** • Purpose and Sources of Risk Assurance, Nature of Risk Assurance, Reports and Challenges of Risk **c) Risk and Stakeholders Expectations:** • Identifying the Range of Stakeholders and Responding to Stakeholders Expectations
4	**Risk Management in Insurance**
	a) Insurance Industry: • Global Perspective, Regulatory Framework in India, IRDA - Reforms, Powers, Functions and Duties. Role and Importance of Actuary **b) Players of Insurance Business:** • Life and Non- Life Insurance, Reinsurance, Bancassurance, Alternative Risk Trance, Insurance Securitization, Pricing of Insurance products, Expected Claim Costs, Risk Classification **c) Claim Management:** • General Guidelines, Life Insurance, Maturity, Death, Fire, Marine, Motor Insurance and Calculation of Discounted Expected Claim Cost and Fair Premium

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

6. Direct Taxes

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Definitions and Residential Status	10
2	Heads of Income – I	15
3	Heads of Income - II	15
4	Deductions under Chapter VI A	10
5	Computation of Taxable Income of Individuals	10
Total		**60**

Objectives

SN	Objectives
01	To understand the provisions of determining residential status of individual
02	To study various heads of income
03	To study deductions from total income
04	To compute taxable income of Individuals

Sr. No.	Modules / Units
1	**Definitions and Residential Status**
	Basic Terms (S. 2,3,4) Assessee, Assessment, Assessment Year, Annual Value, Business, Capital Assets, Income, Previous Year, Person, Transfer. Determination of Residential Status of Individual, Scope of Total Income (S.5)
2	**Heads of Income – I**
	Salary (S.15-17) Income from House Property (S. 22-27) Profit & Gain from Business and Profession(S. 28, 30,31,32, 35, 35D,36,37, 40, 40A and 43B)
3	**Heads of Income – II**
	Capital Gain (S. 45, 48, 49, 50 and 54) Income from other sources (S.56- 59) Exclusions from Total Income (S.10) (Exclusions related to specified heads to be covered with relevant heads of income)
4	**Deductions under Chapter VI A**
	Deductions from Total Income S. 80C, 80CCC, 80D, 80DD, 80E, 80U, 80TTA
5	**Computation of Taxable Income of Individuals.**
	Computation of Total Income and Taxable Income of Individuals

Note: The Syllabus is restricted to study of particular sections, specifically mentioned rules and notifications only.

1. All modules / units include Computational problems / Case Study**.**

2. The Law In force on 1st April immediately preceding the commencement of Academic year will be applicable for ensuing Examinations.

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group B: Marketing Electives

1. Service Marketing

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction of Services Marketing	15
2	Key Elements of Services Marketing Mix	15
3	Managing Quality Aspects of Services Marketing	15
4	Marketing of Services	15
	Total	**60**

Objectives

SN	Objectives
1	To understand distinctive features of services and key elements in services marketing
2	To provide insight into ways to improve service quality and productivity
3	To understand marketing of different services in Indian context

SN	Modules/ Units
1	**Introduction of Services Marketing**
	• Services Marketing Concept, Distinctive Characteristics of Services, Services Marketing Triangle, Purchase Process for Services, Marketing Challenges of Services • Role of Services in Modern Economy, Services Marketing Environment • Goods vs Services Marketing, Goods Services Continuum • Consumer Behaviour, Positioning a Service in the Market Place • Variations in Customer Involvement, Impact of Service Recovery Efforts on Consumer Loyalty • Type of Contact: High Contact Services and Low Contact Services • Sensitivity to Customers' Reluctance to Change
2	**Key Elements of Services Marketing Mix**
	• The Service Product, Pricing Mix, Promotion & Communication Mix, Place/Distribution of Service, People, Physical Evidence, Process-Service Mapping-Flowcharting • Branding of Services – Problems and Solutions • Options for Service Delivery
3	**Managing Quality Aspects of Services Marketing**
	• Improving Service Quality and Productivity • Service Quality – GAP Model, Benchmarking, Measuring Service Quality -Zone of Tolerance and Improving Service Quality • The SERVQUAL Model • Defining Productivity – Improving Productivity • Demand and Capacity Alignment
4	**Marketing of Services**
	• International and Global Strategies in Services Marketing: Services in the Global Economy- Moving from Domestic to Transnational Marketing • Factors Favouring Transnational Strategy • Elements of Transnational Strategy • Recent Trends in Marketing Of Services in: Tourism, Hospitality, Healthcare, Banking, Insurance, Education, IT and Entertainment Industry • Ethics in Services Marketing: Meaning, Importance, Unethical Practices in Service Sector

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group B: Marketing Electives

2. E-Commerce and Digital Marketing

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to E-commerce	15
2	E-Business & Applications	15
3	Payment, Security, Privacy &Legal Issues in E-Commerce	15
4	Digital Marketing	15
	Total	**60**

Objectives

SN	Objectives
1	To understand increasing significance of E-Commerce and its applications in Business and Various Sectors
2	To provide an insight on Digital Marketing activities on various Social Media platforms and its emerging significance in Business
3	To understand Latest Trends and Practices in E-Commerce and Digital Marketing, along with its Challenges and Opportunities for an Organisation

SN	Modules/ Units
1	**Introduction to E-commerce**
	• Ecommerce- Meaning, Features of E-commerce, Categories of E-commerce, Advantages &Limitations of E-Commerce, Traditional Commerce &E-Commerce • Ecommerce Environmental Factors: Economic, Technological, Legal , Cultural & Social • Factors Responsible for Growth of E-Commerce, Issues in Implementing E-Commerce, Myths of E-Commerce • Impact of E-Commerce on Business, Ecommerce in India • Trends in E-Commerce in Various Sectors: Retail, Banking, Tourism, Government, Education • Meaning of M-Commerce, Benefits of M-Commerce, Trends in M-Commerce
2	**E-Business & Applications**
	• E-Business: Meaning, Launching an E-Business, Different phases of Launching an E-Business • Important Concepts in E-Business: Data Warehouse, Customer Relationship Management , Supply Chain Management, Enterprise Resource Planning • Bricks and Clicks business models in E-Business: Brick and Mortar, Pure Online, Bricks and Clicks, Advantages of Bricks & Clicks Business Model, Superiority of Bricks and Clicks E-Business Applications: E-Procurement, E-Communication, E-Delivery, E-Auction, E-Trading. • Electronic Data Interchange (EDI) in E-Business: Meaning of EDI, Benefits of EDI, Drawbacks of EDI, Applications of EDI. • Website : Design and Development of Website, Advantages of Website, Principles of Web Design, Life Cycle Approach for Building a Website, Different Ways of Building a Website
3	**Payment, Security, Privacy &Legal Issues in E-Commerce**
	• Issues Relating to Privacy and Security in E-Business • Electronic Payment Systems: Features, Different Payment Systems :Debit Card, Credit Card ,Smart Card, E-cash, E-Cheque, E-wallet, Electronic Fund Transfer. • Payment Gateway: Introduction, Payment Gateway Process, Payment Gateway Types, Advantages and Disadvantages of Payment Gateway. • Types of Transaction Security • E-Commerce Laws: Need for E-Commerce laws, E-Commerce laws in India, Legal Issues in E-commerce in India, IT Act 2000

SN	Modules/ Units
4	**Digital Marketing**
	• Introduction to Digital Marketing, Advantages and Limitations of Digital Marketing. • Various Activities of Digital Marketing: Search Engine Optimization, Search Engine Marketing, Content Marketing & Content Influencer Marketing, Campaign Marketing, Email Marketing, Display Advertising, Blog Marketing, Viral Marketing, Podcasts & Vodcasts. • Digital Marketing on various Social Media platforms. • Online Advertisement, Online Marketing Research, Online PR • Web Analytics • Promoting Web Traffic • Latest developments and Strategies in Digital Marketing.

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group B: Marketing Electives

3. Sales and Distribution Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction	15
2	Market Analysis and Selling	15
3	Distribution Channel Management	15
4	Performance Evaluation, Ethics and Trends	15
	Total	**60**

Objectives

SN	Objectives
1	To develop understanding of the sales & distribution processes in organizations
2	To get familiarized with concepts, approaches and the practical aspects of the key decision making variables in sales management and distribution channel management

SN	Modules/ Units
1	**Introduction**
	a) Sales Management: • Meaning, Role of Sales Department, Evolution of Sales Management • Interface of Sales with Other Management Functions • Qualities of a Sales Manager • Sales Management: Meaning, Developments in Sales Management- Effectiveness to Efficiency, Multidisciplinary Approach, Internal Marketing, Increased Use of Internet, CRM, Professionalism in Selling. • Structure of Sales Organization – Functional, Product Based, Market Based, Territory Based, Combination or Hybrid Structure **b) Distribution Management:** • Meaning, Importance, Role of Distribution, Role of Intermediaries, Evolution of Distribution Channels. **c) Integration of Marketing, Sales and Distribution**
2	**Market Analysis and Selling**
	a) Market Analysis: • Market Analysis and Sales Forecasting, Methods of Sales Forecasting • Types of Sales Quotas – Value Quota, Volume Quota, Activity Quota, Combination Quota • Factors Determining Fixation of Sales Quota • Assigning Territories to Salespeople **b) Selling:** • Process of Selling, Methods of Closing a Sale, Reasons for Unsuccessful Closing • Theories of Selling – Stimulus Response Theory, Product Orientation Theory, Need Satisfaction Theory • Selling Skills – Communication Skill, Listening Skill, Trust Building Skill, Negotiation Skill, Problem Solving Skill, Conflict Management Skill • Selling Strategies – Softsell Vs. Hardsell Strategy, Client Centered Strategy, Product-Price Strategy, Win-Win Strategy, Negotiation Strategy • Difference Between Consumer Selling and Organizational Selling • Difference Between National Selling and International Selling

SN	Modules/ Units
3	**Distribution Channel Management**
	• Management of Distribution Channel – Meaning & Need • Channel Partners- Wholesalers, Distributors and Retailers & their Functions in Distribution Channel, Difference Between a Distributor and a Wholesaler • Choice of Distribution System – Intensive, Selective, Exclusive • Factors Affecting Distribution Strategy – Locational Demand, Product Characteristics, Pricing Policy, Speed or Efficiency, Distribution Cost • Factors Affecting Effective Management Of Distribution Channels ▪ Channel Design ▪ Channel Policy ▪ Channel Conflicts: Meaning, Types – Vertical, Horizontal, Multichannel, Reasons for Channel Conflict ▪ Resolution of Conflicts: Methods – Kenneth Thomas's Five Styles of Conflict Resolution ▪ Motivating Channel Members ▪ Selecting Channel Partners ▪ Evaluating Channels ▪ Channel Control
4	**Performance Evaluation, Ethics and Trends**
	a) Evaluation & Control of Sales Performance: • Sales Performance – Meaning • Methods of Supervision and Control of Sales Force • Sales Performance Evaluation Criteria- Key Result Areas (KRAs) • Sales Performance Review • Sales Management Audit **b) Measuring Distribution Channel Performance:** • Evaluating Channels- Effectiveness, Efficiency and Equity • Control of Channel – Instruments of Control – Contract or Agreement, Budgets and Reports, Distribution Audit **c) Ethics in Sales Management** **d) New Trends in Sales and Distribution Management**

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group B: Marketing Electives

4. Customer Relationship Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Customer Relationship Management	15
2	CRM Marketing Initiatives, Customer Service and Data Management	15
3	CRM Strategy, Planning, Implementation and Evaluation	15
4	CRM New Horizons	15
	Total	**60**

Objectives

SN	Objectives
1	To understand concept of Customer Relationship Management (CRM) and implementation of Customer Relationship Management
2	To provide insight into CRM marketing initiatives, customer service and designing CRM strategy
3	To understand new trends in CRM, challenges and opportunities for organizations

SN	Modules/ Units
1	**Introduction to Customer Relationship Management**
	• Concept, Evolution of Customer Relationships: Customers as strangers, acquaintances, friends and partners • Objectives, Benefits of CRM to Customers and Organisations, Customer Profitability Segments, Components of CRM: Information, Process, Technology and People, Barriers to CRM • Relationship Marketing and CRM: Relationship Development Strategies: Organizational Pervasive Approach, Managing Customer Emotions, Brand Building through Relationship Marketing, Service Level Agreements, Relationship Challenges
2	**CRM Marketing Initiatives, Customer Service and Data Management**
	• CRM Marketing Initiatives: Cross-Selling and Up-Selling, Customer Retention, Behaviour Prediction, Customer Profitability and Value Modeling, Channel Optimization, Personalization and Event-Based Marketing • CRM and Customer Service: Call Center and Customer Care: Call Routing, Contact Center Sales-Support, Web Based Self Service, Customer Satisfaction Measurement, Call-Scripting, Cyber Agents and Workforce Management • CRM and Data Management: Types of Data: Reference Data, Transactional Data, Warehouse Data and Business View Data, Identifying Data Quality Issues, Planning and Getting Information Quality, Using Tools to Manage Data, Types of Data Analysis: Online Analytical Processing (OLAP), Clickstream Analysis, Personalisation and Collaborative Filtering, Data Reporting
3	**CRM Strategy, Planning, Implementation and Evaluation**
	• Understanding Customers: Customer Value, Customer Care, Company Profit Chain: Satisfaction, Loyalty, Retention and Profits • Objectives of CRM Strategy, The CRM Strategy Cycle: Acquisition, Retention and Win Back, Complexities of CRM Strategy • Planning and Implementation of CRM: Business to Business CRM, Sales and CRM, Sales Force Automation, Sales Process/ Activity Management, Sales Territory Management, Contact Management, Lead Management, Configuration Support, Knowledge Management CRM Implementation: Steps- Business Planning, Architecture and Design, Technology Selection, Development, Delivery and Measurement • CRM Evaluation: Basic Measures: Service Quality, Customer Satisfaction and Loyalty, Company 3E Measures: Efficiency, Effectiveness and Employee Change

4	**CRM New Horizons**
	• e-CRM: Concept, Different Levels of E- CRM, Privacy in E-CRM: • Software App for Customer Service: ▪ Activity Management, Agent Management, Case Assignment, Contract Management, Customer Self Service, Email Response Management, Escalation, Inbound Communication Management, Invoicing, Outbound Communication Management, Queuing and Routing, Scheduling • Social Networking and CRM • Mobile-CRM • CRM Trends, Challenges and Opportunities • Ethical Issues in CRM

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group B: Marketing Electives

5. Industrial Marketing

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Industrial Marketing -An Introduction, Marketing Environment and Buying Behaviour	15
2	Industrial Marketing Research and Segmentation, Targeting and Positioning in Industrial Market	15
3	Industrial Marketing Mix	15
4	Emerging Trends in Industrial Marketing	15
Total		**60**

Objectives

SN	Objectives
01	To understand basics of industrial marketing, Marketing Environment, Segmenting Targeting Positioning, channel strategy, marketing communication and pricing
02	To provide knowledge of industrial market structure and how they function
03	To provide understanding of the various attributes and models applicable in Industrial Marketing
04	To acquaint the students with trends in Industrial Marketing

Sr. No.	Modules / Units
1	**Industrial Marketing -An Introduction, Marketing Environment and Buying Behaviour**
	• **Introduction to Industrial Marketing**: Introduction, Definition, Features, Industrial versus Consumer marketing, Classification of Industrial products and Services • **Industrial Marketing Environment**: Technological; Customer; Competitive, Legal and Economic Environment; Responsibility of industrial Marketing Manager in planning, Coordination, Execution and control • **Industrial Buying and Buying Behaviour**: Procurement function; Purchase policy; Organization buying processes, Profile of Business buyers: Buying Centres; Buying Centres Roles; Buying Centre Members, Vender Analysis: Criteria for evaluating potential vendor; Vendor Rating, Models of industrial buying Behaviour
2	**Industrial Marketing Research and Segmentation, Targeting and Positioning in Industrial Market**
	• **Industrial Marketing Research**: Introduction, Classification of Industrial Marketing Research, Industrial Marketing Research Process, Role and Scope of Industrial Marketing Research, Advantages and limitations of Industrial Marketing Research, Role of Industrial Marketing Research in Marketing Information System and Decision Support System. • **Segmentation, Targeting and Positioning in Industrial Market**: Introduction to segmentation; Criteria for market segmentation; Basis of Market segmentation, choosing the market segmentation, Target Market: Concept, Approaches to Target Market, Positioning: Concept, Objectives of positioning, Positioning of Products and services; Effective Positioning; positioning process.
3	**Industrial Marketing Mix**
	• **Industrial Products and New Product Development**: Introduction to Industrial Products; Product Policy; Product Classification; Introduction to new product development; New industrial products; stages in New product development. • **Industrial Pricing**: Introduction to industrial Pricing; Factors influencing industrial pricing decision; Types of pricing; Leasing; Bidding; Negotiation • **Industrial Marketing Communication**: Advertising, Personal selling and Sales promotion: Role of advertising in B2B Market; various media options; Advertising on the internet; Using Advertising Agencies for industrial Marketers; Personal Selling in industrial Marketing; Different steps in Personal Selling; Sales promotion in industrial marketing. • **Marketing Channels and Physical Distribution of Industrial Products**: Industrial marketing channels; Indirect and direct marketing channels; Importance of marketing channels; Factors affecting selection of Marketing Channels; Process of designing the channel structure: Analyzing the channel objectives, constraints, channel tasks, channel alternatives and selecting the channel
4	**Emerging Trends in Industrial Marketing**
	• **Business Networks** : Business Networks in Industrial marketing, Relationship in Business networks , Technology and Business networks • **E-Procurement in Industrial Market**: Meaning , Importance of E-procurement , Implementation of E-procurement • **E-Commerce**: Definition of E-Commerce, Advantages and disadvantages of B2B E-Commerce, Role of E-Commerce in the context B2B marketer, Forms of B2B E-Commerce, Electronic Data Interchange; E-payments; E-security

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group B: Marketing Electives

6. Strategic Marketing Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Strategic Marketing Management	15
2	Segmenting, Targeting, Positioning and Creation of Value in the context of Strategic Marketing	15
3	Strategic Decisions in Product, Services and Branding	15
4	Strategic Decisions in Pricing, Promotion and Distribution and strategic growth management	15
Total		**60**

Objectives

SN	Objectives
01	To understand marketing strategies and their impact on business models
02	To learn strategic marketing tactics related to product, price, service, brand, positioning, incentives and communication for business growth.
03	To learn the various marketing strategies adopted by Companies to create a competitive advantage

Sr. No.	Modules / Units
1	**Introduction to Strategic Marketing Management**
	• **Marketing**: Nature of Marketing, marketing as an art, science and business discipline, marketing as a value creation process • **Strategic decisions**: Nature of strategy, the marketing strategy interface, difference between marketing planning and strategic planning • **Identifying the market**: The five C framework-customer, company, collaborator, competitor, context • **The 7 tactics of Marketing mix**: Product, service, brand, price ,incentives, communication and distribution • **Business Model and Strategic Marketing Planning**: Meaning, Role of Business models in marketing management, Strategies for developing a business models: top-down business model generation, bottom up business model generation, The G-STIC frame work for marketing planning: Goal-Strategy-Tactics-Implementation-control
2	**Segmenting, Targeting, Positioning and Creation of Value in the context of Strategic Marketing:**
	• **Segmentation:** Essence of segmentation, Factors to be considered while segmenting, key segmenting principles- relevance, similarity, exclusivity • **Identifying Target Customers**: Factors to be considered while targeting, targeting strategies-One for all strategy, one for each strategy, Strategic Targeting criteria: target attractiveness, target compatibility Essential strategic assets for target compatibility: business infrastructure, collaborator networks, human capital, intellectual property, strong brands, established customer base, synergistic offerings, access to scarce resources and capital. • **Creating Customer Value through Positioning:** Role of strategic positioning, strategic positioning options: The quality option, value option, the pioneer, a narrow product focus, target segment focus; strategies for creating superior customer value. **Creating Company Value:** Understanding Company Value: Monetary, functional and psychological value; strategically managing profits--increasing sales revenue-through volume, optimizing price, lowering costs **Creating Collaborator Value**: Meaning of collaborators, collaboration as business process, advantages and drawbacks of collaboration, levels of strategic collaboration: explicit, implicit; alternatives to collaboration: horizontal and vertical integration, managing collaborator relations; gaining collaborator power: offering differentiation; collaborator size, strategic importance, switching costs

3	**Strategic Decisions in Product, Services and Branding**
	• **Managing Product and Services**: factors affecting product and service decisions- performance, consistency, reliability, durability, compatibility, ease of use, technological design, degree of customization, physical aspects, style, packaging. **Managing New Products**: Forecasting new product demand using Primary Data and secondary data: offering specific forecasting, forecasting by analogy, category based forecasting. **New product adoption:** Understanding new product adoption, factors influencing diffusion of new offering, new product development process, managing risk in new products- market risk and technological risk, Moore's Model of adoption of new technologies, managing product life cycle at various stages, extending Product lifecycle. • **Managing Product Lines**: Managing vertical, upscale, downscale, horizontal product-Line Extensions, Managing Product Line Cannibalization, Managing Product lines to gain and defend market position-The Fighting Brand Strategy, The sandwich strategy, The Good-better-best strategy • **Brand Tactics**: Brand: Meaning, brand identity, brand as value creation process brand hierarchy-Individual and umbrella branding, brand extension: vertical and horizontal, brand equity and brand power, measuring brand equity-cost based approach, market based approach and financial based approach.
4	**Strategic Decisions in Pricing, Promotion and Distribution and strategic growth management**
	A) Managing Price: Major approaches to strategic pricing-cost based pricing, competitive pricing, demand pricing; Price sensitivity: meaning, psychological pricing, Five psychological pricing effects: reference price effects, price quantity effects, price tier effects, price ending effects, product line effects; Understanding competitive pricing and price wars: factors affecting price wars, Approach for developing a strategic response to competitors price cut, Other pricing strategies-captive pricing, cross price elasticity, deceptive pricing, everyday low pricing, experience curve pricing, loss leader pricing, horizontal price fixing, price signalling. **B) Managing Promotions and incentives**: Promotion mix strategy, Factors affecting strategic decisions in promotion mix, Promotion expenditure strategy, Methods to determine promotion expenditure-Breakdown Method, Buildup Method, Push and Pull promotions. Managing incentives as a value creation process, Goals of using customer incentives, Monetary incentives for customers, Non monetary incentives for customers. Collaborator incentives meaning, monetary incentives-slotting allowance, stocking allowance, cooperative advertising allowance, market development allowance, display allowance, spiffs **C) Managing distribution**: Distribution as value creation process, distribution channel design process- Channel structure: Direct, indirect and hybrid channel; channel coordination- common ownership, contractual relationship, implicit channel coordination; channel type, channel coverage, channel exclusivity **D) Strategic Growth Management**: Gaining market position: strategies to gain market position: steal share strategy, market growth strategy, market innovation strategy; Pioneering new markets: Meaning, Types of Pioneers: technology, product, business model, markets; benefits and drawbacks of being a Pioneer. **Defending market position**: Strategies to defend market position- ignoring competitors' action, repositioning the existing offer- repositioning to increase value for current customers, repositioning to attract new customers.

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Elective Courses (EC)

Group C: Human Resource Electives

1. Finance for HR Professionals and Compensation Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Compensation Plans and HR Professionals	15
2	Incentives and Wages	15
3	Compensation to Special Groups and Recent Trends	15
4	Legal and Ethical issues in Compensation	15
	Total	**60**

Objectives

SN	Objectives
1	To orient HR professionals with financial concepts to enable them to make prudent HR decisions
2	To understand the various compensation plans
3	To study the issues related to compensation management and understand the legal framework of compensation management

SN	Modules/ Units
1	**Compensation Plans and HR Professionals**
	• Meaning, Objectives of Compensation Plans, Role of HR Professionals in Compensation Plans, Types of Compensation: Financial and non-financial, Factors Influencing Compensation • Compensation Tools: Job based and Skill based, Models: Distributive Justice Model and Labour Market Model, Dimensions of Compensation • 3 Ps Compensation Concept, Benefits of Compensation: Personal, Health and Safety, Welfare, Social Security • Pay Structure: Meaning, Features, Factors, Designing the Compensation System, Compensation Scenario in India.
2	**Incentives and Wages**
	• Incentive Plans – Meaning and Types: Piecework, Team, Incentives for Managers and Executives, Salespeople, Merit pay, Scanlon Pay, Profit Sharing Plan, ESOP, Gain Sharing, Earning at Risk plan, Technology and Incentives. Prerequisites of an Effective Incentive System • Wage Differentials: Concepts, Factors contributing to Wage Differentials, Types of Wage Differentials, Importance of Wage Differentials, Elements of a Good Wage Plan. • Theories of Wages: Subsistence Theory, Wage Fund Theory, Marginal Productivity Theory, Residual Claimant Theory, Bargaining Theory.
3	**Compensation to Special Groups and Recent Trends**
	• Compensation for Special Groups: Team Based pay, Remunerating Professionals, Contract Employees, Corporate Directors, CEOs, Expatriates and Executives. • Human Resource Accounting – Meaning, Features, Objectives and Methods • Recent Trends: Golden Parachutes, e-Compensation, Salary Progression Curve, Competency and Skill based, Broad banding and New Pay, Cafeteria approach – Features, Advantages and Disadvantages.
4	**Legal and Ethical issues in Compensation**
	• Legal Framework of Compensation in India: Wage Policy in India, Payment of Bonus Act 1965, Equal Remuneration Act 1976, Payment of Wages Act 1936, Payment of Gratuity Act 1972, Employee Compensation Act 1923, Employees Provident Funds and Miscellaneous Provision Act 1952. • Pay Commissions, Wage Boards, Adjudication, Legal considerations, COBRA requirement, Pay Restructuring in Mergers and Acquisitions, Current Issues and Challenges in Compensation Management, Ethics in Compensation Management.

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Elective Courses (EC)

Group C: Human Resource Electives

2. Strategic Human Resource Management and HR Policies

Modules at a Glance

SN	Modules	No. of Lectures
1	SHRM - An Overview	15
2	HR Strategies	15
3	HR Policies	15
4	Recent Trends in SHRM	15
	Total	**60**

Objectives

SN	Objectives
1	To understand human resource management from a strategic perspective
2	To link the HRM functions to corporate strategies in order to understand HR as a strategic resource
3	To understand the relationship between strategic human resource management and organizational performance
4	To apply the theories and concepts relevant to strategic human resource management in contemporary organizations
5	To understand the purpose and process of developing Human Resource Policies

SN	Modules/ Units
1	**SHRM - An Overview**
	• Strategic Human Resource Management (SHRM) – Meaning, Features, Evolution, Objectives, Advantages, Barriers to SHRM, SHRM v/s Traditional HRM, Steps in SHRM, Roles in SHRM - Top Management, Front-line Management, HR, Changing Role of HR Professionals, Models of SHRM – High Performance Working Model, High Commitment Management Model, High Involvement Management Model • HR Environment –Environmental trends and HR Challenges • Linking SHRM and Business Performance
2	**HR Strategies**
	• Developing HR Strategies to Support Organisational Strategies, Resourcing Strategy – Meaning and Objectives, Strategic HR Planning – Meaning, Advantages, Interaction between Strategic Planning and HRP, Managing HR Surplus and Shortages, Strategic Recruitment and Selection – Meaning and Need, Strategic Human Resource Development – Meaning, Advantages and Process, Strategic Compensation as a Competitive Advantage, Rewards Strategies – Meaning, Importance, Employee Relations Strategy, Retention Strategies, Strategies for Enhancing Employee Work Performance
3	**HR Policies**
	• Human Resource Policies – Meaning, Features, Purpose of HR Policies, Process of Developing HR Policies, Factors affecting HR Policies, Areas of HR Policies in Organisation, Requisites of a Sound HR Policies – Recruitment, Selection, Training and Development, Performance Appraisal, Compensation, Promotion, Outsourcing, Retrenchment, Barriers to Effective Implementation of HR Policies and Ways to Overcome These Barriers, Need for Reviewing and Updating HR Policies, Importance of Strategic HR Policies to Maintain Workplace Harmony
4	**Recent Trends in SHRM**
	• i.e. Mentoring • Employee Engagement – Meaning, Factors Influencing Employee Engagement, Strategies for Enhancing Employee Engagement • Contemporary Approaches to HR Evaluation – Balance Score Card, HR Score Card, Benchmarking and Business Excellence Model • Competency based HRM – Meaning, Types of Competencies, Benefits of Competencies for Effective Execution of HRM Functions. • Human Capital Management –Meaning and Role • New Approaches to Recruitment – Employer Branding, Special Event Recruiting, Contest Recruitment, e - Recruitment • Strategic International Human Resource Management – Meaning and Features, International SHRM Strategic Issues, Approaches to Strategic International HRM.

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Elective Courses (EC)

Group C: Human Resource Electives

3. Performance Management and Career Planning

Modules at a Glance

SN	Modules	No. of Lectures
1	Performance Management – An Overview	15
2	Performance Management Process	15
3	Ethics, Under Performance and Key Issues in Performance Management	15
4	Career Planning and Development	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concept of performance management in organizations
2	To review performance appraisal systems
3	To understand the significance of career planning and practices

SN	Modules/ Units
1	**Performance Management – An Overview**
	• Performance Management– Meaning, Features, Components of Performance Management, Evolution, Objectives, Need and Importance, Scope, Performance Management Process, Pre-Requisites of Performance Management, Linkage of Performance Management with other HR functions, Performance Management and Performance Appraisal, Performance Management Cycle • Best Practices in Performance Management, Future of Performance Management. • Role of Technology in Performance Management
2	**Performance Management Process**
	• Performance Planning – Meaning, Objectives, Steps for Setting Performance Criteria, Performance Benchmarking • Performance Managing – Meaning, Objectives, Process • Performance Appraisal – Meaning, Approaches of Performance Appraisal – Trait Approach, Behaviour Approach, Result Approach • Performance Monitoring–Meaning, Objectives and Process • Performance Management Implementation – Strategies for Effective Implementation of Performance Management • Linking Performance Management to Compensation • Concept of High Performance Teams
3	**Ethics, Under Performance and Key Issues in Performance Management**
	• Ethical Performance Management - Meaning, Principles, Significance of Ethics in Performance Management, Ethical Issues in Performance Management, Code of Ethics in Performance Management, Building Ethical Performance Culture, Future Implications of Ethics in Performance Management • Under Performers and Approaches to Manage Under Performers, Retraining • Key Issues and Challenges in Performance Management • Potential Appraisal: Steps, Advantages and Limitations. • Pay Criteria -Performance related pay, Competence related pay, Team based pay, Contribution related pay.
4	**Career Planning and Development**
	• Career Planning - Meaning, Objectives, Benefits and Limitations, Steps in Career Planning, Factors affecting Individual Career Planning, Role of Mentor in Career Planning, Requisites of Effective Career Planning • Career Development – Meaning, Role of employer and employee in Career Development, Career Development Initiatives • Role of Technology in Career Planning and Development • Career Models – Pyramidal Model, Obsolescence Model, Japanese Career Model • New Organizational Structures and Changing Career Patterns

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Elective Courses (EC)

Group C: Human Resource Electives

4. Industrial Relations

Modules at a Glance

SN	Modules	No. of Lectures
1	Industrial Relations- An overview	15
2	Industrial Disputes	15
3	Trade Unions and Collective Bargaining	15
4	Industrial Relations Related Laws in India	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concept of performance management in organizations
2	To review performance appraisal systems
3	To understand the significance of career planning and practices

SN	Modules/ Units
1	**Industrial Relations- An overview**
	• Meaning, Objectives, Characteristics of a good Industrial Relations System/Principles of a good IR/Essentials of good IR, Scope, Significance/Need and Importance of IR, Major Stakeholders of IR, Evolution of IR in India, Factors affecting IR, Role of State, Employers and Unions in IR, Changing Dimensions of IR in India, Impact of Liberalisation, Privatisation and Globalisation on Industrial Relations, Issues and Challenges of industrial relations in India
2	**Industrial Disputes**
	a) Industrial Disputes: • Meaning of Industrial Dispute, Causes, Forms/Types, Consequences/Effects, Methods of Settling Industrial Disputes (Arbitration, Joint Consultations, Works Committee, Conciliation, Adjudication etc) • Concepts Related to Industrial Disputes (Relevant Examples): Strike, Layoff, Lockout, Retrenchment **b) Employee Discipline:** • Meaning, Determinants, Causes of Indiscipline, Code of Discipline and its Enforcement. **c) Grievance Handling:** • Meaning of Grievances, Causes of Grievances, Guidelines for Grievance Handling, Grievance Redressal Procedure in India. **d) Workers' Participation in Management:** • Meaning and Types with Respect to India
3	**Trade Unions and Collective Bargaining**
	a) Trade Unions: • Meaning, Features, Objectives, Role of Trade Unions, Functions/Activities, Types, Evolution of Trade Unions across Globe, Evolution of Trade Unions in India, Structure of Trade Unions in India, Recognition of Trade Unions, Rights and Privileges of Registered Trade Unions, Impact of Globalisation on Trade Unions in India, Central Organisations of Indian Trade Unions : INTUC, AITUC, HMS,UTUC, Problems of Trade Unions in India. **b) Collective Bargaining:** • Meaning, Features, Importance, Scope, Collective Bargaining Process, Prerequisites of Collective Bargaining, Types of Collective Bargaining Contracts, Levels of Collective Bargaining, Growth of Collective Bargaining in India, Obstacles to Collective Bargaining in India.

SN	Modules/ Units
4	**Industrial Relations Related Laws in India**
	• Role of Judiciary in Industrial Relations: Labour Court, Industrial Tribunal, National Tribunal • The Trade Unions Act, 1926; • The Industrial Employment (Standing Orders) Act, 1946; • The Industrial Disputes Act, 1947; • The Factories' Act, 1948 • The Minimum Wages Act, 1948

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Elective Courses (EC)

Group C:Human Resource Electives

5. Talent & Competency Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Talent Management	15
2	Talent Management System	15
3	Contemporary Issues and Current Trends in Talent Management	15
4	Competency Management and Competency Mapping	15
Total		**60**

Objectives

SN	Objectives
01	To understand key talent management & competency management concepts
02	To understand the concept and importance of competency mapping
03	To understand the role of talent management and competency management in building sustainable competitive advantage to an organization
04	To know the ethical and legal obligations associated with talent management

Sr. No.	Modules / Units
1	**Introduction to Talent Management**
	• Talent Management – Meaning, History, Scope of Talent Management, Need of Talent Management • Benefits and Limitations of Talent Management • Principles of Talent Management • Source of Talent Management • Talent Gap – Meaning, Strategies to Fill Gaps • The Talent Value Chain • Role of HR in Talent Management • Role of Talent Management in building Sustainable Competitive Advantage to an Organization
2	**Talent Management System**
	• Talent Management System – Meaning, Key Elements of Talent Management System • Critical Success Factors to Create Talent Management System • Building Blocks for Talent Management - Introduction, Effective Talent Management System, Building Blocks of Effective Talent Management System • Life Cycle of Talent Management - Meaning, Steps in Talent Management Process, Importance of Talent Management Process, Essentials of Talent Management Process • Approaches to Talent Management • Talent Management Strategy – Meaning, Developing a Talent Management Strategy, Mapping Business Strategies and Talent Management Strategies • Talent Management and Succession Planning
3	**Contemporary Issues and Current Trends in Talent Management**
	• Role of Information Technology in Effective Talent Management Systems, Talent Management Information System, Creating Business Value through Information Technology, Five Steps to a Talent Management Information Strategy • Contemporary Talent Management Issues, Talent Management Challenges • Current Trends in Talent Management • Best Practices of Talent Management • Ethical and Legal Obligations Associated with Talent Management • Talent Management in India
4	**Competency Management and Competency Mapping**
	• Concept of Competency and Competence, Competence v/s Competency • Types of Competencies, Benefits and Limitations of implementing competencies • Iceberg Model of Competency • Competency Management – Meaning, Features and Objectives • Benefits and Challenges of Competency Management • Competency Development – Meaning, Process • Competency Mapping - Meaning, Features, Need and importance of competency mapping • Methods of Competency Mapping, Steps in Competency Mapping

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Elective Courses (EC)

Group C:Human Resource Electives

6. Stress Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Understanding Stress	15
2	Managing Stress – I	15
3	Managing Stress – II	15
4	Stress Management Leading to Success	15
Total		**60**

Objectives

SN	Objectives
01	To understand the nature and causes of stress in organizations
02	To familiarize the learners with the stress prevention mechanism
03	To understand the strategies that help cope with stress
04	To be able to apply stress management principles in order to achieve high levels of performance
05	To enable to learners to adopt effective strategies, plans and techniques to deal with stress

Sr. No.	Modules / Units
1	**Understanding Stress**
	• Stress – concept, features, types of stress • Relation between Stressors and Stress • Potential Sources of Stress – Environmental, Organizational and Individual • Consequences of Stress – Physiological, Psychological and Behavioural Symptoms • Stress at work place – Meaning, Reasons • Impact of Stress on Performance • Work Stress Model • Burnout – Concept • Stress v/s Burnout
2	**Managing Stress – I**
	• Pre-requisites of Stress-free Life • Anxiety - Meaning, Mechanisms to cope up with anxiety • Relaxation - Concept and Techniques • Time Management - Meaning, Importance of Time Management • Approaches to Time Management • Stress Management - Concept, Benefits • Managing Stress at Individual level • Role of Organization in Managing Stress/ Stress Management Techniques • Approaches to Manage Stress - Action oriented, Emotion oriented, Acceptance oriented.
3	**Managing Stress – II**
	• Models of Stress Management - Transactional Model, Health Realization/ Innate Health Model • General Adaption Syndrome (GAS) - Concept, Stages • Measurement of Stress Reaction - The Physiological Response, The Cognitive Response, The Behavioural Response. • Stress prevention mechanism - Stress management through mind control and purification theory and practice of yoga education. • Stress management interventions: primary, secondary, tertiary. • Meditation – Meaning, Importance • Role of Pranayama, Mantras, Nutrition, Music, Non-violence in stress control
4	**Stress Management Leading to Success**
	• Eustress – Concept, Factors affecting Eustress • Stress Management Therapy - Concept, Benefits • Stress Counselling - Concept • Value education for stress management • Stress and New Technology • Stress Audit Process • Assessment of Stress - Tools and Methods • Future of Stress Management

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Core Course (CC)

5. Logistics and Supply Chain Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Overview of Logistics and Supply Chain Management	15
2	Elements of Logistics Mix	15
3	Inventory Management, Logistics Costing, Performance Management and Logistical Network Analysis	15
4	Recent Trends in Logistics and Supply Chain Management	15
	Total	**60**

Objectives

SN	Objectives
1	To provide students with basic understanding of concepts of logistics and supply chain management
2	To introduce students to the key activities performed by the logistics function
3	To provide an insight in to the nature of supply chain, its functions and supply chain systems
4	To understand global trends in logistics and supply chain management

SN	Modules/ Units
1	**Overview of Logistics and Supply Chain Management**
	a) Introduction to Logistics Management • Meaning, Basic Concepts of Logistics- Logistical Performance Cycle, Inbound Logistics, Inprocess Logistics, Outbound Logistics, Logistical Competency, Integrated Logistics , Reverse Logistics and Green Logistics • Objectives of Logistics, Importance of Logistics, Scope of Logistics, Logistical Functions/Logistic Mix, Changing Logistics Environment **b) Introduction to Supply Chain Management** • Meaning, Objectives, Functions, Participants of Supply Chain, Role of Logistics in Supply Chain, Comparison between Logistics and Supply Chain Management, Channel Management and Channel Integration **c) Customer Service: Key Element of Logistics** • Meaning of Customer Service, Objectives, Elements, Levels of customer service, Rights of Customers **d) Demand Forecasting** • Meaning, Objectives ,Approaches to Forecasting, Forecasting Methods, Forecasting Techniques, (Numerical on Simple Moving Average, Weighted Moving Average)
2	**Elements of Logistics Mix**
	a) Transportation • Introduction, Principles and Participants in Transportation, Transport Functionality, Factors Influencing Transportation Decisions, Modes of Transportation- Railways, Roadways, Airways, Waterways, Ropeways, Pipeline, Transportation Infrastructure, Intermodal Transportation **b) Warehousing** • Introduction, Warehouse Functionality, Benefits of Warehousing, Warehouse Operating Principles, Types of Warehouses, Warehousing Strategies, Factors affecting Warehousing **c) Materials Handling** • Meaning, Objectives, Principles of Materials Handling, Systems of Materials Handling, Equipments used for Materials Handling, Factors affecting Materials Handling Equipments **d) Packaging** • Introduction, Objectives of Packaging, Functions/Benefits of Packaging, Design Considerations in Packaging, Types of Packaging Material, Packaging Costs

SN	Modules/ Units
3	**Inventory Management, Logistics Costing, Performance Management and Logistical Network Analysis**
	a) Inventory Management • Meaning, Objectives, Functions, Importance, Techniques of Inventory Management (Numericals - EOQ and Reorder levels) **b) Logistics Costing** • Meaning, Total Cost Approach, Activity Based Costing, Mission Based Costing **c) Performance Measurement in Supply Chain** • Meaning, Objectives of Performance Measurement, Types of Performance Measurement, Dimensions of Performance Measurement, Characteristics of Ideal Measurement System **d) Logistical Network Analysis** • Meaning, Objectives, Importance, Scope, RORO/LASH
4	**Recent Trends in Logistics and Supply Chain Management**
	a) Information Technology in Logistics • Introduction, Objectives, Role of Information Technology in Logistics and Supply Chain Management, Logistical Information System, Principles of Logistical Information System, Types of Logistical Information System, Logistical Information Functionality, Information Technology Infrastructure **b) Modern Logistics Infrastructure** • Golden Quadrilateral, Logistics Parks, Deep Water Ports, Dedicated Freight Corridor, Inland Container Depots/Container Freight Stations, Maritime Logistics, Double Stack Containers/Unit Trains **c) Logistics Outsourcing** • Meaning, Objectives, Benefits/Advantages of Outsourcing, Third Party Logistics Provider, Fourth Party Logistics Provider, Drawbacks of Outsourcing, Selection of Logistics Service Provider, Outsourcing-Value Proposition **d) Logistics in the Global Environment** • Managing the Global Supply Chain, Impact of Globalization on Logistics and Supply Chain Management, Global Logistics Trends, Global Issues and Challenges in Logistics and Supply Chain Management

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Ability Enhancement Courses (AEC)

6. Corporate Communication & Public Relations

Modules at a Glance

SN	Modules	No. of Lectures
1	Foundation of Corporate Communication	15
2	Understanding Public Relations	15
3	Functions of Corporate Communication and Public Relations	15
4	Emerging Technology in Corporate Communication and Public Relations	15
	Total	**60**

Objectives

SN	Objectives
1	To provide the students with basic understanding of the concepts of corporate communication and public relations
2	To introduce the various elements of corporate communication and consider their roles in managing organizations
3	To examine how various elements of corporate communication must be coordinated to communicate effectively
4	To develop critical understanding of the different practices associated with corporate communication

SN	Modules/ Units
1	**Foundation of Corporate Communication**
	a) Corporate Communication: Scope and Relevance • Introduction, Meaning, Scope, Corporate Communication in India, Need/ Relevance of Corporate Communication in Contemporary Scenario **b) Keys concept in Corporate Communication** • Corporate Identity: Meaning and Features, Corporate Image: Meaning, Factors Influencing Corporate Image, Corporate Reputation: Meaning, Advantages of Good Corporate Reputation **c) Ethics and Law in Corporate Communication** • Importance of Ethics in Corporate Communication, Corporate Communication and Professional Code of Ethics, Mass Media Laws: Defamation, Invasion of Privacy, Copyright Act, Digital Piracy, RTI
2	**Understanding Public Relations**
	a) Fundamental of Public Relations: • Introduction, Meaning, Essentials of Public Relations, Objectives of Public Relations, Scope of Public Relations, Significance of Public Relations in Business **b) Emergence of Public Relations:** • Tracing Growth of Public Relations, Public Relations in India, Reasons for Emerging International Public Relations **c) Public Relations Environment:** • Introduction, Social and Cultural Issues, Economic Issues, Political Issues, Legal Issues **d) Theories used in Public Relations:** • Systems Theory, Situational Theory, Social Exchange Theory, Diffusion Theory
3	**Functions of Corporate Communication and Public Relations**
	a) Media Relations: • Introduction, Importance of Media Relations, Sources of Media Information, Building Effective Media Relations, Principles of Good Media Relations **b) Employee Communication:** • Introduction, Sources of Employee Communications, Organizing Employee Communications, Benefits of Good Employee Communications, Steps in Implementing An Effective Employee Communications Programme, Role of Management in Employee Communications **c) Crisis Communication:** • Introduction, Impact of Crisis, Role of Communication in Crisis, Guidelines for Handling Crisis, Trust Building **d) Financial Communication:** • Introduction, Tracing the Growth of Financial Communication in India, Audiences for Financial Communication, Financial Advertising

SN	Modules/ Units
4	**Emerging Technology in Corporate Communication and Public Relations**
	a) Contribution of Technology to Corporate Communication • Introduction, Today's Communication Technology, Importance of Technology to Corporate Communication, Functions of Communication Technology in Corporate Communication, Types of Communication Technology, New Media: Web Conferencing, Really Simple Syndication (RSS) **b) Information Technology in Corporate Communication** • Introduction, E-media Relations, E-internal Communication, E-brand Identity and Company Reputation **c) Corporate Blogging** • Introduction, Defining Corporate Blogging, Characteristics of a Blog, Types of Corporate Blogs, Role of Corporate Blogs, Making a Business Blog

Revised Syllabus of Courses of Bachelor of Management Studies (BMS)Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Investment Analysis & Portfolio Management
• *Kevin. S, Security Analysis and Portfolio Management* • *Donald Fischer & Ronald Jordon, Security Analysis & Portfolio Management* • *Prasanna Chandra, Security Analysis & Portfolio Management* • *Sudhindhra Bhatt, Security Analysis and Portfolio Management.*
Commodity & Derivatives Market
• *John C. Hull & Basu -Futures, options & other derivatives* • *Robert McDonald, Derivatives market, Pearson education* • *John Hull, Fundamentals of futures & options* • *Ankit Gala & Jitendra Gala, Guide to Indian Commodity market, Buzzingstock publishing house* • *K.Sasidharan & Alex K. Mathews, Option trading – bull market strategies, McGraw Hill publication* • *Niti Chatnani, Commodity markets, McGraw Hill Publication* • *S.Kevin, Commodities & financial derivatives, PHI learning Pvt ltd* • *Suni K Parmeswaran, Futures & options, McGraw Hill*
Wealth Management
• *Harold Evensky, Wealth Management, McGraw Hill Publication* • *NCFM, CFP, IIBF, etc, Wealth Management modules* • *Harold Evensky, The new wealth Management, CFA Institute Investment Series Publication*
Financial Accounting
• *Ashish K. Bhattacharyya – "Financial Accounting for Business Managers", Prentice Hall of India Pvt. Ltd.* • *Shashi K. Gupta – "Contemporary Issues in Accounting", Kalyani Publishers.* • *R. Narayanaswamy – "Financial Accounting", Prentice Hall of India, New Delhi* • *Ashok Sehgal – "Fundamentals of Financial Accounting", Taxmann's Publishers* • *Financial Accounting Reporting – Barry Elliot and Jamie Elliot – Prentice Hall (14th Edition)*
Risk Management
• *Thomas S. Coleman, Quantitative Risk Management : A Practical Guide to Financial Risk* • *Steve Peterson, Investment Theory and Risk Management* • *Risk Management , M/s Macmillan India Limited* • *Theory & Practice of Treasury Risk Management: M/s Taxman Publications Ltd.* • *Sim Segal, Corporate Value of ERM* • *Dr. G Kotreshwar, Risk Management : Insurance and Derivatives, Himalaya Publishing House*
Direct Taxes
• *Income Tax Act- Bare act* • *Dr V K Singhania-Direct Tax Law & Practice*

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Services Marketing
• *Valarie A. Zeuhaml &Mary Jo Bitner, Service Marketing, Tata McgrawHill, 6th Edition* • *Christoper Lovelock, JochenWirtz, Jayanta Chatterjee, Service Marketing People, Technology, Strategy – A South Asian Perspective , Pearson Education, 7th Edition* • *Ramneek Kapoor, Justin Paul &Biplab Halder, Services Marketing-Concepts And Practices, McgrawHill, 2011* • *Harsh V.Verma, Services Marketing Text &Cases, Pearson Education, 2nd Edition* • *K. Ram Mohan Rao, Services Marketing, Pearson Education, 2nd Edition, 2011* • *C. Bhattacharjee, Service Sector Management, Jaico Publishing House, Mumbai, 2008* • *Govind Apte, Services Marketing, Oxford Press, 2004*
E-Commerce & Digital Marketing
• *D Nidhi ,E-Commerce Concepts and Applications, ,Edn 2011, International Book house P.ltd* • *Bajaj Kamlesh K,E-Commerce- The cutting edge of Business* • *Whiteley David, E-Commerce Technologies and Apllications-2013* • *E-Business & E-Commerce Management 3rd Ed, Pearson Education* • *Kalokota & Robinson,E-Business 2.0 Road map for Success, Pearson Education* • *Elias M. Awad ,Electronic Commerce, 3rd Edition, Pearson Education* • *Erfan Turban et.al ,Electronic Commerce - A Managerial Perspective, Pearson Education* • *R. Kalokota, Andrew V. Winston, Electronic Commerce - A Manger's Guide, Pearson Education* • *Tripathi, E-Commerce, Jaico Publishing House, Mumbai, Edn. 2010.*
Sales & Distribution Management
• *A. Nag, Sales And Distribution Management, Mcgraw Hill, 2013 Edition* • *Richard R. Still, Edward W. Cundiff, Norman A.P. Govoni, Sales Management, Pearson Education, 5th Edition* • *Krishna K. Havaldar, Vasant M. Cavale, Sales And Distribution Management – Text & Cases, Mcgraw Hill Education, 2nd Edition, 2011* • *Dr.Matin Khan, Sakes And Distribution Management, Excel Books, 1st Edition* • *Kotler & Armstrong, Principles Of Marketing – South Asian Perspective, Pearson Education, 13th Edition*
Customer Relationship Management
• *Baran Roger J. & Robert J. Galka (2014), Customer Relationship Management: The Foundation of Contemporary Marketing Strategy, Routledge Taylor & Francis Group.* • *Anderrson Kristin and Carol Kerr (2002), Customer Relationship Management, Tata McGraw-Hill.* • *Ed Peelen, Customer Relationship Management, Pearson Education* • *Bhasin Jaspreet Kaur (2012), Customer Relationship Management, Dreamtech Press.* • *Judith W. Kincaid (2006), Customer Relationship Management Getting it Right, Pearson Education.* • *Jill Dyche' (2007), The CTM Handbook: A Business Guide to Customer Relationship Management, Pearson Education.* • *Valarie A Zeithmal, Mary Jo Bitner, Dwayne D Gremler and Ajay Pandit (2010), Services Marketing Integrating Customer Focus Across the Firm, Tata McGraw Hill.* • *Urvashi Makkar and Harinder Kumar Makkar (2013), CRM Customer Relationship Management, McGraw Hill Education.*

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Industrial Marketing
• *Industrial Marketing: A practices in India by S.L. Gupta, Sanjeev Bahadur, and Hitesh Gupta: Excel Books (First Edition)* • *Industrial Marketing by Hory, Sankar and Mukerjee by Excel Books (First Edition)* • *Industrial Marketing: A Process of Creating and Maintaining Exchange by Krishnamacharyulu , Lalitha R, Publisher: Jaico Book House* • *Industrial Marketing by Ghosh, Publisher: Oxford University Press* • *Industrial Marketing by K. K. Havaldar, Publisher: Tata McGraw-Hill Publishing Company limited* • *Industrial Marketing Management by Govindarajan, Publisher: Vikas Publishing House Pvt. Ltd.* • *Industrial Marketing by Phadtare M. T, Publisher: Prentice Hall of India Private Limited*
Strategic Marketing Management
• *Alexander Chernav, Strategic management, Eight Edition ,June 2014,Cerebellum press* • *Richardn m.s Wilson, Collin Gilligan, Strategic marketing management,3rd edition, Elsevier* • *Subhash .C.Jain, Marketing Strategy, India edition, cengage learning* • *Sharan Jagpal, Marketng strategy, oxford university press* • *David A. Aker, Startegic Market Management, John Wiley & Sons, 2001* • *Philip Kotler, Kevin Keller, Abraham Koshy, Mithileshwar Jha, Marketing Management, Pearson, 13th edition*
Finance for HR Professionals & Compensation Management
• *Gary Dessler, Biju Varkkey, Human Resource Management, Pearson, 12th edition* • *Mick Marchington and Adrian Wilkinson, Human Resource Management at Work – People Management and Development- IIIrd Edition,* • *Shashi K. Gupta, Rosy Joshi, Human Resource Management, Kalyani Publishers* • *Gary Dessler, Framework for HRM, 3rd Edition, Pearson Education* • *Ashwathappa, Human Resource Management* • *Luis.R.Gomez, David.B.Balkin, Robert. L. Cardy, Managing Human Resources – IVth Edition, (Eastern Economy Edition)* • *Milkovich, George T, Newman J.M, Compensation, Tata Mc Graw Hill.* • *Henderson, R.O, Compensation Management, Pearson Edition .* • *BD Singh, Compensation and Reward Management, Excel Books.* • *Karen Permant, Joe Knight, Financial Intelligence for HR Professionals* • *Sharma A.M, Understanding Wage system, Himalaya Publishing House, Mumbai.*
Strategic Human Resource Management & HR Policies
• *Michael Armstrong, Angela Baron, Handbook of Strategic HRM, Jaico publishing House* • *Armstrong M.-Strategic Human Resource Management_ A Guide to Action (2006)* • *Strategic Human Resource Management, Tanuja Agarwal* • *Strategic Human Resource Management, Jeffrey A. Mello* • *Gary Dessler, Human Resource Management, PHI, New Delhi, 2003* • *Charles R. Greer, Strategic Human Resource Management, Pearson Education, 2003* • *Rajib Lochan Dhar, Strategic Human Resource Management, Excel Books, NewDelhi, 2008*

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Performance Management & Career Planning
• *Shashi K. Gupta, Rosy Joshi, Human Resource Management, Kalyani Publishers* • *Armstrong, Michael, Baron, Performance Management, Jaico Publishers* • *Robert Bacal, Performance Management, McGraw-Hill Education, 2007* • *T.V. Rao, Performance Management and Appraisal Systems: HR Tools for Global Competitiveness, Response Books, New Delhi, 2007.* • *Davinder Sharma, Performance Appraisal and Management, Himalaya Publishing House.* • *A.S. Kohli, T.Deb, Performance Management, Oxford University Press.* • *Herman Agnuinis, Performance Management, Second edition, Pearson Education.*
Industrial Relations
• *Davar R S: Personnel Management and Industrial Relations in India* • *Mamoria C B: Industrial Relations* • *Charles Myeres: Industrial Relations in India* • *Arun Monappa: Industrial Relations* • *Sharma A M : Industrial Relations* • *Ahuja K K : Industrial Relations Theory and Practice* • *C.S. Vekata Ratnam : Globalisation and Labour-Management Relations* • *Srivastava K D: Laws relating to Trade Unions and Unfair Labour Practice* • *A.M.Sarma: A conceptual and legal frame work* • *Farnham, David and John Pimlot, Understanding Industrial Relations, London: Cassell* • *Ratna Sen, Industrial Relations in India, Shifting Paradigms, Macmillan India Ltd., New Delhi, 2009.* • *C.S.Venkata Ratnam, Globalisation and Labour Management Relations, Response Books, 2010.* • *Srivastava, Industrial Relations and Labour Laws, Vikas, 6 th edition, 2012.* • *P.R.N Sinha, Indu Bala Sinha, Seema Priyardarshini Shekhar. Industrial Relations, Trade Unions and Labour Legislation.* • *Srivastava, S. C. :Industrial Relations and Labour Laws, Vikas Publishing House Pvt Ltd, New Delhi.* • *Sinha, P.R.N., Sinha, Indu Bala and Shekhar, Seema Priyadarshini Industrial Relations, Trade Unions and Labour Legislation, Pearson Education, New Delhi.*
Talent & Competency Management
• *Dessler Gary, A Framework for Human Resource Management, Pearson Publication, 7th Edition.* • *Dessler Gary, Varkkey Biju, Fundamentals of Human Resource Management, Pearson Publication,14th Edition Rao VSP, Human Resource Management, Vikas Publishing, New Delhi* • *K. Aswathappa – Human Resources and Personnel Management, Tata McGraw Hill* • *Robbins SP, Timothy A, Judge & Sanghi Seema, Organizational Behaviour, Pearson Education, New Delhi,13th edition.* • *Lance A Berger, Dorothy R Berger, Talent Management Hand Book, McGraw Hill* • *Hasan, M., Singh, A. K., Dhamija, S. (eds.), Talent management in India: Challenges and opportunities, Atlantic Publication* • *Seema Sanghi: The Handbook of Competency Mapping: Understanding, Designing and Implementing Competency Models in Organizations, Sage Publishing*

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester V with effect from the Academic Year 2018-2019

Reference Books

Reference Books
Stress Management
• *Stress management by Susan R. Gregson* • *Stress management: Leading to Success By B Hiriyappa* • *Strategic Stress Management: An Organizational Approach by V. Sutherland, C. Cooper* • *Stress Management: An Integrated Approach to Therapy by Dorothy H.G. Cotton* • *Stress Management by A. K. Rai* • *Organizational Stress Management: A Strategic Approach By A. Weinberg, V. Sutherland, C. Cooper* • *Stress Management by Dr. Nivedita*
Logistics and Supply Chain Management
• *David Simchi Levi, Philip Kaminshy, Edith Simchi Levi, Designing & Managing the Supply Chain - Concepts, Strategies and Case Studies Logistics* • *Donald Waters, An Introduction to Supply Chain* • *Martin Christopher, Logistics & Supply Chain Management - Strategies for Reducing Cost & Improving Services* • *Vinod Sople, Logistic Management - The Supply Chain Imperative* • *Donald J Bowersox & David J Closs, Logistic Management - The Integrated Supply Chain Process* • *Alan Rushton, Phil Croucher, Peter Baker, The Handbook of Logistics and Distribution Management- Understanding the Supply Chain* • *Donald J. Bowersox & David J Closs, Logistical Management-The Integrated Supply Chain Process, McGraw Hill Education* • *Ronald H Ballou & Samir K Srivastava, Business Logistics/ Supply Chain Management- Pearson* • *Donald J Bowersox, David J Closs & M Bixby Cooper, Supply Chain Logistics Management- The McGraw Hill Companies*
Corporate Communication & Public Relations
• *Richard R. Dolphin, The Fundamentals of Corporate Communication* • *Joep Cornelissen, Corporate Communications: Theory and Practice* • *James L.Horton,Integrating Corporate Communication:The Cost Effective Use of Message & Medium* • *Sandra Oliver, Handbook of Corporate Communication & Public Relations A Cross-Cultural Approach* • *Rosella Gambetti, Stephen Quigley, Managing Corporate Communication* • *Joseph Fernandez, Corporate Communications: A 21st Century Primer* • *C.B.M. van Riel, Chris Blackburn, Principles of Corporate Communication* • *Jaishri Jethwaney, Corporate Communication: Principles and Practice*

Bachelor of Management Studies (BMS) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2018-2019)

Semester VI

No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***	
1,2,3 & 4	**Any four courses from the following list of the courses	**12**
2	***Core Course (CC)***	
5	Operation Research	**04**
3	***Ability Enhancement Course (AEC)***	
6	Project Work	**04**
	Total Credits	**20**

** *List of group of Elective Courses(EC)for Semester VI (Any Four)*	
Group A: Finance Electives (Any four Courses)	
1	International Finance
2	Innovative Financial Services
3	Project Management
4	Strategic Financial Management
5	Financing Rural Development
6	Indirect Taxes
Group B:Marketing Electives (Any four Courses)	
1	Brand Management
2	Retail Management
3	International Marketing
4	Media Planning & Management
5	Sports Marketing
6	Marketing of Non Profit Organisation
Group C: Human Resource Electives (Any four Courses)	
1	HRM in Global Perspective
2	Organisational Development
3	HRM in Service Sector Management
4	Workforce Diversity
5	Human Resource Accounting & Audit
6	Indian Ethos in Management

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

1. International Finance

Modules at a Glance

SN	Modules	No. of Lectures
1	Fundamentals of International Finance	15
2	Foreign Exchange Markets, Exchange Rate Determination & Currency Derivatives	15
3	World Financial Markets & Institutions & Risks	15
4	Foreign Exchange Risk, Appraisal & Tax Management	15
	Total	**60**

Objectives

SN	Objectives
1	The objective of this course is to familiarize the student with the fundamental aspects of various issues associated with International Finance
2	The course aims to give a comprehensive overview of International Finance as a separate area in International Business
3	To introduce the basic concepts, functions, process, techniques and create an awareness of the role, functions and functioning of International Finance in this Globalised Market

SN	Modules/ Units
1	**Fundamentals of International Finance**
	a) Introduction to International Finance: • Meaning/ Importance of International Finance, Scope of International Finance, Globalization of the World Economy, Goals of International Finance, The Emerging Challenges in International Finance **b) Balance of Payment:** • Introduction to Balance of Payment, Accounting Principles in Balance of Payment, Components of Balance of Payments, Balance of Payment Identity Indian Heritage in Business, Management, Production and Consumption. **c) International Monetary Systems:** • Evolution of International Monetary System , Gold Standard System , Bretton Woods System, Flexible Exchange Rate Regimes – 1973 to Present, Current Exchange Rate Arrangements, European Monetary System, Fixed & Flexible Exchange Rate System **d) An introduction to Exchange Rates:** • Foreign Bank Note Market, Spot Foreign Exchange Market • Exchange Rate Quotations ▪ Direct & Indirect Rates ▪ Cross Currency Rates ▪ Spread & Spread % • Factors Affecting Exchange Rates
2	**Foreign Exchange Markets, Exchange Rate Determination & Currency Derivatives**
	a) Foreign Exchange Markets: • Introduction to Foreign Exchange Markets, Structure of Foreign Exchange Markets, Types of Transactions & Settlement Date, Exchange Rate Quotations & Arbitrage, Forward Quotations (Annualized Forward Margin) **b) International Parity Relationships & Foreign Exchange Rate:** • Interest Rate Parity, Purchasing Power Parity & Fishers Parity, Forecasting Exchange Rates (Efficient Market Approach, Fundamental Approach, Technical Approach, Performance of the Forecasters), Global Financial Markets & Interest Rates (Domestic & Offshore Markets, Money Market Instruments) **c) Currency & Interest Rate Futures:** • Introduction to Currency Options (Option on Spot, Futures & Futures Style Options), Futures Contracts, Markets & the Trading Process, Hedging & Speculation with Interest Rate Futures, Currency Options in India

SN	Modules/ Units
3	**World Financial Markets & Institutions & Risks**
	a) Euro Currency Bond Markets: • Introduction to Euro Currency Market, Origin of Euro Currency Market, Euro Bond Market (Deposit, Loan, Notes Market), Types of Euro Bonds, Innovation in the Euro Bond Markets, Competitive Advantages of Euro Banks, Control & Regulation of Euro Bond Market **b) International Equity Markets & Investments:** • Introduction to International Equity Market, International Equity Market Benchmarks, Risk & Return from Foreign Equity Investments, Equity Financing in the International Markets, Depository Receipts – ADR,GDR,IDR **c) International Foreign Exchange Markets:** • Meaning of International Foreign Exchange Market, FERA v/s FEMA, Scope & Significance of Foreign Exchange Markets, Role of Forex Manager, FDI v/s FPI, Role of FEDAI in Foreign Exchange Market **d) International Capital Budgeting:** • Meaning of Capital Budgeting, Capital Budgeting Decisions, Incremental Cash Flows, Cash Flows at Subsidiary and Parent Company, Repatriation of Profits, Capital Budgeting Techniques – NPV
4	**Foreign Exchange Risk, Appraisal & Tax Management**
	a) Foreign Exchange Risk Management: • Introduction to Foreign Exchange Risk Management, Types of Risk, Trade & Exchange Risk, Portfolio Management in Foreign Assets, Arbitrage & Speculation **b) International Tax Environment:** • Meaning of International Tax Environment, Objectives of Taxation, Types of Taxation, Benefits towards Parties doing Business Internationally, Tax Havens, Tax Liabilities **c) International Project Appraisal:** • Meaning of Project Appraisal, Review of Net Present Value Approach (NPV), Option Approach to Project Appraisal, Project Appraisal in the International Context, Practice of Investment Appraisal

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

2. Innovative Financial Services

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Traditional Financial Services	15
2	Issue Management and Securitization	15
3	Financial Services and its Mechanism	15
4	Consumer Finance and Credit Rating	15
	Total	**60**

Objectives

SN	Objectives
1	To familiarize the learners with the fundamental aspects of various issues associated with various Financial Services
2	To give a comprehensive overview of emerging financial services in the light of globalization
3	To introduce the basic concepts, functions, process, techniques and create an awareness of the role, functions and functioning of financial services

SN	Modules/ Units
1	**Introduction to Traditional Financial Services**
	a) Financial Services: • Concept, Objectives/Functions, Characteristics, Financial Service Market, Financial Service Market Constituents, Growth of Financial Services in India, Problems in Financial Services Sector, Banking and Non-Banking Companies, Regulatory Framework **b) Factoring and Forfaiting:** • Introduction, Types of Factoring, Theoretical Framework, Factoring Cost, Advantages and Disadvantages of Factoring, Factoring in India, Factoring v/s Forfaiting, Working of Forfaiting, Benefits and Drawbacks of Forfaiting, Practical Problems. **c) Bill Discounting:** • Introduction, Framework, Bill Market Schemes, Factoring V/s Bill Discounting in Receivable Management.
2	**Issue Management and Securitization**
	a) Issue Management and Intermediaries: • Introduction, Merchant Bankers/ Lead Managers, Underwriters, Bankers to an Issue, Brokers to an Issue **b) Stock Broking:** • Introduction, Stock Brokers, SubBrokers, Foreign Brokers, Trading and Clearing/Self Clearing Members, Stock Trading (Cash and Normal) Derivative Trading **c) Securitization:** • Definition, Securitization v/s Factoring, Features of Securitization, Pass Through Certificates, Securitization Mechanism, Special Purpose Vehicle, Securitisable Assets, Benefits of Securitization, New Guidelines on Securitization
3	**Financial Services and its Mechanism**
	a) Lease and Hire-Purchase: • Meaning, Types of Lease - Finance Lease, Operating Lease, Advantages and Disadvantages of Leasing, Leasing in India, Legal Aspects of Leasing. • Definition of Hire Purchase, Hire Purchase and Installment Sale Characteristics, Hire Purchase and Leasing, Advantages of Hire Purchase, Problems of Hire Purchase. **b) Housing Finance:** • Introduction, Housing Finance Industry, Housing Finance Policy Aspect, Sources of Funds, Market of Housing Finance, Housing Finance in India- Major Issues, Housing Finance in India – Growth Factors, Housing Finance Institutions in India, National Housing Bank (NHB), Guidelines for Asset Liability Management System in HFC, Fair Trade Practice Code for HFC's, Housing Finance Agencies

SN	Modules/ Units
	c) Venture Capital: Introduction, Features of Venture Capital, Types of Venture Capital Financing Stages, Disinvestment mechanisms, Venture Capital Investment process, Indian Scenario
4	**Consumer Finance and Credit Rating**
	a) Consumer Finance: • Introduction, Sources, Types of Products, Consumer Finance Practice in India, Mechanics of Consumer Finance, Terms, Pricing, Marketing and Insurance of Consumer Finance, Consumer Credit Scoring, Case for and against Consumer Finance **b) Plastic Money:** • Growth of Plastic Money Services in India, Types of Plastic Cards- Credit card- Debit Card- Smart card- Add-on Cards, Performance of Credit Cards and Debit Cards, Benefits of Credit Cards, Dangers of Debit Cards, Prevention of Frauds and Misuse, Consumer Protection. Indian Scenario. • Smart Cards- Features, Types, Security Features and Financial Applications **c) Credit Rating:** • Meaning, Origin, Features, Advantages of Rating, Regulatory Framework, Credit Rating Agencies, Credit Rating Process, Credit Rating Symbols. Credit Rating Agencies in India, Limitations of Rating

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

3. Project Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Project Management & Project Initiation	15
2	Analyzing Project Feasibility	15
3	Budgeting, Cost & Risk Estimation in Project Management	15
4	New Dimensions in Project Management	15
	Total	**60**

Objectives

SN	Objectives
1	The objective of this course is to familiarize the learners with the fundamental aspects of various issues associated with Project Management
2	To give a comprehensive overview of Project Management as a separate area of Management
3	To introduce the basic concepts, functions, process, techniques and create an awareness of the role, functions and functioning of Project Management

SN	Modules/ Units
1	**Introduction to Project Management & Project Initiation**
	a) Introduction to Project Management: • Meaning/Definition of Project & Project Management, Classification of Projects, Why Project Management, Characteristics/Importance of Project Management, Need for Project Management (Objectives), History of Project Management **b) Organizational Structure (Project Organization):** • Meaning/Definition of Organizational Structure, Organizational Work Flow, Developing Work Integration Positions, Types of Organizational Structure, Forms of Organization, Strategic Business Units (SBU) in Project Management. **c) Project Initiation:** • **Project Selection**-Meaning of Project Selection, Importance of Project Selection, Criteria for Project Selection (Models), Types of Project Selection, Understanding Risk & Uncertainty in Project Selection • **Project Manager**-Meaning of Project Manager, Role of Project Manager, Importance of Project Manager, Role of Consultants in Project Management, Selecting Criteria for Project Manager • **Project Planning**-Importance of Project Planning, Functions of Project Planning, System Integration, Project Management Life Cycle, Conflicts & Negotiation Handling in Project Management, Planning Cycle & Master Production Scheduling
2	**Analyzing Project Feasibility**
	a) Project Feasibility Analysis: • Meaning/Definition of Project Feasibility, Importance of Project Feasibility, Scope of Project Feasibility • Types of Project Feasibility- Market Feasibility, Technical Feasibility, Financial Feasibility, Economic Viability, Operational Feasibility • SWOT Analysis (Environment Impact Assessment, Social Cost Benefit Analysis) **b) Market Analysis:** • Meaning of Market Analysis**,** Demand Forecasting**,** Product Mix Analysis**,** Customer Requirement Analysis **c) Technical Analysis:** • Meaning of Technical Analysis, Use of Various Informational Tools for Analyzing, Advancement in the Era of E- Commerce in Project Management **d) Operational Analysis:** • Meaning of Operation Management, Importance of Operation Management, Operation Strategy - Levels of Decisions, Production Planning & Control, Material Management - Work Study & Method Study, Lean Operations

SN	Modules/ Units
3	**Budgeting, Cost & Risk Estimation in Project Management**
	a) Funds Estimation in Project: • Means of Financing, Types of Financing, Sources of Finance, Government Assistance towards Project Management for Start ups, Cost Control (Operating Cycle, Budgets & Allocations), Determining Financial Needs for Projects, Impact of Leveraging on Cost of Finance **b) Risk Management in Projects:** • What is Risk, Types of Risk in Projects, Risk Management Process, Risk Analysis & Identification, Impact of Risk Handling Measures, Work break Down Structure, New Venture Valuation (Asset Based, Earnings Based, Discounted Cash flow Models) **c) Cost Benefit Analysis in Projects** • Introduction to Cost Benefit Analysis, Efficient Investment Analysis, Cash - Flow Projections, Financial Criteria for Capital Allocation, Strategic Investment Decisions
4	**New Dimensions in Project Management**
	a) Modern Development in Project Management: • Introduction to Modern Development in Project Management, Project Management Maturity Model (PMMM), Continuous Improvement, Developing Effective Procedural Documentation, Capacity Planning **b) Project Monitoring & Controlling:** • Introduction to Project Monitoring & Controlling, The Planning – Monitoring-Controlling Cycle, Computerized Project Management Information System (PMIS), Balance in Control System in Project Management, Project Auditing – Life Cycle **c) Project Termination & Solving Project Management Problems:** • Meaning of Project Termination, Reasons for Termination of Projects, Process for Terminating Projects, Strategy/ Ways to Solve Project Management Problems, Project Review & Administrative Aspects, Execution Tools for Closing of Projects

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group A: Finance Electives

4. Strategic Financial Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Dividend Decision and XBRL	15
2	Capital Budgeting and Capital Rationing	15
3	Shareholder Value and Corporate Governance/ Corporate Restructuring	15
4	Financial Management in Banking Sector and Working Capital Financing	15
	Total	**60**

Objectives

SN	Objectives
1	To match the needs of current market scenario and upgrade the learner's skills and knowledge for long term sustainability
2	Changing scenario in Banking Sector and the inclination of learners towards choosing banking as a career option has made study of financial management in banking sector inevitable
3	To acquaint learners with contemporary issues related to financial management

SN	Modules/ Units
1	**Dividend Decision and XBRL**
	a) Dividend Decision: • Meaning and Forms of Dividend, Dividend-Modigliani and Miller's Approach, Walter Model, Gordon Model, Factors determining Dividend Policy, Types of Dividend Policy **b) XBRL:** • Introduction, Advantages and Disadvantages, Features and Users
2	**Capital Budgeting and Capital Rationing**
	a) Capital Budgeting: • Risk and Uncertainty in Capital Budgeting, Risk Adjusted Cut off Rate, Certainty Equivalent Method, Sensitivity Technique, Probability Technique, Standard Deviation Method, Co-efficient of Variation Method, Decision Tree Analysis, Construction of Decision Tree. **b) Capital Rationing:** • Meaning, Advantages, Disadvantages, Practical Problems
3	**Shareholder Value and Corporate Governance/Corporate Restructuring**
	a) Shareholder Value and Corporate Governance: • Financial Goals and Strategy, Shareholder Value Creation: EVA and MVA Approach, Theories of Corporate Governance, Practices of Corporate Governance in India **b) Corporate Restructuring:** • Meaning, Types, Limitations of Merger, Amalgamation, Acquisition, Takeover, Determination of Firm's Value, Effect of Merger on EPS and MPS, Pre Merger and Post Merger Impact.
4	**Financial Management in Banking Sector and Working Capital Financing**
	a) Financial Management in Banking Sector: • An Introduction, Classification of Investments, NPA & their Provisioning, Classes of Advances, Capital Adequacy Norms, Rebate on Bill Discounting, Treatment of Interest on Advances **b) Working Capital Financing:** • Maximum Permissible Bank Finance (Tandon Committee), Cost of issuing Commercial Paper and Trade Credit, Matching Approach, Aggressive Approach, Conservative Approach

Elective Courses (EC)

Group A: Finance Electives

5. Financing Rural Development

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Rural Banking	10
2	Micro Finance	15
3	MSME Finance	10
4	Final Accounts of the Banking Companies	15
5	Risk Management in Rural Finance	10
Total		**60**

Objectives

SN	Objectives
01	To acquaint the learners with the concept of rural banking
02	To give an overview of micro finance and MSME finance
03	To study the provisions of final accounts of the Banking Companies
04	To understand risk management in rural finance

Sr. No.	Modules / Units
1	**Rural Banking**
	Rural India – Demographic Features, Characteristics of Rural Society, Economic Features, Infrastructure in Rural Areas, Agriculture Economy, Rural Issues and Rural Development Policies, Sources and Pattern of agriculture in India, Trends in Agricultural Finance. Institutional Framework – Regulation of Rural Financial Services, Rural Credit Institutions, Financing Agriculture/ Allied Activities, Financing Rural Non Farm Sector, Priority Sector Lending, Rural Housing and Education Loans. Rural Banking – Financial Needs of the Poor, Role of Rural Banking, Transaction Costs, Risk Costs, Financing Poor as Bankable Opportunities Micro Credit and Self Help Groups.
2	**Micro Finance**
	Introduction – Emergence of Microfinance, Definition, Meaning and Scope, Importance and Assumptions. Lessons from International Experience. Models – Models of Microfinance across the world, Portfolio Securitization, SHG-2, National Rural Livelihood Mission, Impact of Microfinance, Impact Assessment and Monitoring, Microfinance and Poverty Assessment Tools. Financial Products and Services – Objectives, Introduction, The role of MFI – Minimalist V/s Integrated, Financial services/ products, Non – Financial Services, Designing Microfinance Models, Liquidity Management, The Revenue Model of an MFI**,** Cost, Volume and Profit Analysis, Measuring Operating Efficiency and Productivity in MFI's, Factors affecting Operating Expenses, Operating Efficiency.
3	**MSME Finance**
	Institutional Framework – Central Government, NIMSME, Indian Institute of Entrepreneurship Guwahati, NIESBUD, NSIC, Organizations under the control of State Government, SIDBI, CGTMSE, SMERA, SSI Association in India, Changing Role of MSME Associations , Policy Orientation & Resource Allocation. Financing Options & Modes – Financing MSME, Why lend to MSME Sector, Debt Finance, Equity Finance, Options for Financing MSME's, Financial Products and their Access, Existing MSME Loan Products and their Nature, Common Guidelines for lending to MSME Sector, Factoring, Credit Process, Credit Assessment, Costs and Risks specific to MSME Lending, Risk Rating, Monitoring and Review of Lending.
4	**Final Accounts of the Banking Companies**
	Legal Provision in Banking Regulation Act, 1949 relating to Accounts. Statutory reserves including Cash Reserve and Statutory Liquidity Ratio. Bill purchase and discounted, Rebate of Bill Discounted. Final Accounts in prescribed form Non – performing assets and Income from non – performing assets, Classification of Advances, standard, sub – standard, doubtful and provisioning requirement.
5	**Risk Management in Rural Finance**
	An Introduction –Objectives, Introduction , Types of risks for MFI's, Risk Management Framework for MFI's Indicators of Credit Risk, Portfolio at Risk (PAR), Causes of high Credit Risk , Impact of Delinquencies, Managing Credit Risk, Transaction Risk, Process, System & Technology, Relationship and Portfolio Risk. Cash Planning and Co-ordination between Operation Manager and Finance Manager. Compliance to State Acts, Revised Guidelines on Priority Sector, Compliance to RBI Guidelines on NBFC – MFI's, Self Regulation.

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Elective Courses (EC)

Group A: Finance Electives

6.Indirect Taxes

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Indirect Taxation and GST	10
2	Concept of Supply	20
3	Registration and Computation of GST	20
4	Filing of Returns	10
Total		**60**

Objectives

SN	Objectives
01	To understand the basics of GST
02	To study the registration and computation of GST
03	To acquaint the students with filing of returns in GST

Sr. No.	Modules / Units
1	**Introduction to Indirect Taxation and GST**
	A. Basics for Taxation - Direct Taxes and Indirect Taxes – Difference, Advantages and Disadvantages, Sources and Authority of Taxes in India (Art 246 of the Indian Constitution) **B. Introduction to GST** – Genesis of GST in India, Power to tax GST (Constitutional Provisions), Extent and Commencement, Meaning and Definition of GST, Benefits of GST, Conceptual Framework – CGST, IGST,SGST,UTGST, Imports of goods or services or both, Export of goods or services or both, Taxes subsumed and not subsumed under GST. **C. Definitions** – Goods (2(52) of CGST Act), Services (2(102) of CGST Act), Money (2(75) of CGST Act), Securities (2(101) of SCRA Act,1956), India(2(56) of CGST Act), Persons (2(84) of CGST Act),Taxable Person (2(107) of CGST Act), Business (2(17) of CGST Act), Consideration(2(31) of CGST Act), E- Commerce Operator (2(45) of CGST Act), Supplier(2(105) of CGST Act),Recipient(2(93) of CGST Act) **D. Levy and Collection of GST** – Levy and Collection of CGST, IGST, SGST,UTGST (Sec 9 of CGST Act), Composition Scheme under GST (Sec 10 of CGST Act), Power to Grant Exemption (Sec 11 of CGST Act)GST Rate Schedule for Goods and Services.
2	**Concept of Supply**
	A. Taxable Event Supply– Meaning and Scope of Supply (Section 7 Subsection 1, 2 and 3 of Act) Schedule I, Schedule II, Schedule III, Composite and Mixed Supplies (Sec 8 of CGST Act) **B. Place of Supply** – Location of Supplier of Goods and Services, Place of Supply of Goods (Sec 10, 11,12 and 13 of IGST Act), Special Provision for Payment of Tax by a Supplier of Online Information Database Access Retrieval. **C. Time of Supply**- Time of Supply (Sec 31 of CGST Act), Issue of Invoice by the Supplier (Sec 31 (1) and Sec 31(2)of CGST Act), Continuous Supply of Goods and Services, Goods Sent on Approval (Sec 31(7) of CGST Act) **D. Value of Supply** – Determination of Value of Supply (Sec 15 of CGST Act and CGST Rules 2017), Input Tax Credit (Sec 2(62) of CGST Act) Capital Goods (Sec 2(19) of CGST Act), Input Sec 2(59) of CGST Act), Input Service (Sec 2(60) of CGST Act). Eligibility and Conditions for taking Input Tax Credit (Sec 16 of CGST Act)
3	**Registration and Computation of GST**
	A. Registration – Persons liable for Registration (Sec 22 of the Act), Persons not liable for Registration, Procedure for Registration (Sec 25 of the Act), Deemed Registration(Sec 26 of the Act), Special Provisions (Sec 27 of the Act), Amendment, Cancellation and Revocation of Registration(Sec 28,Sec29and Sec 31 of the Act) **B. Computation of GST –** Computation of GST under Inter State and Intra State Supplies. **C. Payment of Tax-** Payment of Tax, Interest and other Amounts(Sec 49 of the Act), Interest on delayed Payment (Sec 50 of the Act), TDS (Sec 51 of the Act), TCS (Sec 52 of the Act)
4	**Filing of Returns**
	A. Documentation- Tax Invoices (Sec 31 and 32 of the Act), Credit and Debit notes(Sec 34 of the Act), Electronic Way Bill **B. Returns –**Types of Returns and Provisions relating to filing of Returns (Sec 37 to Sec 48 of the Act)

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Elective Courses (EC)

Group B: Marketing Electives

1. Brand Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Brand Management	15
2	Planning and Implementing Brand Marketing Programs	15
3	Measuring and Interpreting Brand Performance	15
4	Growing and Sustaining Brand Equity	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the meaning and significance of Brand Management
2	To Know how to build, sustain and grow brands
3	To know the various sources of brand equity

SN	Modules/ Units
1	**Introduction to Brand Management**
	a) Introduction to Brand Management: • Meaning of Brand, Branding, Brand Management, Importance of Branding to Consumers, Firms, Brands v/s Products, Scope of Branding, Branding Challenges and Opportunities, Strategic Brand Management Process, Customer Based Brand Equity model (CBBE), Sources of Brand Equity, Steps of Brand Building including Brand Building Blocks, Brand Positioning: Meaning, Importance, Basis
2	**Planning and Implementing Brand Marketing Programs**
	a) Planning and Implementing Brand Marketing Programs: • Brand Elements: Meaning, Criteria for choosing Brand Elements, Types of Brand Elements • Integrating Marketing Programs and Activities • Personalising Marketing: Experiential Marketing, One to One Marketing, Permission Marketing • Product Strategy: Perceived Quality and Relationship Marketing • Pricing Strategy: Setting Prices to Build Brand Equity • Channel Strategy: Direct, Indirect Channels • Promotion Strategy: Developing Integrated Marketing Communication Programs • Leveraging Secondary Brand Associations to Build Brand Equity: Companies, Countries, Channel of Distribution, Co-branding, Characters, Events.
3	**Measuring and Interpreting Brand Performance**
	a) The Brand Value Chain **b) Measuring Sources of Brand Equity:** • **Qualitative Research Techniques**: Projective Techniques: Completion, Comparison, Brand Personality and Values: The Big Five, Free Association • **Quantitative Research Techniques:** Brand Awareness: Recognition, Recall, Brand Image, Brand Responses **c) Young and Rubicam's Brand Asset Valuator** **d) Measuring Outcomes of Brand Equity** • **Comparative Methods**: Brand based Comparative Approaches, Marketing Based Comparative Approaches, Conjoint Analysis • **Holistic Methods:** Residual Approaches, Valuation Approaches: Historical Perspectives and Interbrand's Brand Valuation Methodology

4	**Growing and Sustaining Brand Equity**
	a) Designing & Implementing Branding Strategies: • **Brand Architecture**: Meaning of Brand Architecture, The Brand-Product Matri, Breadth of a Branding Strategy, Depth of a Branding Strategy • **Brand Hierarchy:** Meaning of Brand Hierarchy, Building Equity at Different Hierarchy Levels • **Cause Marketing to Build Brand Equity:** Meaning of Cause Marketing, Advantages, Green Marketing **b) Brand Extensions:** • Meaning, Advantages, Disadvantages, Brand Extension and Brand Equity **c) Managing Brands over Time:** • Reinforcing Brands, Revatilising Brands **d) Building Global Customer Based Brand Equity**

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Elective Courses (EC)

Group B: Marketing Electives

2. Retail Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Retail Management- An overview	15
2	Retail Consumer and Retail Strategy	15
3	Merchandise Management and Pricing	15
4	Managing and Sustaining Retail	15
	Total	**60**

Objectives

SN	Objectives
1	To familiarize the students with retail management concepts and operations
2	To provide understanding of retail management and types of retailers
3	To develop an understanding of retail management terminology including merchandize management, store management and retail strategy.
4	To acquaint the students with legal and ethical aspects of retail management
5	To create awareness about emerging trends in retail management

SN	Modules/ Units
1	**Retail Management- An overview**
	a) Retail Management: • Introduction and Meaning, Significance, Factors Influencing Retail Management, Scope of Retail Management **b) Retail Formats:** • Concept of Organized Retailing: Factors Responsible for the Growth of Organized Retail in India, Multichannel Retailing: Meaning and Types, E-tailing: Meaning, Advantages and Limitations **c) Emerging Trends in Retailing** • Impact of Globalization on Retailing • I.T in Retail: Importance, Advantages and Limitations, Applications of I.T. in Retail: EDI, Bar Coding, RFID Tags, Electronic Surveillance, Electronic Shelf Labels • FDI in Retailing: Meaning, Need for FDI in Indian Retail Scenario • Franchising: Meaning, Types, Advantages and Limitations, Franchising in India • Green Retailing • Airport Retailing
2	**Retail Consumer and Retail Strategy**
	a) Retail Consumer/Shopper: • Meaning of Retail Shopper, Factors Influencing Retail Shoppers, Changing Profile of Retail Shoppers, Market Research as a Tool for Understanding Retail Markets and Shoppers **b) CRM in Retail:** • Meaning, Objectives • Customer Retention Approaches: Frequent Shopper Programme, Special Customer Services, Personalization, Community **c) Retail Strategy:** • Meaning, Steps in Developing Retail Strategy, Retail Value Chain **d) Store Location Selection:** • Meaning, Types of Retail Locations, Factors Influencing Store Location **e) HRM in Retail:** • Meaning, Significance, Functions • Organization Structure in Retail: Meaning, Factors Influencing Designing Organization Structure, Organization Structure for Small Stores/Single Stores/Independent Retailers and Retail Store Chain/Department Store

SN	Modules/ Units
3	**Merchandise Management and Pricing**
	a) Merchandise Management • Concept, Types of Merchandise, Principles of Merchandising, Merchandise Planning- Meaning and Process, Merchandise Category – Meaning, Importance, Components, Role of Category Captain, Merchandise Procurement/Sourcing- Meaning, Process, Sources for Merchandise **b) Buying Function:** • Meaning, Buying Cycle, Factors Affecting Buying Functions, Functions of Buying for Different Types of Organizations Young and Rubicam's Brand Asset Valuator- Independent Store, Retail Chain, Non-store Retailer **c) Concept of Lifestyle Merchandising** **d) Private Label** • Meaning, Need and Importance, Private Labels in India **e) Retail Pricing** • Meaning, Considerations in Setting Retail Pricing • Pricing Strategies: High/ Low Pricing: Meaning, Benefits, Everyday Low Pricing: Meaning, Benefits, Market Skimming, Market Penetration, Leader Pricing, Odd Pricing, Single Pricing, Multiple Pricing, Anchor Pricing • Variable Pricing and Price Discrimination- Meaning Types: ▪ Individualized Variable Pricing/First Degree Price ▪ Self-Selected Variable Pricing/ Second Degree Price Discrimination- Clearance and Promotional Markdowns, Coupons, Price Bundling, Multiple – Unit Pricing ▪ Variable Pricing by Market Segment/ Third Degree Price Discrimination
4	**Managing and Sustaining Retail**
	a) Retail Store Operations: • Meaning, Responsibilities of Store Manager, The 5 S's of Retail Operations (Systems, Standards, Stock, Space, Staff) **b) Store Design and Layout:** • Store Design- Meaning, Objectives, Principles, Elements of Exterior and Interior Store Design, Store Atmospherics and Aesthetics • Store Layout- Meaning, Types: Grid, Racetrack, Free Form • Signage and Graphics: Meaning, Significance, Concept of Digital Signage • Feature Areas: Meaning, Types: Windows, Entrances, Freestanding Displays, End Caps, Promotional Aisles, Walls, Dressing Rooms, Cash Wraps

SN	Modules/ Units
	c) Visual Merchandising and Display: • Visual Merchandising- Meaning, Significance, Tools Used for Visual Merchandising • The Concept of Planogram • Display- Meaning, Methods of Display, Errors in Creating Display **d) Mall Management** • Meaning and Components: Positioning, Zoning, Promotion and Marketing, Facility Management, Finance Management **e) Legal and Ethical Aspects of Retailing** • Licenses/Permissions Required to Start Retail Store in India • Ethical Issues in Retailing **Career Options in Retailing**

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Elective Courses (EC)

Group B: Marketing Electives

3. International Marketing

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to International Marketing & Trade	15
2	International Marketing Environment and Marketing Research	15
3	International Marketing Mix	15
4	Developments in International Marketing	15
	Total	**60**

Objectives

SN	Objectives
1	To understand International Marketing, its Advantages and Challenges.
2	To provide an insight on the dynamics of International Marketing Environment.
3	To understand the relevance of International Marketing Mix decisions and recent developments in Global Market

SN	Modules/ Units
1	**Introduction to International Marketing & Trade**
	a) Introduction of International Marketing: • Meaning, Features of International Marketing, Need and Drivers of International Marketing, Process of International Marketing, Phases of International Marketing, Benefits of International Marketing, Challenges of International Marketing, Difference between Domestic and International Marketing, Different Orientations of International Marketing : EPRG Framework, Entering International Markets :Exporting, Licensing, Franchising, Mergers and Acquisition, Joint Ventures, Strategic Alliance, Wholly Owned Subsidiaries, Contract Manufacturing and Turnkey Projects, Concept of Globalization **b) Introduction to International Trade:** • Concept of International Trade, Barriers to Trade: Tariff and Non Tariff, Trading Blocs : SAARC, ASEAN, NAFTA, EU, OPEC
2	**International Marketing Environment and Marketing Research**
	a) International Marketing Environment: • Economic Environment : International Economic Institution (World Bank, IMF, IFC) ,International Economic Integration (Free Trade Agreement, Customs Union, Common Market, Economic Union) • Political and Legal Environment: Political System (Democracy, Authoritarianism, Communism), Political Risk, Political Instability, Political Intervention. Legal Systems (Common Law, Civil Law, Theocratic Law), Legal Differences, Anti Dumping Law and Import License. • Cultural Environment : Concept , Elements of Culture (Language, Religion, Values and Attitude , Manners and Customs, Aesthetics and Education) , HOFSTEDE's Six Dimension of Culture , Cultural Values (Individualism v/s Collectivism) **b) Marketing Research:** • Introduction, Need for Conducting International Marketing Research, International Marketing Research Process, Scope of International Marketing Research, IT in Marketing Research
3	**International Marketing Mix**
	a) International Product Decision • International Product Line Decisions, Product Standardization v/s Adaptation Argument, International Product Life Cycle, Role of Packaging and Labelling in International Markets, Branding Decisions in International Markets, International Market Segmentation and Targeting, International Product Positioning

SN	Modules/ Units
	b) International Pricing Decision: • Concept of International Pricing, Objectives of International Pricing, Factors Affecting International Pricing • International Pricing Methods: Cost Based, Demand Based, Competition Based , Value Pricing, Target Return Pricing and Going Rate Pricing • International Pricing Strategies : Skimming Pricing, Penetration Pricing , Predatory Pricing • International Pricing Issues : Gray Market , Counter Trade, Dumping, Transfer Pricing **c) International Distribution Decisions** • Concept of International Distribution Channels, Types of International Distribution Channels, Factors Influencing Selection of International Distribution Channel **d) International Promotion Decisions** • Concept of International Promotion Decision • Planning International Promotional Campaigns: Steps - Determine the Target Audience, Determine Specific Campaigns, Determine Budget, Determine Message, Determine Campaign Approach and Determine Campaign Effectiveness • Standardization V/S Adaptation of International Promotional Strategies • International Promotional Tools/Elements
4	**Developments in International Marketing**
	a) Introduction -Developing International Marketing Plan: • Preparing International Marketing Plan, Examining International Organisational Design, Controlling International Marketing Operations, Devising International Marketing Plan **b) International strategies:** • Need for International Strategies, Types of International Strategies **c) International Marketing of Services** • Concept of International Service Marketing, Features of International Service Marketing, Need of International Service Marketing, Drivers of Global Service Marketing, Advantages and Disadvantages of Global Service Marketing, Service Culture

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Elective Courses (EC)

Group B: Marketing Electives

4. Media Planning and Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Overview of Media and Media Planning	15
2	Media Mix & Media Strategy	15
3	Media Budgeting, Buying & Scheduling	15
4	Media Measurement, Evaluation	15
	Total	**60**

Objectives

SN	Objectives
1	To understand Media Planning, Strategy and Management with reference to current business scenario.
2	To know the basic characteristics of all media to ensure most effective use of advertising budget.
3	To provide an insight on Media Planning, Budgeting, Scheduling and Evaluating the Different Media Buys.

SN	Modules/ Units
1	**Overview of Media and Media Planning**
	a) Overview of Media and Media Planning: • Meaning of Media & Features of Media, Meaning of Media Planning , Scope of Media planning , Media Planning Elements, Role of Media in Business, Media Planning Process, Impact of Marketing Objectives on Media Planning, Factors Influencing Media Planning Decisions, Role and Importance of Media in Consumer Buying Decision, Role of Media Planner, Challenges of Media Planning, Organization Structure of Media Company, Regulatory Framework and Legal Aspects in Media Planning **b) Media Research:** • Meaning, Role and Importance • Sources of Media Research : Audit Bureau of Circulation, Press Audits, National Readership Survey/IRS, Businessmen's Readership Survey, TRP, National Television Study, ADMAR Satellite Cable Network Study, Reach and Coverage Study, ClB Listenership Survey
2	**Media Mix and Media Strategy**
	a) Media Mix: • Meaning, Need for Media Mix, Identifying Audience for Mass Media , Factors Affecting Media Mix Decision, Types of Media Mix Decisions: Broad Media Classes, Media Vehicles, Media Units, Deciding Ideal Media Mix **b) Media Choices:** • **Print Meaning-** Factors Affecting Selection of Print Media Decisions , Types of Print Media, Advantages and Limitations • **Television-** Meaning, Factors Affecting Selection of Television Media Decisions, Advantages and Limitations • **Radio-** Meaning, Factors Affecting Selection of Radio Media Decision, Advantages and Limitations • **Out of Home (OOH)-** Meaning, Types of OOH, Factors Affecting OOH Planning Decision, Advantages and Limitations **c) Emerging Media:** • Online, Mobile, Gaming, In flight, In Store, Interactive Media **d) Media Strategy:** • Meaning, Need for Media Strategy, Situation Analysis for Media Strategy and its Components • Steps in Formulating Media Strategies: Defining the Target Group, Market Prioritization, Media Weights, Media Mix, Media Scheduling.

SN	Modules/ Units
3	**Media Budgeting, Buying & Scheduling**
	a) Media Budget • Meaning • Factors to be considered while Framing a Budget: Advertising Task, Competitive Framework, Market Dominance, Market Coverage, Media Cost, Market Task, Pricing ,Frequency of Purchase • Importance of Media Budget. • Methods of Setting Media Budget - Status Quo, Inflation Adjusted, Advertising Sales, Case Rate & Advertising Margin Method, Share of Market, Yardstick Method, Effective Frequency & Reach Method & Margin Analysis ROI Based Approach, Experimental Approach, Break Even Planning. **b) Media Buying:** • Meaning, Role of Media Buyer, Objectives of Media Buying, • Buying Process: Buying Brief, Environmental Analysis, Science and Art of Buying, Benchmarking Buying Plan Presentation Deal Management and Post Buy • Buying brief: Concept & Elements of Buying Brief, Art of Media Buying – Negotiation in Media Buying, Plan Presentation and Client Feedback • Criteria in Media Buying **c) Media Scheduling** • Meaning, Importance • Factors Affecting Scheduling: Sales Pattern, Purchase Cycle, Product Availability, Competitive Activity, Marketing Task, Budget Constraints, Target Group. • Scheduling Patterns – Continuity, Flighting, Pulsing • Scheduling Strategies for Creating Impact: Road Block , Day or Day part • Emphasis, Multiple Spotting, Teasers

SN	Modules/ Units
4	**Developments in International Marketing**
	a) Media Measurement: • **Basic Metrics:** Reach, Cumulative/Frequency Reach, Discrete & Cumulative distribution, Average Opportunity to See (AOTS), Effective frequency/Reach • **Television Metrics:** Dairy v/s Peoplemeter,TRP,/TVR, Program Reach & Time Spent, Stickiness Index, Ad Viewership • **Radio Metrics:** Arbitron Radio Rating • **Print Metrics:** Circulation, Average Issue Readership (AIR), Total or Claimed Reader, Sole or Solus reader. • **OOH Metrics:** Traffic Audit Bureau (TAB) **b) Benchmarking Metrics:** • Share, Profile, and Selectivity Index **c) Plan Metrics:** • Gross Rating Points (GRP), Gross Impressions (GI), Share of Voice (SOV). **d) Evaluating Media Buys** • **Evaluating Television Media Buying:** Dysfunctional Card Rate, Secondary and Effective Rate, Deal Composition, Cost Per Rating Point(CPRP), Reach Delivered by the Buy, Visibility Spots, Bonus Percentage, Upgrades and Spot Fixing, Sponsorships • **Evaluating Print Media Buying:** Discount on Rate Card, Negotiated Rate, Cost Per Thousand (CPT), Market Share Incentives, Readership v/s Circulation Track, Growth Incentives, Combination Rate Incentives, Full Page Discounts and Size Upgrades, Discount for Colour Ads, Date Flexibility Incentives, Positioning, Innovations. • **Evaluating Other Media Buys:** Radio Buys, Outdoor Buys, Cinema Buys, Internet Buys, and Mobile Buys

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Elective Courses (EC)

Group B: Marketing Electives

5. Sports Marketing

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Sports Marketing: Introduction, Environment & Research	15
2	The Sports Product, Pricing Strategies & Sponsorship	15
3	Promotion & Distribution Strategies in Sports Marketing	15
4	Legal aspects & Marketing of Major Sport Events	15
Total		**60**

Objectives

SN	Objectives
01	To equip the learner with an understanding of the business of sports marketing
02	To help the learner understand environmental factors influencing sports marketing
03	To help the learner understand components of marketing mix in the context of sports marketing
04	To understand legal aspects in sports marketing & franchising agreements

Sr. No.	Modules / Units
1	**Sports Marketing: Introduction, Environment & Research**
	Introduction to sports marketing: Sports marketing definition & characteristics, marketing myopia in sports, distinctive features of sports marketing, Model of sports Industry, Implementation of sports marketing programme Environment & Research in Sports Marketing: Environmental factors, individual factors, decision making for sports involvement, role of research in sports marketing: types of primary market research, common problems in sports marketing research
2	**The sports Product, Pricing Strategies & Sponsorship**
	The sports products: Core & extensions, key issues in sports products strategy, managing sports brands, brand equity: benefits & development, Sales: Definition, sales approaches used in sports, selling sports to the community Pricing strategies: The basics of pricing, core issues, factors affecting pricing Sponsorship: Definition, growth of sponsorship, evaluating and ensuring sponsorship effectiveness, selling the sponsorship, ethical issues in selling the sponsorships
3	**Promotion & Distribution Strategies in Sports Marketing**
	Promotional strategies: Promotional concepts & practice, components of promotion mix for sports marketing: Sales promotion, sponsorship, public relation, digital marketing & advertising. Media options in sports marketing, Distribution strategies: Placing core products & their extensions, the facility: marketing channels, the product-place matrix
4	**Legal Aspects & Marketing of major Sport Events**
	Cross impact among the 5Ps of sports marketing mix Legal aspects of sports marketing: Endorsement agreement, Player agreement, Franchise agreement & Sponsorship agreement Marketing of major sport events: Olympic Games, Commonwealth Games, ICC Cricket World Cup, Indian Premier League, FIFA Football World Cup, Wimbledon tennis tournament

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Elective Courses (EC)

Group B: Marketing Electives

6. Marketing of Non-Profit Organisation

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Non-profit Organization	15
2	Segmenting Targeting Positioning, Product mix & Pricing mix in Non-profit organizations	15
3	Promotion mix, Place mix of non-profit organizations & advocacy of non-profit organizations	15
4	Corporate Social Responsibility, innovations & Ethics in non-profit organizations	15
Total		**60**

Objectives

SN	Objectives
01	This course introduces students to the challenges of marketing in the non-profit sector.
02	To understand the role and application of marketing to promote social change and to achieve social goals for non-profits organizations including social and cause related marketing, fundraising
03	To apply marketing in a diverse range of non-profit environments including charities, social programs and ideas, health, education, arts, as well as goods and services
04	To understand the advocacy v/s lobbying and the concept of CSR and the policy framework of CSR under the Companies Act of 2013

Sr. No.	Modules / Units
1	**Introduction to Non-profit Organization**
	a) **Non-profit organization**: Meaning of Non-Profit Organization, Features of non-profit organization, Characteristics of Non Profit marketing, Stakeholders in non-profit organization, Types of non-profit organization: Charities, newly emerging social enterprise sector, public sector, political parties and campaign organizations, classification of non-profit organizations, Social need: concept, social need as a basis for developing sustainable business model for a non-profit organization. b) **Fundraising**: meaning, common techniques to solicit funds, fund raising loyalty ladder, marketing and communication for fundraising
2	**Segmenting Targeting Positioning, Product mix & Pricing mix in Non-profit organizations**
	a) **Segmentation, Targeting & Positioning of non-profit organizations**: Strategic Marketing for Non-Profit Organization, Steps in Strategic Marketing of non-profit organization, Market Segmentation, Targeting & Positioning in non-profit organization b) **Product mix & Pricing mix in non-profit organization**: Budgeting, cost effective marketing mix, Cost Management, Product or offer in non-profit organization, level of offer in non-profit organization, Pricing Objectives in non-profit organizations, Pricing Strategies in non-profit organizations
3	**Promotion mix, Place mix of non-profit organizations & advocacy of non-profit organizations**
	a) **Promotion Mix**: Promotion of non-profit Organizations: Marketing Communication Strategies, Integrated Marketing Communication in nonprofit organizations, Image & reputation, Marketing Communication process, Marketing communication process, Role of Audience, message and vehicle in non-profit organization communication. Significance of place in non-profit organizations, Challenges for non-profit organizations in rural areas. b) **Advocacy & Fund Raising in non-profit organization**: Meaning, steps in building support for advocacy, advocacy tactics: lobbying, Coalition Building, outreach to media, educating policy makers on issues, educating public on policy issue, building relationship with policy maker. Distinctive characteristics of advocacy groups, Steps in crafting an advocacy plan, steps in engaging policy makers for lobbying, advocacy v/s lobbying, Evaluating advocacy. **Fund Raising**: meaning, Principles of fundraising, Fund raising cycle, The fund raising pyramid and donor life cycle.
4	**Corporate Social Responsibility, innovations & Ethics in non-profit organizations**
	a) **Corporate social responsibility**: CSR, Importance of CSR, history and evolution of CSR, Policy framework for CSR in India, Section 135 of Companies Act 2013, Role of CSR committee on Boards Code of Ethics in non-profit organization, hierarchy of ethical values in non-profit organization, careers in CSR. b) **Trends and Innovations**: Current trends, innovations and opportunities in CSR, Influence of non-profit organizations and their impact on corporate CSR, Challenges faced by non-profit organizations in India. c) **Non-Governmental Organization (NGO)**: Meaning of Non-Government Organization (NGO), Difference between Voluntary Organization & NGO, Steps of Voluntarism, Types of NGO: advocacy of chosen cause, Small or Grassroot NGO, Mother NGO, National NGO, corporate NGO, Global NGO's

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Elective Courses (EC)

Group C: Human Resource Electives

1. HRM in Global Perspective

Modules at a Glance

SN	Modules	No. of Lectures
1	International HRM – An Overview	15
2	Global HRM Functions	15
3	Managing Expatriation and Repatriation	15
4	International HRM Trends and Challenges	15
	Total	**60**

Objectives

SN	Objectives
1	To introduce the students to the study and practice of IHRM
2	To understand the concepts, theoretical framework and issues of HRM in Global Perspective
3	To get insights of the concepts of Expatriates and Repatriates
4	To find out the impact of cross culture on Human Resource Management
5	To provide information about Global Workforce Management
6	To study International HRM Trends and Challenges

SN	Modules/ Units
1	**International HRM – An Overview**
	a) International HRM – An Overview: • International HRM- Meaning and Features, Objectives, Evolution of IHRM, Reasons for Emergency of IHRM, Significance of IHRM in International Business, Scope/Functions • Difference between International HRM and Domestic HRM • Approaches to IHRM- Ethnocentric, Polycentric, Geocentric and Regiocentric • Limitations to IHRM • Qualities of Global Managers • Organizational Dynamics and IHRM • Components of IHRM- Cross Cultural Management and Comparative HRM • Cross Cultural Management- Meaning, Features, Convergence of Cultures, Role of IHRM in Cross Culture Management, Problems of Cross Cultural Issues in Organizations, Importance of Cultural Sensitivity to International Managers • Comparative HRM- Meaning, Importance, Difference between IHRM and Comparative HRM • Managing Diversity in Workforce • Dealing with Cultural Shock
2	**Global HRM Functions**
	a) Global HRM Functions: • International Recruitment and Selection- Meaning- Sources of International Labour Market, Global Staffing, Selection Criteria, Managing Global Diverse Workforce • International Compensation – Meaning, Objectives, Components of International Compensation Program, Approaches to International Compensation • HRM Perspectives in Training and Development - Meaning, Advantages, Cross Cultural Training, Issues in Cross Cultural Training • International Performance Management – Meaning, Factors Influencing Performance, Criterion used for Performance Appraisal of International Employees, Problems Faced in International Performance Management • Motivation and Reward System- Meaning, Benchmarking Global Practices • International Industrial Relations – Meaning, Key Issues in International Industrial Relations, Trade Union and International IR

SN	Modules/ Units
3	**Managing Expatriation and Repatriation**
	a) Managing Expatriation and Repatriation • Concepts of PCNs (Parent-Country Nationals), TCNs(Third-Country Nationals) and HCNs(Host-Country Nationals) • Expatriation- Meaning, Reasons for Expatriation, Factors in Selection of Expatriates, Advantages of Using Expatriates, Limitations of using Expatriates, Role of Family, the Role of Non-expatriates, Reasons for Expatriate Failure, Women and Expatriation, Requirements/Characteristics of Effective Expatriate Managers • Repatriation- Meaning, Repatriation Process, Factors affecting Repatriation Process, Role of Repatriate, Challenges faced by Repatriates
4	**International HRM Trends and Challenges**
	a) International HRM Trends and Challenges: • Emerging Trends in IHRM • Off Shoring – Meaning, Importance, Off Shoring and HRM in India • International Business Ethics and IHRM – Meaning of Business Ethics, Global Values, International Corporate Code of Conduct, Criminalization of Bribery, Operationalizing Corporate Ethics of HR in Overall Corporate Ethics Programme • Managing International Projects and Teams- Meaning, How Projects are Managed across the World and Challenges in Managing International Projects across the World • HR in MNCs – Industrial Relations in MNCs • Role of Technology on IHRM • IHRM and Virtual Organization- Meaning and Features of Virtual Organization, Difference between Virtual Organization and Traditional Organization, Managing HR in Virtual Organization • Growth in Strategic Alliances and Cross Border Mergers and Acquisitions- Impact on IHRM • Knowledge Management and IHRM

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group C: Human Resource Electives

2. Organisational Development

Modules at a Glance

SN	Modules	No. of Lectures
1	International HRM – An Overview	15
2	Global HRM Functions	15
3	Managing Expatriation and Repatriation	15
4	International HRM Trends and Challenges	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concept of Organisational Development and its Relevance in the organisation
2	To Study the Issues and Challenges of OD while undergoing Changes
3	To get an Understanding of Phases of OD Programme
4	To Study the OD Intervention to meet the Challenges faced in the Organisation
5	To get an Insight into Ethical Issues in OD

SN	Modules/ Units
1	**Organisational Development – An Overview**
	a) Organisational Development – An Overview: • Organisational Development – Meaning, Features, Evolution, Components, Objectives, Principles, Process, Importance • Relevance of Organisational Development for Managers, OD- HRD Interface, Participation of Top Management in OD • OD Practitioner – Meaning, Role of OD Practitioner, Competencies of an OD Practitioner • Emerging Trends in OD • OD in Global Setting
2	**Organisational Diagnosis, Renewal and Change**
	a) Organisational Diagnosis, Renewal and Change: • Organisational Diagnosis - Meaning, Need, Phases, Levels of Organisational Diagnosis, Techniques of Organisational Diagnosis, Tools used in Organisational Diagnosis • Organizational Renewal, Re-energising, OD and Business Process Re-Engineering (BPR), OD and Leadership Development • Organisational Change- Meaning, Organisational Life Cycle, Planned Change, Organizational Growth and its Implication for Change • Change Agents- Meaning, Features, Types, Role, Skills required
3	**OD Interventions**
	a) Managing Expatriation and Repatriation • OD Interventions- Meaning, Features, Factors Affecting Success of Interventions, Steps in OD Interventions • Types of Interventions- Human Resource Intervention, Structural Intervention, Strategic Interventions, Third Party Peace Making Intervention • Techniques of OD Intervention : ▪ Traditional: Sensitive Training, Grid Training, Survey Feedback. ▪ Modern : Process Consultation, Third Party, Team Building, Transactional Analysis • Evaluation of OD Interventions : Process, Types, Methods, Importance

SN	Modules/ Units
4	**OD Effectiveness**
	a) OD Effectiveness: • Issues Faced in OD- Issues Related to Client Relationship, Power-Individual skills and Attributes as a Source of Power, Power and Influence Tactics, Politics and OD • Values in OD – Meaning, Professional Values, Value Conflict and Dilemma • Ethics in OD – Meaning, Factors Influencing Ethical Judgement, Ethical Guidelines for OD Professionals • Organisational Effectiveness- Meaning , Effectiveness v/s Efficiency, Approaches of Organisational Effectiveness : Goal Approach, System Resource Approach, Strategic Constituency Approach, Internal Process Approach; Parameters for Judging Organisational Effectiveness, Ways to Enhance Organisational Effectiveness

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group C: Human Resource Electives

3. HRM in Service Sector Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Service Sector Management- An Overview	15
2	Managing Human Element in Service Sector	15
3	Issues and Challenges of HR in Service Sector	15
4	HRP Evaluation, Attrition, Retention & Globalization	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concept and growing importance of HRM in service sector
2	To understand how to manage human resources in service sector
3	To understand the significance of human element in creating customer satisfaction through service quality
4	To understand the Issues and Challenges of HR in various service sectors

SN	Modules/ Units
1	**Service Sector Management- An Overview**
	a) Service Sector Management- An Overview: • **Services -** Meaning, Features, Classification of Services: End User, Degree of Tangibility, People Based Services, Expertise Required, Orientation Towards Profit, By Location • **Service Sector Management –** Meaning, Significance of Service Sector, Reasons for Growth in Service Sector • **Service Organization** - Importance of Layout and Design of Service Organization, Servicescape • **Service Culture in Organization –** Meaning, Developing Service Culture in Organization • **Relationship Marketing –** Meaning, Need and Importance in Service Sector Organizations, Six Market Model • Role of Service Employee • **Role of Customers in Service Process–** Customers as Productive Resources, Customers as Contributors to Service Quality, Customers as Competitors • **Service Encounter and Moment of Truth –**Meaning, Nature, Elements of Service Encounter
2	**Managing Human Element in Service Sector**
	a) Managing Human Element in Service Sector: • **Human Element in Service Sector –** Introduction, Role and Significance • The Services Triangle • **Front Line Employees /Boundary Spanners–** Meaning, Issues Faced by Front Line Employees: Person/ Role Conflicts, Organization/ Client Conflict, Interclient Conflict • **Emotional Labour –** Meaning, Strategies for Managing Emotional Labour • **Recruitment in Service Sector–** Recruiting Right People, Recruitment Procedures and Criteria, Challenges in Recruitment in Service Sector • **Selection of Employees in Service Sector –** Interviewing Techniques: Abstract Questioning, Situational Vignette, Role Playing • Develop People to Deliver Service Quality • Compensating Employees in Service Sector • Motivating Employees for Services • **Empowerment of Service Workers –** Meaning, Advantages and Limitations

SN	Modules/ Units
3	**Issues and Challenges of HR in Service Sector**
	a) Issues and Challenges of HR in Service Sector: • **Quality Issues in Services**: Meaning and Dimensions of Service Quality, The Service – Gap Model, Reasons and Strategies to fill the Gaps • **Delivering Services through Agents and Brokers** - Meaning, Advantages, Challenges, Strategies for Effective Service Delivery through Agents and Brokers • **HRM in Public Sector Organizations and Non –** Profit Sector in India • **Issues and Challenges of HR in Specific Services:** ▪ Business and Professional Services: Banking and Insurance, Legal, Accountancy ▪ Infrastructure: Roads, Railways, Power ▪ Public Services: Police, Defense, Disaster Management ▪ Trade Services: Wholesale and Retail, Advertising, Maintenance and Repairs ▪ Personnel Services: Education, Health Care, Hotels • Social and Charitable Services
4	**HRP Evaluation, Attrition, Retention & Globalization**
	a) HRP Evaluation, Attrition, Retention & Globalization: • **Human Resource Planning Evaluation in Service Sector –** Meaning, HRP Evaluation Process, Purpose of HRP Evaluation in Service Sector, Issues Influencing HRP Evaluation in Service Sector • **Service Leadership –** Meaning, Integrating Marketing Operation and Human Resources, Creating a Leading Service Organization, The Service – Profit Chain Model • **Attrition in Service Sector –**Meaning, Reasons for Attrition in Service Sector, Cycle of Failure, Cycle of Mediocrity and Cycle of Success • **Retaining the Best People in Service Sector –** Including Employees in Company's Vision, Treat Employees as Customers, Measure and Reward String Service Performers • **Globalization of Services-** Meaning, Reasons for Globalization of Services, Impact of Globalization on Indian Service Sector. Organisational Effectiveness, Ways to Enhance Organisational Effectiveness

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group C:Human Resource Electives

4. Workforce Diversity

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Workforce Diversity - An Overview	15
2	Workforce Diversity and HRM Functions	15
3	Strategies to Manage Diversity	15
4	Issues in Managing Diversity and Recent Trends	15
Total		**60**

Objectives

SN	Objectives
01	To understand the nature of workforce diversity
02	To familiarize the learners with the strategies to deal with work force diversity
03	To understand the impact of technology in managing workforce diversity
04	To be able to interlink between workforce diversity and HRM functions

Sr. No.	Modules / Units
1	**Workforce Diversity - An Overview**
	• Meaning of Workforce • Workforce Diversity - Meaning, Features and Significance • Dimensions of Workforce Diversity • Advantages and Limitations of having a diverse workforce • Positive and Negative effects of workforce diversity in workplace
2	**Workforce Diversity and HRM Functions**
	• Steps to Recruiting and Retaining a Diverse Workforce • Workforce Diversity and HRM Functions – Diversity and Recruitment, Diversity and Supervision, Diversity and Training, Diversity and Compensation, Diversity and Performance Management, Diversity and Work life Balance • Role of Recruiter in Hiring Diversified Workforce • Workforce Diversity – Key to Organizational Performance • Workforce Diversity as a Determinant of Sustainable Competitive Advantage
3	**Strategies to Manage Diversity**
	• Organizational Strategies for Managing Workforce Diversity –Workplace Inclusion Strategies through Corporate Leadership, Diversity Training and Mentoring • Diversity Management Programmes - Concept • Corporate Culture and Diversity at workplace • Techniques of Managing Work Force Diversity • Approaches to Diversity Management System
4	**Issues in Managing Diversity and Recent Trends**
	• Best Practices in Achieving Workforce Diversity • Diversity and Multi-culturism • Global workforce diversity management • Recent Trends of Diversity • Role of Technology in Handling Workforce Diversity • Workforce Diversity Management for Creativity and Innovation • Ethical and Legal Issues in Managing Diversity

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group C: Human Resource Electives

5. Human Resource Accounting & Auditing

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Human Resource Accounting: An Overview	15
2	Methods and Human Resource Accounting Practices in India	15
3	Human Resource Audit: An Overview	15
4	HR Audit for Legal Compliance and Safe Business Practices	15
Total		**60**

Objectives

SN	Objectives
01	To understand the value of human resource in organizations
02	To understand the importance of Human Resource Accounting at National and International level
03	To familiarize with the Human Resource Accounting Practices in India
04	To familiarize the learners with the process and approaches of Human Resources Accounting and Audit
05	To understand the significance of Human Resource Auditing as a Tool of Human Resource Valuation

Sr. No.	Modules / Units
1	**Human Resource Accounting: An Overview**
	• Human Resource Accounting – Meaning, Need and Objectives of HR Accounting • Historical Development of Human Resource Accounting, • Cost of Human Resource - Acquisition Cost, Training and Development Cost and additional Cost • Benefits and Limitations of Human Resource Accounting • Reporting of Human Resource Accounting at National Levels • Disclosures at International Level
2	**Methods and Human Resource Accounting Practices in India**
	• **Methods of Human Resource Accounting**: **1. Cost of Production Approach - Concept** i. Historical Cost Model – Meaning, Advantages and Limitations ii. Replacement Cost Model – Meaning, Advantages and Limitations iii. Opportunity Cost - – Meaning, Advantages and Limitations **2. Capitalized Earnings Approach - Concept** i. Economic Value Model - Meaning, Advantages and Limitations ii. Capitalization of Salary - Meaning, Advantages and Limitations • **Statutory Provisions governing HR accounts** • **Human Resource Accounting Practices in India**
3	**Human Resource Audit: An Overview**
	• Human Resource Audit - Meaning, Features, Objectives of HR Audit • Benefits and limitations of HR Audit • Need and Significance of HR Audit • Process of HR Audit • Approaches of HR Audit • Principles of Effective HR Auditing • Role of HR Auditor • Methods of conducting HR Audit – Interview, Workshop, Observation, Questionnaire. • Components of HR Audit • HR Audit and Workforce Issues : Workforce Communication and Employee Relations, Performance Management, Compensation System, Teambuilding System
4	**HR Audit for Legal Compliance and Safe Business Practices**
	• Areas covered by HR Audit - Pre-employment Requirements, Hiring Process, New-hire Orientation Process, Workplace Policies and Practices • HR Audit as Intervention - Introduction, Effectiveness of Human Resource Development Audit as an Intervention • Human Resource Audit and Business Linkages • Human Resource Auditing as a Tool of Human Resource Valuation: Introduction, Rationale of Human Resource Valuation and Auditing, Valuation of Human Resources, Issues in Human Capital Measurement and Reporting.

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Elective Courses (EC)

Group C: Human Resource Electives

6. Indian Ethos in Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Indian Ethos – An Overview	15
2	Work Ethos and Values	15
3	Stress Management	15
4	Indian Systems of Learning	15
	Total	**60**

Objectives

SN	Objectives
1	To understand the concept of Indian Ethos in Management
2	To link the Traditional Management System to Modern Management System
3	To understand the Techniques of Stress Management
4	To understand the Evolution of Learning Systems in India

SN	Modules/ Units
1	**Indian Ethos – An Overview**
	a) Indian Ethos • Meaning, Features, Need, History, Relevance, Principles Practised by Indian Companies, Requisites, Elements, Role of Indian Ethos in Managerial Practices **b) Management Lessons from Scriptures:** • Management Lessons from Vedas, Management Lessons from Mahabharata, Management Lessons from Bible, Management Lessons from Quran, Management Lessons from Kautilya's Arthashastra Indian Heritage in Business, Management, Production and Consumption. Ethics v/s Ethos Indian Management v/s Western Management
2	**Work Ethos and Values**
	a) Work Ethos: • Meaning, Levels, Dimensions, Steps, Factors Responsible for Poor Work Ethos **b) Values:** • Meaning, Features, Values for Indian Managers, Relevance of Value Based Management in Global Change, Impact of Values on Stakeholders: Employees, Customers, Government, Competitors and Society. • Values for Managers, Trans-Cultural Human Values in Management and Management Education, Secular v/s Spiritual Values in Management, Importance of Value System in Work Culture
3	**Stress Management**
	a) Stress Management: • Meaning, Types of Stress at Work, Causes of Stress, Consequences of Stress b) **Stress Management Techniques:** • Meditation : Meaning, Techniques, Advantages, Mental Health and its Importance in Management, Brain Storming, Brain Stilling, Yoga: Meaning, Significance **c) Leadership:** • Meaning, Contemporary Approaches to Leadership, Joint Hindu Family Business – Leadership Qualities of Karta **d) Motivation:** • Meaning, Indian Approach to Motivation, Techniques

SN	Modules/ Units
4	**Indian Systems of Learning**
	a) Learning: Meaning, Mechanisms • Gurukul System of Learning : Meaning, Features, Advantages, Disadvantages • Modern System of Learning: Meanings, Features, Advantages, Disadvantages • Karma: Meaning, Importance of Karma to Managers, Nishkama Karma • Laws of Karma: The Great Law, Law of Creation, Law of Humility, Law of Growth, Law of Responsibility, Law of Connection • Corporate Karma: Meaning, Methodology, Guidelines for good Corporate Karma • Self-Management: Personal growth and Lessons from Ancient Indian Education System • Personality Development: Meaning, Determinants, Indian Ethos and Personality Development

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester VI with effect from the Academic Year 2018-2019

Core Course (CC)

5. Operations Research

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Operations Research and Linear Programming	15
2	Assignment and Transportation Models	15
3	Network Analysis	15
4	Job Sequencing and Theory of Games	15
	Total	**60**

Objectives

SN	Objectives
1	To help students to understand operations research methodologies
2	To help students to solve various problems practically
3	To make students proficient in case analysis and interpretation

SN	Modules/ Units
1	**Introduction to Operations Research and Linear Programming**
	a) Introduction To Operations Research • Operations Research - Definition, Characteristics of OR, OR Techniques, Areas of Application, Limitations of OR. **b) Linear Programming Problems: Introduction and Formulation** • Introduction to Linear Programming • Applications of LP • Components of LP • Requirements for Formulation of LP Problem • Assumptions Underlying Linear Programming • Steps in Solving LP Problems • LPP Formulation (Decision Variables, Objective Function, Constraints, Non Negativity Constraints) **c) Linear Programming Problems: Graphical Method** • Maximization & Minimization Type Problems. (Max. Z & Min. Z) • Two Decision Variables and Maximum Three Constraints Problem • Constraints can be "less than or equal to", "greater than or equal to" or a combination of both the types i.e. mixed constraints. • Concepts: Feasible Region of Solution, Unbounded Solution, Redundant Constraint, Infeasible Solution, Alternative Optima. **d) Linear Programming Problems: Simplex Method** • Only Maximization Type Problems. (Only Max. Z). No Minimization problems. (No Min. Z) Numericals on Degeneracy in Maximization Simplex Problems. • Two or Three Decision Variables and Maximum Three Constraints Problem. (Up to Maximum Two Iterations) • All Constraints to be "less than or equal to" Constraints. ("Greater than or Equal to" Constraints not included.) • Concepts : Slack Variables, Surplus Variables, Artificial Variables, Duality, Product Mix and Profit, Feasible and Infeasible Solution, Unique or Alternate Optimal Solution, Degeneracy, Non Degenerate, Shadow Prices of Resources, Scarce and Abundant Resources, Utilized and Unutilized Capacity of Resources, Percentage Utilization of Resources, Decision for Introduction of a New Product. **Note:** 1. Surplus Variable, Artificial Variable and Duality to be covered only at Conceptual level for Theory Questions only and not included in Numerical. 2. Sensitivity Analysis including Profit Range and Capacity Range is not included.

SN	Modules/ Units
2	**Assignment and Transportation Models**
	a) Assignment Problem – Hungarian Method • Maximization & Minimization Type Problems. • Balanced and Unbalanced Problems. • Prohibited Assignment Problems, Unique or Multiple Optimal Solutions. • Simple Formulation of Assignment Problems. • Maximum 5 x 5 Matrix. Up to Maximum Two Iterations after Row and Column Minimization. **Note:** 1. Travelling Salesman Assignment Problem is not included. **b) Transportation Problems** • Maximization & Minimization Type Problems. • Balanced and Unbalanced problems. • Prohibited Transportation Problems, Unique or Multiple Optimal Solutions. • Simple Formulation of Transportation Problems. • Initial Feasible Solution (IFS) by: a. North West Corner Rule (NWCR) b. Least Cost Method (LCM) c. Vogel's Approximation Method (VAM) • Maximum 5 x 5 Transportation Matrix. • Finding Optimal Solution by Modified Distribution (MODI) Method. (u, v and Δ) • Maximum Two Iterations (i.e. Maximum Two Loops) after IFS. **Note:** 1. Production Scheduling Problem is not included. 2. Time Minimization Problem is not included. 3. Degeneracy Concept to be covered only at Conceptual Level. Not to be included in Numerical.

SN	Modules/ Units
3	**Network Analysis**
	a) Critical Path Method (CPM) • Concepts: Activity, Event, Network Diagram, Merge Event, Burst Event, Concurrent and Burst Activity, • Construction of a Network Diagram. Node Relationship and Precedence Relationship. • Principles of Constructing Network Diagram. • Use of Dummy Activity • Numerical Consisting of Maximum Ten (10) Activities. • Critical Path, Sub-critical Path, Critical and Non-critical Activities, Project Completion Time. • Forward Pass and Backward Pass Methods. • Calculation of EST, EFT, LST, LFT, Head Event Slack, Tail Event Slack, Total Float, Free Float, Independent Float and Interfering Float **b) Project Crashing** • Meaning of Project Crashing. • Concepts: Normal Time, Normal Cost, Crash Time, Crash Cost of Activities. Cost Slope of an Activity. • Costs involved in Project Crashing: Numericals with Direct, Indirect, Penalty, crash cost and Total Costs. • Time – Cost Trade off in Project Crashing. • Optimal (Minimum) Project Cost and Optimal Project Completion Time. • Process of Project Crashing. • Numerical Consisting of Maximum Ten (10) Activities. • Numerical based on Maximum Four (04) Iterations of Crashing **c) Program Evaluation and Review Technique (PERT)** • Three Time Estimates of PERT: Optimistic Time (a), Most Likely Time (m) and Pessimistic Time (b). • Expected Time (te) of an Activity Using Three Time Estimates. • Difference between CPM and PERT. • Numerical Consisting of Maximum Ten (10) Activities. • Construction of PERT Network using tevalues of all Activities. • Mean (Expected) Project Completion Time. • Standard Deviation and Variance of Activities. • Project Variance and Project Standard Deviation. • 'Prob. Z' Formula. • Standard Normal Probability Table. Calculation of Probability from the Probability Table using 'Z' Value and Simple Questions related to PERT Technique. • Meaning, Objectives, Importance, Scope, RORO/LASH

SN	Modules/ Units
4	**Job Sequencing and Theory of Games**
	a) Job Sequencing Problem • Processing Maximum 9 Jobs through Two Machines only. • Processing Maximum 6 Jobs through Three Machines only. • Calculations of Idle Time, Elapsed Time etc. **b) Theory of Games** • Introduction • Terminology of Game Theory: Players, Strategies, Play, Payoff, Payoff matrix, Maximin, Maximax, Saddle Point. • Types of Games. • Numericals based on: ▪ Two Person Zero Sum Games including strictly determinable and Fair Game - Pure Strategy Games (Saddle Point available). Principles of Dominance method.

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1. Introduction to Financial Accounts

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	15
2	Accounting Transactions	15
3	Depreciation Accounting & Trial Balance	15
4	Final Accounts	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	• **Meaning and Scope of Accounting:** Need and development, definition: Book-Keeping and accounting, Persons interested in accounting, Branches of accounting, Objectives of accounting • **Accounting principles**: Introductions to Concepts and conventions. • **Introduction to Accounting Standards:** Meaning and Scope) ▪ **AS 1** : Disclosure to Accounting Policies ▪ **AS 6:** Depreciation Accounting. ▪ **AS 9:** Revenue Recognition. ▪ **AS 10:** Accounting For Fixed Assets. • **International Financial Reporting Standards (IFRS):** Introduction to IFRS ▪ **IAS-1:**Presenttion of Financial Statements (Introductory Knowledge) ▪ **IAS-2:**Inventories (Introductory Knowledge) • **Accounting in Computerized Environment:** Introduction, Features and application in various areas of Accounting
2	**Accounting Transactions**
	• **Accounting transactions**: Accounting cycle, Journal, Journal proper, Opening and closing entries, Relationship between journal & ledger: Rules regarding posting: Trial balance: Subsidiary books (Purchase, Purchase Returns, Sales, Sales Returns & cash book –Triple Column), Bank Reconciliation Statement. • **Expenditure**:Classification of Expenditure- Capital, revenue and Deferred Revenue expenditureUnusual expenses: Effects of error: Criteria test. • **Receipts:** Capital receipt, Revenue receipt, distinction between capital receipts and revenue receipts. • **Profit or Loss:** Revenue profit or loss, capital profit or loss
3	**Depreciation Accounting & Trial Balance**
	• **Depreciation accounting:** Practical problem based on depreciation using SLM and RBM methods. (Where Provision for depreciation Account not maintained). • **Preparation of Trial Balance:**Introduction and Preparation of Trial Balance
4	**Final Accounts**
	• Introduction to Final Accounts of a Sole proprietor. • Rectification of errors. • Manufacturing Account, Trading Account, Profit and Loss Account and Balance Sheet. • Preparation and presentation of Final Accounts in horizontal format • Introduction to Schedule 6 of Companies Act ,1956

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2. Business Law

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Contract Act, 1872 & Sale of Goods Act, 1930	15
2	Negotiable Instrument Act, 1981 & Consumer Protection Act, 1986	15
3	Company Law	15
4	Intellectual Property Rights(IPR)	15
	Total	60

Sr. No.	Modules / Units
1	**Contract Act, 1872 & Sale of Goods Act, 1930**
	• **Contract Act,1872:** Essential elements of Contract; Agreement and Contract – Capacity to Contract, free consent, consideration, lawful objects/ consideration, Breach of contract. Remedies for breach of Contract. • **Sale of Goods Act,1930:** Scope of Act, Sale and Agreement to sell, essential of a valid Sale Contract – Conditions and warranties – Implied Condition and warranties, Rights of an unpaid seller.
2	**Negotiable Instrument Act, 1981 & Consumer Protection Act, 1986**
	• **Negotiable Instrument Act,1981:** Introduction of Negotiable Instruments – Characteristics of negotiable instruments, Promissory note, Bills of exchange, Cheque, Dishonour of Cheque. • **Consumer Protection Act, 1986:** Objects of Consumer Protection- Introduction of Consumers, who is consumer? Meaning of the words "Goods and services" – Meaning of thewords "Defects and Deficiencies of goods and services" Consumer disputes and Complaints.
3	**Company Law**
	• **Company Law:** What is company? – Incorporation of company – MOA, AOA, Prospectus, Meetings, Meaning of transfer and transmission of shares.
4	**Intellectual Property Rights(IPR)**
	• **Intellectual Property Rights (IPR)** ▪ IPR definition/ objectives ▪ Patent definition. What is patentable? What is not patentable? Invention And its Attributes, Inventors and Applications ▪ Trademarks, definition, types of trademarks, infringement and passing off. ▪ Copy right definition and subject in which copy right exists, Originality, Meaning and Content, Authors and Owners, Rights and Restrictions. ▪ Geographical indications (only short notes)

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3. Business Statistics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Statistics	15
2	Measures of Dispersion, Co-Relation and Linear Regression	15
3	Time Series and Index Number	15
4	Probability andDecision Theory	15
	Total	60

Sr. No.	Modules / Units
1	**Introduction to Statistics**
	• **Introduction:** Functions/Scope, Importance, Limitations • **Data:** Relevance of Data(Current Scenario), Type of data(Primary & Secondary), Primary(Census vs Samples, Method of Collection (In Brief), Secondary(Merits, Limitations, Sources) (In Brief) • **Presentation Of Data:**Classification – Frequency Distribution – Discrete & Continuous, Tabulation, Graph(Frequency, Bar Diagram, Pie Chart, Histogram, Ogives) • **Measures Of Central Tendency:**Mean(A.M, Weighted, Combined), Median(Calculation and graphical using Ogives), Mode(Calculation and Graphical using Histogram), Comparative analysis of all measures of Central Tendency
2	**Measures of Dispersion, Co-Relation and Linear Regression**
	• **Measures Of Dispersion:** Range with C.R(Co-Efficient Of Range), Quartiles & Quartile deviation with CQ (Co-Efficient Of Quartile), Mean Deviation from mean with CMD (Co-Efficient Of Mean Deviation), Standard deviation with CV(Co-Efficient Of Variance), Skewness& Kurtosis (Only concept) • **Co-Relation:** Karl Pearson, Rank Co-Relation • **Linear Regression:** Least Square Method
3	**Time Series and Index Number**
	• **Time Series:** Least Square Method, Moving Average Method, Determination of Season • **Index Number:** Simple(unweighted) Aggregate Method, Weighted Aggregate Method, Simple Average of Price Relatives, Weighted Average of Price Relatives, Chain Base Index Numbers, Base Shifting, Splicing and Deflating, Cost of Living Index Number
4	**Probability and Decision Theory**
	• **Probability:** Concept of Sample space, Concept of Event, Definition of Probability, Addition & Multiplication laws of Probability, Conditional Probability, Bayes' Theorem(Concept only), Expectation & Variance, Concept of Probability Distribution(Only Concept) • **Decision Theory:** Acts, State of Nature Events, Pay offs, Opportunity loss, Decision Making under Certainty, Decision Making under Uncertainty, • Non-Probability: Maximax, Maximin, Minimax, Regret, Laplace &Hurwicz) • **Probabilitistics (Decision Making under risk):**EMV, EOL, EVPI • Decision Tree

Ability Enhancement Courses (AEC)

4. Business Communication- I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	15
2	Obstacles to Communication in Business World	15
3	Business Correspondence	15
4	Language and Writing Skills	15
	Total	**60**

Sr. No.	Modules / Units
1	**Theory of Communication**
	Concept of Communication: Meaning, Definition, Process, Need, FeedbackEmergence of Communication as a key concept in the Corporate and Global worldImpact of technological advancements on Communication **Channels and Objectives of Communication**: **Channels-** Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine **Objectives of Communication**: Information, Advice, Order and Instruction, Persuasion, Motivation, Education,Warning, and Boosting the Morale of Employees(A brief introduction to these objectives to be given) **Methods and Modes of Communication:** Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	**Obstacles to Communication in Business World**
	Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers **Listening:** Importance of Listening Skills, Cultivating good Listening Skills – 4 **Introduction to Business Ethics:** Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	**Business Correspondence**
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, **Personnel Correspondence:** Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]

Sr. No.	Modules / Units
4	**Language and Writing Skills**
	Commercial Terms used in Business Communication **Paragraph Writing:** Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] **Activities** ▪ Listening Comprehension ▪ Remedial Teaching ▪ Speaking Skills: Presenting a News Item, Dialogue and Speeches ▪ Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. ▪ Reading Comprehension: Analysis of texts from the fields of Commerce and Management

Revised Syllabus of Courses ofBachelor of Management Studies (BMS)Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course -I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity- 1	10
3	Concept of Disparity-2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Indian Society**
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	**Concept of Disparity- 1**
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	**Concept of Disparity-2**
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	**The Indian Constitution**
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	**Significant Aspects of Political Processes**
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

Revised Syllabus of Courses ofBachelor of Management Studies (BMS)Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	45

Sr. No.	Modules / Units
1	**Introduction to NSS**
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level **National Service Scheme(NSS) Regular activities** Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	**Concept of Society and Social Issues in India**
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India **Basic social issues in India** Degeneration of value system, Family system, Gender issues, Regional imbalance
3	**Indian Constitution and Social Justice**
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development **Social Justice** Social Justice- the concept and its features Inclusive growth- the concept and its features
4	**Human Personality and National Integration**
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. **National integration & Communal Harmony** National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

Revised Syllabus of Courses ofBachelor of Management Studies (BMS) Programme at Semester I WithEffect from the Academic Year 2016-2017

Core Courses (CC)

6.Foundation of Human Skills

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Understanding of Human Nature	15
2	Introduction to Group Behaviour	15
3	Organizational Culture and Motivation at workplace	15
4	Organisational Change, Creativity and Development and Work Stress	15
	Total	**60**

Sr. No.	Modules / Units
1	**Understanding of Human Nature**
	• **IndividualBehaviour:**Concept of a man, individual differences, factors affecting individual differences, Influence of environment • **Personality and attitude:** Determinants of personality, Personality traits theory, Big five model, Personality traits important for organizational behaviour like authoritarianism, locus of control, Machiavellianism, introversion-extroversion achievement orientation , self – esteem, risk taking, self-monitoring and type A and B personalities, Concept of understanding self through JOHARI WINDOWS, Nature and components of attitude, Functions of attitude, Ways of changing attitude, Reading emotions • **Thinking, learning and perceptions:** Thinking skills, thinking styles and thinking hat, Managerial skills and development, Learning characteristics, theories of learning (classical conditioning, operant conditioning and social learning approaches), Intelligence, type (IQ, EQ, SQ, at work place), Perception features and factor influencing individual perception, Effects of perceptual error in managerial decision making at work place. (Errors such as Halo effect, stereotyping, prejudice attributional).
2	**Introduction to Group Behaviour**
	• **Introduction to Group Behaviour** ▪ **Group Dynamics:** Nature, types, group behaviour model (roles, norms, status, process, structures) ▪ **Team effectiveness:** nature, types of teams, ways of forming an effective team. ▪ Setting goals. • **Organizational processes and system.** ▪ **Power and politics:** nature, bases of power, politics nature, types, causes of organizational politics, political games. ▪ **Organizational conflicts and resolution**: Conflict features, types, causes leading to organizational conflicts, levels of conflicts, ways to resolve conflicts through five conflicts resolution strategies with outcomes.
3	**Organizational Culture and Motivation at workplace**
	• **Organizational Culture:** ▪ Characteristics of organizational culture. ▪ Types, functions and barriers of organizational culture ▪ Ways of creating and maintaining effective organization culture • **Motivation at workplace**: Concept of motivation Theories of motivation in an organisational set up. ▪ A.Maslow Need Heirachy ▪ F.Hertzberg Dual Factor ▪ Mc.Gregor theory X and theory Y. Waysofmotivating through carrot (positive reinforcement) and stick (negative reinforcement) at workplace.

4	Organisational Change, Creativity and Development and Work Stress
	• **Organisational change and creativity:** Concepts of organisational change, Factors leading/influencing organisational change, Kurt Lewins model of organisational change and development, Creativity and qualities of a creative person, Ways of enhancing creativity for effective decision making, Creative problem solving. • **Organisational Development and work stress:** Need for organisational development, OD Techniques, Stress, types of stress, Causes and consequences of job stress, Ways for coping up with job stress

Revised Syllabus of Courses ofBachelorof Management Studies (BMS) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

7. Business Economics - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	10
3	Supply and Production Decisions and Cost of Production	15
4	Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition	15
5	Pricing Practices	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	**Demand Analysis**
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts **Demand estimation and forecasting:** Meaning and significance - methods of demand estimation : survey and statistical methods *(numerical illustrations on trend analysis and simple linear regression)*
3	**Supply and Production Decisions and Cost of Production**
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale. **Cost concepts:** Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run *(hypothetical numerical problems to be discussed)*, LAC and Learning curve - Break even analysis *(with business applications)*
4	**Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition**
	Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under Monopoly **Monopolistic competition:**Equilibrium of a firm under monopolistic competition, debate over role of advertising *(topics to be taught using case studies from real life examples)* **Oligopolistic markets:** key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models *(with practical examples)*
5	**Pricing Practices**
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing *(case studies on how pricing methods are used in business world)*

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses(EC)

1. Principles of Marketing

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Marketing	15
2	Marketing Environment, Research and Consumer Behaviour	15
3	Marketing Mix	15
4	Segmentation, Targeting and Positioning and Trends In Marketing	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Marketing**
	• **Introduction to Marketing:**Definition, features, advantages and scope of marketing. The 4P's and 4C's of marketing. Marketing v/s Selling. Marketing as an activity and function • **Concepts of Marketing:** Needs, wants and demands, transactions, transfer and exchanges. • **Orientations of a firm:** Production concept; Product concept; selling concept and marketing concept, social relationship, Holistic marketing.
2	**Marketing Environment, Research and Consumer Behaviour**
	• **The micro environment of business:** Management structure; Marketing Channels; Markets in which a firm operates; competitors and stakeholders. • **Macro environment:** Political Factors; Economic Factors; Socio Cultural Factors , Technological Factors (PEST Analysis) • **Marketing research:** Meaning, features, Importance of marketing research. Types of marketing research: Product research; Sales research; consumer/customer research; production research • **MIS:**Meaning, features and Importance • **Consumer Behaviour:** Meaning, feature, importance, factors affecting Consumer Behaviour
3	**Marketing Mix**
	• **Marketing mix:** Meaning –elements of Marketing Mix. • Product-product mix-product line lifecycle-product planning – New product development- failure of new product-levels of product. • Branding –Packing and packaging – role and importance • Pricing – objectives- factors influencing pricing policy and Pricing strategy. • Physical distribution – meaning – factor affecting channel selection-types of marketing channels • Promotion – meaning and significance of promotion. Promotion • tools (brief)
4	**Segmentation, Targeting and Positioning and Trends In Marketing**
	• Segmentation – meaning , importance , basis • Targeting – meaning , types • Positioning – meaning – strategies • New trends in marketing – E-marketing , Internet marketing and marketing using Social network • Social marketing/ Relationship marketing

Elective Courses (EC)

2.Industrial Law

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Laws Related to Industrial Relations and Industrial Disputes	15
2	Laws Related to Health, Safety and Welfare	15
3	Social Legislation	15
4	Laws Related to Compensation Management	15
	Total	60

Sr. No.	Modules / Units
1	**Laws Related to Industrial Relations and Industrial Disputes**
	• Industrial Disputes Act, 1947: Definition, Authorities, Awards, Settlements, Strikes Lockouts, Lay Offs, Retrenchment and Closure • The Trade Union Act, 1926
2	**Laws Related to Health, Safety and Welfare**
	• The Factory Act 1948: (Provisions related to Health, Safety and Welfare) • The Workmen's Compensation Act, 1923 Provisions: ▪ Introduction: The doctrine of assumed risk, The doctrine of Common Employment, The doctrine of Contributory Negligence ▪ Definitions ▪ Employers liability for compensation (S-3 to 13) ▪ Rules as to Compensation (Sec 4 to Sec 9) (14 A & 17)
3	**Social Legislation**
	• Employee State Insurance Act 1948: Definition and Employees Provident Fund • Miscellaneous Provision Act 1948: Schemes, Administration and determination of dues
4	**Laws Related To Compensation Management**
	• The payment of Wages Act 1948: Objectives, Definition, Authorised Deductions • Payment of Bonus Act, 1965 • The Payment Of Gratuity Act, 1972

Revised Syllabus of Courses of Bachelor of Management Studies (BMS) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3.Business Mathematics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Elementary Financial Mathematics	15
2	Matrices and Determinants	15
3	Derivatives and Applications of Derivatives	15
4	Numerical Analysis [Interpolation]	15
	Total	60

Sr. No.	Modules / Units
1	**Elementary Financial Mathematics**
	• **Simple and Compound Interest**: Interest compounded once a year, more than once a year, continuous, nominal and effective rate of interest • Annuity-Present and future value-sinking funds • **Depreciation of Assets:** Equated Monthly Installments (EMI)- using flat interest rate and reducing balance method. • **Functions:**Algebraic functions and the functions used in business and economics, Break Even and Equilibrium point. • **Permutation and Combination:** (Simple problems to be solved with the calculator only)
2	**Matrices and Determinants**
	• **Matrices:** Some important definitions and some important results. Matrix operation (Addition, scalar multiplication , matrix multiplication, transpose of a matrix) • **Determinants of a matrix of order two or three**: properties and results of Determinants • Solving a system of linear equations using Cramer's rule • Inverse of a Matrix (up to order three) using ad-joint of a matrix and matrix inversion method • **Case study:** Input Output Analysis
3	**Derivatives and Applications of Derivatives**
	• **Introduction and Concept:** Derivatives of constant function, logarithmic functions, polynomial and exponential function • **Rules of derivatives:** addition, multiplication, quotient • Second order derivatives • **Application of Derivatives:** Maxima, Minima, Average Cost and Marginal Cost. Total revenue, Marginal revenue, Average revenue. Average and Marginal profit. Price elasticity of demand
4	**Numerical Analysis [Interpolation]**
	• **Introduction and concept**: Finite differences – forward difference operator – Newton's forward difference formula with simple examples • Backward Difference Operator. Newton's backward interpolation formula with simple examples

Ability Enhancement Courses (AEC)

4. Business Communication - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	15
2	Group Communication	15
3	Business Correspondence	15
4	Language and Writing Skills	15
	Total	60

Sr. No.	Modules / Units
1	**Presentation Skills**
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	**Group Communication**
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit **Meetings:**Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions **Conference:**Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele – Conferencing **Public Relations:** Meaning, Functions of PR Department, External and Internal Measures of PR
3	**Business Correspondence**
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) **Only following to be taught in detail:-** Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	**Language and Writing Skills**
	Reports: Parts, Types, Feasibility Reports, Investigative Reports **Summarisation:** Identification of main and supporting/sub points Presenting these in a cohesive manner

Skill Enhancement Courses (SEC)

5. Foundation Course – II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	45

Sr. No	Modules /Units
1	**Globalisation and Indian Society**
	Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	**Human Rights**
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	**Ecology**
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation- causes and impact on human life;Sustainable development- concept and components; poverty and environment
4	**Understanding Stress and Conflict**
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	**Managing Stress and Conflict in Contemporary Society**
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society

Core Courses (CC)

6.Business Environment

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Business Environment	15
2	Political and Legal environment	15
3	Social and Cultural Environment, Technological environment and Competitive Environment	15
4	International Environment	15
	Total	60

Sr. No.	Modules / Units
1	**Introduction to Business Environment**
	• **Business:** Meaning, Definition, Nature & Scope, Types of Business Organizations • **Business Environment**: Meaning, Characteristics, Scope and Significance, Components of Business Environment • **Micro and Macro Environment:** Definition, Differentiation, Analysis of Business Environment, SWOT Analysis. • **Introduction to Micro-Environment**: ▪ **Internal Environment:** Value system, Mission, Objectives, Organizational Structure, Organizational Resources, Company Image, Brand Equity ▪ **External Environment:** Firm, customers, suppliers, distributors, Competitors, Society • **Introduction to Macro Components**: Demographic, Natural, Political, Social, Cultural, Economic, Technological, International and Legal)
2	**Political and Legal environment**
	• **Political Institutions:** Legislature, Executive, Judiciary, Role of government in Business, Legal framework in India. • **Economic environment:** economic system and economic policies. Concept of Capitalism, Socialism and Mixed Economy • Impact of business on Private sector, Public sector and Joint sector • Sun-rise sectors of India Economy. Challenges of Indian economy.
3	**Social and Cultural Environment, Technological environment and Competitive Environment**
	• **Social and Cultural Environment:** Nature, Impact of foreign culture on Business, Traditional Values and its Impact, Social Audit - Meaning and Importance of Corporate Governance and Social Responsibility of Business • **Technological environment:** Features, impact of technology on Business • **Competitive Environment:** Meaning, Michael Porter's Five Forces Analysis, Competitive Strategies
4	**International Environment**
	• **International Environment –** ▪ **GATT/ WTO:** Objective and Evolution of GATT, Uruguay round, GATT v/s WTO, Functions of WTO, Pros and Cons of WTO. ▪ **Globalization:** Meaning, Nature and stages of Globalization, features of Globalization, Foreign Market entry strategies, LPG model. ▪ **MNCs:** Definition, meaning, merits, demerits, MNCs in India ▪ **FDI:** Meaning, FDI concepts and functions, Need for FDI in developing countries, Factors influencing FDI, FDI operations in India, • **Challenges faced by International Business and Investment Opportunities for Indian Industry.**

Core Courses (CC)

7. Principles of Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Nature of Management	15
2	Planning and Decision Making	15
3	Organising	15
4	Directing, Leadership, Co-ordination and Controlling	15
	Total	60

Sr. No.	Modules / Units
1	**Nature of Management**
	• **Management:** Concept, Significance, Role & Skills, Levels of Management, Concepts of PODSCORB, Managerial Grid. • Evolution of Management thoughts, Contribution of F.W Taylor, Henri Fayol and Contingency Approach.
2	**Planning and Decision Making**
	• **Planning:** Meaning, Importance, Elements, Process, Limitations and MBO. • **Decision Making**: Meaning, Importance, Process, Techniques of Decision Making.
3	**Organizing**
	• **Organizing:** Concepts, Structure (Formal & Informal, Line & Staff and Matrix), Meaning, Advantages and Limitations • **Departmentation:** Meaning, Basis and Significance • **Span of Control:** Meaning, Graicunas Theory, Factors affecting span of ControlCentralization vs Decentralization • **Delegation:** Authority & Responsibility relationship
4	**Directing, Leadership, Co-ordination and Controlling**
	• **Directing:** Meaning and Process • **Leadership:** Meaning, Styles and Qualities of Good Leader • **Co-ordination** as an Essence of Management • **Controlling:** Meaning, Process and Techniques • **Recent Trends:** Green Management & CSR

Academic Council:

Item No:

UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.Sc.

(Restructured)

Programme: B.Sc.

Course: Biotechnology

with effect from the academic year

2017 – 2018

SEMESTER- III				
Course code	**Course type**	**Course Title**	**Credits**	**Lectures/ Week**
USBT301	Core Subject	Biophysics	2	3
USBT302	Core subject	Applied Chemistry- I	2	3
USBT303	Core Subject	Immunology	2	3
USBT304	Core Subject	Cell Biology and Cytogenetics	2	3
USBT305	Core Subject	Molecular Biology	2	3
USBT306	Skill enhancement elective	Bioprocess Technology	2	3
USBT307	General Elective	Research Methodology	2	3
USBTP301	Core subject Practicals	Practicals of USBT301 and USBT302	2	6
USBTP302	Core subject Practicals	Practicals of USBT303 and USBT304	2	6
USBTP303	Core Subject and Skill enhancement elective Practicals	Practicals of USBT305 and USBT306	2	6
SEMESTER-IV				
Course code	**Course type**	**Course Title**	**Credits**	**Lectures/ Week**
USBT401	Core Subject	Biochemistry	2	3
USBT402	Core subject	Applied Chemistry- II	2	3
USBT403	Core Subject	Medical Microbiology	2	3
USBT404	Core Subject	Environmental Biotechnology	2	3
USBT405	Core Subject	Biostatistics and Bioinformatics	2	3
USBT406	Skill enhancement elective	Molecular Diagnostics	2	3
USBT407	General Elective	Entrepreneurship Development	2	3
USBTP401	Core subject Practicals	Practicals of USBT401 and USBT402	2	6
USBTP402	Core subject Practicals	Practicals of USBT403 and USBT404	2	6
USBTP403	Core Subject and Skill enhancement elective Practicals	Practicals of USBT405 and USBT406	2	6

SEMESTER III

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT301	**BIOPHYSICS**	**2**		
Course objectives:- The objective of this course is to have a firm foundation in the fundamentals and applications of current biophysical theories. **Learning outcomes:-** By the end of the course the student will: • develop an understanding of the different aspects of classical physics. • be able to relate principles of physics to applications and techniques in the field of biology such as microscopy, spectroscopy and electrophoresis.				
UNIT I **Optics and Electromagnetic Radiations**	**Introduction to Optics and Lasers:** ***Optics* :** Properties of Light - Reflection, Refraction, Dispersion, Interference. ***Lasers* :** Properties of Lasers, Stimulated Emissions, Laser Action; Applications of Laser. **Electromagnetic Radiations:** Introduction to Electromagnetic Radiation. **Spectroscopy :** Types and Properties of Spectra; Basic Laws of Light Absorption. Spectrophotometer:-Principle, Instrumentation and Applications; UV-Vis Spectrophotometer, Single and Dual Beam Spectrophotometer. **Microscopy:** Types of Microscopy; Electron Optics; Electron Microscopy- Preparation of Specimen, SEM, TEM and Immuno-Electron Microscopy. Fluorescence Microscopy.		15	
UNIT II **Heat, Sound, Magnetism and Fluid Dynamics**	**Heat:** Concept of Temperature; Modes of Heat Transfer; Measuring Temperature; Platinum Resistance Thermometer; Thermocouple and Thermistors. **Sound:** Types of Sound Waves - Audible, Ultrasonic and Infrasonic Waves; Doppler Effect; Applications of Ultrasonic Waves. **Magnetism:** Magnetic Field; Magnetism of Earth; Para-magnetism, Diamagnetism, Ferromagnetism. Nuclear Magnetism and Biomagnetism.		15	

	Fluid Dynamics : ***Viscosity*:** Definition Flow of Liquids through Capillaries; Stokes' Law; Terminal Velocity. Determination of 'η' by Falling Sphere Method; Viscosity Estimation by Oswald's Viscometer. ***Surface Tension*:** Definition - Surface Tension and Surface Energy; Capillary Action; Angle of Contact; Wettability; Temperature Dependence of Surface Tension. Applications in Biology.			
UNIT III **Electrophoretic Techniques**	**Electrophoresis:** Migration of Ions in an applied electric field; Factors affecting Electrophoretic Mobility; Moving Boundary Electrophoresis; Principle of Electrophoresis; Supporting Matrix; Paper electrophoresis; AGE; Native and SDS PAGE (reducing and non-reducing, continuous and discontinuous);IEF and 2D PAGE. Staining and Detection methods; Gel-Documentation. Applications in Biology.		15	

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT302	**APPLIED CHEMISTRY –I**	**2**		
Course objectives:- The objective of this course is to have a firm foundation in the fundamentals and applications of organic and green chemistry. **Learning outcomes:-** By the end of the course the student will be able to: • develop an understanding of the different aspects of organic and green chemistry. • discuss role of organic compounds in biology and synthesis of organic compounds. • discuss role of green chemistry and its application in industry.				
UNIT I **Organic Chemistry**	**Introduction to Types of Organic Reactions :** Addition, Elimination and Substitution Reactions. Essential and Non-essential Elements in Biological Systems. Role of Metal Ions in Biological Systems. **Metal Coordination in Biological Systems :** Enzymes, Apoenzymes and Coenzymes. Biological Role of Metalloenzymes wrt Myoglobins, Haemoglobin. Biological Role of Carboxypeptidases, Catalases and Peroxidases.		15	

	Structure and Function : Dioxygen Binding, Transfer and Utilization; Metal Complexes in Medicines.			
UNIT II Synthesis of Organic Compounds	**Synthesis of Organic Compounds :** Criteria for Ideal Synthesis; Selectivity and Yield. Linear and Convergent Synthesis and Multicomponent Reactions. Microwave Assisted Organic Synthesis, Ultrasound in Synthesis and Polymer supported Synthesis. Retrosynthesis.		15	
UNIT III Green Chemistry and Synthesis	**Green Chemistry and Synthesis:** Introduction to Green Chemistry; Need and Relevance of Green Chemistry; Principles of Green Chemistry. Green Synthesis in Industry: Green Materials, Green Reagents, Green Solvents and Green Catalysts.		15	

Course Code	**Title**	**Credits**	**No. of lectures**	**Notional hours**
USBT303	**IMMUNOLOGY**	**2**		
Course objectives:- The objective of this course is to familiarize students with the immune effector mechanisms and various immunotechniques. **Learning outcomes:-** By the end of the course the student will be able to: • understand the role of different types of cells, effector molecules and effector mechanisms in immunology. • understand the principles underlying various immunotechniques.				
UNIT I **Effectors of Immune Response**	Haematopoiesis; Cells of the Immune System; Primary and Secondary Lymphoid Organs. Complement System- Classical, Alternate and Lectin; Regulation and Biological Effects of Complement System; Deficiencies of Complement System		15	
UNIT II **Cell Receptors**	**T-cell Receptor Complex :** Structure and Activation. MHC Classes - General Organization and Inheritance; Structures and Peptide Interactions; Class I and II Diversity and Polymorphism; Antigen Presentation - Endocytic and Exocytic Pathways; MHC Restriction. **B-cell Receptor :** Structure, Maturation and Activation **B-T cell interaction (B-T cell cooperation).**		15	

UNIT III **Immuno-Techniques**	**Precipitation Reactions :** Immunoprecipitation, Immunoelectrophoresis, CIEP, Rocket Electrophoresis and 2-D Immunoelectrophoresis. **Agglutination Reactions :** Passive, Reverse Passive, Agglutination Inhibition. Coomb's Test; Complement Fixation Tests, RIA, ELISA, ELISPOT, Chemiluminescence, Western Blot, Immunofluorescence, Flow Cytometry. **Alternatives to Antigen-Antibody Reactions.**		15	

Course Code	Title	Credits	No. of lectures	Notional hours
USBT304	**CELL BIOLOGY AND CYTOGENETICS**	**2**		

Course objectives:-

The objective of this course is to have a firm foundation in the fundamentals of cell biology and cytogenetics.

Learning outcomes:- By the end of the course the student will be able to:

- develop an understanding of the cytoskeleton and cell membrane.
- discuss the structure of chromosomes and types of chromosomal aberrations.
- discuss the principles underlying sex determination, linkage and mapping.

UNIT I **Cytoskeleton**	**Cytoskeleton :** Overview of the Major Functions of Cytoskeleton. Microtubules: Structure and Composition. MAPs: Functions- Role in Mitosis, Structural Support and Cytoskeleton Intracellular Motility. Motor Proteins: Kinesins, Dynein; MTOCs. Dynamic Properties of Microtubules. Microtubules in Cilia and Flagella. Microfilaments: Structure, Composition, Assembly and Disassembly. Motor Protein: Myosin. Muscle Contractility: Sliding Filament Model. Actin Binding Proteins : Examples of Non-Muscle Motility. Intermediate Filaments :Structure and Composition; Assembly and Disassembly; Types and Functions.		**15**	
UNIT II **Cell Membrane**	**Cell Membrane :** Uptake of Nutrients by Prokaryotic Cells; Cell Permeability. Principles of Membrane Transport-Transporters and Channels; Active Transport,		**15**	

	Passive Transport; Types of Transporters; Types of ATP Driven Pumps - Na+ K+ Pump. Cell Junctions; Cell Adhesion and Extracellular Material Microvilli; Tight Junctions, Gap Junctions; Cell Coat and Cell Recognition. Cellular Interactions.			
UNIT III **Cytogenetics**	**Cytogenetics :** Structure of Chromosome - Heterochromatin, Euchromatin, Polytene Chromosomes. **Variation in Chromosomal Structure and Number :** Deletion, Duplication, Inversion, Translocation, Aneuploidy, Euploidy and Polyploidy and Syndromes- Klinefelter, Turner, Cri-du-Chat, Trisomy -21, Trisomy 18 and Trisomy 13. **Sex Determination and Sex Linkage :** Mechanisms of Sex Determination (XX-XY, ZZ-ZW, XX-XO) Dosage Compensation and Barr Body. **Genetic Linkage, Crossing Over and Chromosomal Mapping :** Tetrad Analysis; Two-point Cross; Three-point Cross; Pedigree Analysis.		**15**	

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT305	**MOLECULAR BIOLOGY**	**2**		

Course objectives:-

The objective of this course is to have an insight into mechanism of gene expression and regulation.

Learning outcomes:- By the end of the course the student will be able to:

- discuss the mechanisms associated with gene expression at the level of transcription and translation.
- discuss the mechanisms associated with regulation of gene expression in prokaryotes and eukaryotes

UNIT I **Gene Expression-Transcription**	**Gene Expression- an Overview.** **Transcription Process in Prokaryotes :** RNA Synthesis; Promoters and Enhancers; Initiation of Transcription at Promoters; Elongation and Termination of an RNA Chain. **Transcription in Eukaryotes :** Eukaryotic RNA Polymerases; Eukaryotic Promoters; Transcription of Protein Coding Genes by RNA Polymerase; Eukaryotic mRNA's; Transcription of other genes;		15	

	Spliceosomes; RNA editing.			
UNIT II **Gene Expression-Translation**	**Nature of Genetic Code.** **Wobble Hypothesis.** **Translation :** Process of Protein Synthesis (Initiation, Elongation, Translocation, Termination); **Post Translation Modifications.** **Protein sorting.**		15	
UNIT III **Regulation of Gene Expression**	**In Prokaryotes:** ***In Bacteria* :** *lac* Operon of *E.coli*; *trp* Operon of *E.coli*. ***In Viruses* :** Lytic / Lysogenic Regulation **In Eukaryotes :** Operons in Eukaryotes; Control of Transcriptional Initiation; Gene Silencing and Genomic Imprinting; Post-Transcriptional Control; RNA Interference.		15	

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT306	**BIOPROCESS TECHNOLOGY**	**2**		

Course objectives:-

The objective of this course is to understand the basics skills applied in fermentation technology and build a foundation for more advanced studies in bioprocess technology.

Learning outcomes:- By the end of the course the student will be able to:

- develop an understanding of the various aspects of bioprocess technology.
- develop skills associated with screening of industrially important strains.
- understand principles underlying design of fermentor and fermentation process.

UNIT I **Microorganisms in Industrial Processes**	**Types of Microorganisms used in Industrial Processes :** Bacteria, Actinomycetes, Fungi and Algae. **Screening and maintenance of strains:** Primary Screening and Secondary Screening; Cultivation; Preservation of Industrially Important Microbial Strains.		15	
UNIT II **Fermentor and Fermentation Processes**	**Design of a fermentor :** Stirred Tank Fermentor- Basic Design; Parts of a Typical Industrial Fermentor. **Fermentation Media :** Components; Design and Optimization. **Sterilization :** Sterilization of Fermentor and Fermentation Media.		15	

	Process Parameters : pH, Temperature, Aeration, Agitation, Foam, etc. **Types of Fermentation :** Surface and Submerged; Batch and Continuous, Aerobic and Anaerobic. **Product Isolation and Purification.** **Study of representative fermentation processes :** Outline of Penicillin and Ethanol Production by fermentation along with a flow-diagram.			
UNIT III ***In-vivo* and I*n-vitro* Assay of Industrial Products**	**Assay of Industrial Products:** Chemical and Biological; Types and Subtypes; Kinetics. Advantages and Disadvantages. Half-Life Determination of Pharmacological Products. Bioavailability and Bioequivalence Studies		15	

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT307	**RESEARCH METHODLOGY**	**2**		
Course objectives:- The objective of this course is to develop research aptitude, logical thinking and reasoning. **Learning outcomes:-** By the end of the course the student will be able to: • understand basic principles of research methodology and identify a research problem. • understand a general definition of research design. • identify the overall process of designing a research study from its inception to its report.				
UNIT I **Introduction to Research Methodology and Research Problem**	Meaning of Research; Objectives of Research; Motivation in Research; Types of Research; Research Approaches; Significance of Research; Research Methods versus Methodology; Research Process; Criteria of Good Research; Problems Encountered by Researchers in India; What is a Research Problem? Selecting the Problem; Necessity of Defining the Problem; Technique Involved in Defining a Problem		15	
UNIT II **Research Design and Data Collection**	Meaning of Research Design; Need for Research Design; Features of a Good Design; Important Concepts Relating to Research Design; Different Research Designs; Basic Principles of Experimental Designs; Developing a Research Plan- Collection of Primary Data; Observation Method; Interview Method; Collection of Data through Questionnaires; Collection of Data through Schedules; Other Methods of Data Collection, Collection of Secondary Data,		15	

	Selection of Appropriate Method for Data Collection, Case Study Method			
UNIT III Interpretation and Report Writing	Meaning of Interpretation, Why Interpretation?, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports.		15	
Internal Evaluation	Submission of Research Report/ Project/ Case Study/ Assignment			

PRACTICALS

	SEMESTER III	
Course code	**Title**	**Credits**
USBTP301 (PRACTICALS based on USBT301 and USBT302)	1. Study of Absorption Spectra of Coloured Compounds ($CuSO_4$, $CoCl_2$, $KMnO_4$). 2. Verification of Beer-Lambert's Law. 3. Extraction of Plasmid DNA and Separation by Agarose Gel Electrophoresis. 4. Determination of Purity of Plasmid DNA using UV Spectrophotometry. 5. Study of the Structure and Function of an Electron Microscope (Visit / Video Demonstration - including Sample Preparation and Staining). 6. Demonstration of Structure and Working of a Fluorescence Microscope (Stained Preparation). 7. Electrophoresis of Proteins by PAGE and SDS-PAGE. 8. Purification of any TWO Organic Compounds by Recrystallization Selecting Suitable Solvent. 9. Organic Estimations: Acetone, Amide, Benzoic Acid. 10. Organic Preparations : a) Acetylation of Primary Amine (Preparation of Acetanilide). b) Base Catalysed Aldol Condensation (Synthesis of Dibenzalpropanone).	**2**
Course code	**Title**	**Credits**
USBTP302 (PRACTICALS based on USBT303 and USBT304)	1. Complement Fixation Test (CFT). 2. Passive Agglutination- RA Factor Test. 3. Immunoelectrophoresis. 4. ELISA (Kit-based) - HEPALISA. 5. DOT-ELISA. 6. Western Blotting - Demonstration. 7. Flow Cytometry - Lab Visit. 8. Study of Chromosomal Aberrations- Deletion, Duplication, Inversion, Translocation and Syndromes- Trisomy 21 Trisomy 13 Trisomy 18, Klinefelter and Turner, Cri-du-Chat.	**2**

	9. Induction of Polyploidy by PDB Treatment using Suitable Plant Material. 10. Study of Polytene Chromosomes. 11. Mapping based on Tetrad Analysis and Three Point Cross. 12. Pedigree Analysis- Autosomal and Sex-Linked.	
Course code	**Title**	**Credits**
USBTP303 (PRACTICALS based on USBT305 and USBT306)	1. Study of *E.coli* Diauxic Growth Curve- (Lactose and Glucose). 2. Study of *lac* Gene Expression using Blue-White Selection. 3. Expression of β-galactosidase and Measurement of Activity. 4. Screening for an Antibiotic Producing Strain of Microorganism. 5. Screening for an Alcohol Producing Strain of Microorganism. 6. Lab Scale Production of Penicillin (Static and shaker). 7. Purification of Penicillin from Broth Culture of *Penicillium spp*. by Solvent Extraction. 8. Lab Scale Production of Ethanol. 9. Purification of Ethanol from Broth Culture of *Saccharomyces spp*. by Distillation. 10. Estimation of Penicillin from Recovered Broth by Chemical (Iodometric) Method. 11. Estimation of Penicillin from Recovered Broth by Biological (Bioassay) Method. 12. Estimation of Alcohol from Recovered Broth by Dichromate Method.	**2**

SEMESTER-IV

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT401	**BIOCHEMISTRY**	**2**		

Course objectives:-

The objective of this course is to gain an insight into the metabolic processes associated with catabolism of carbohydrates, amino acids, lipids and nucleotides.

Learning outcomes:- By the end of the course the student will be able to

- discuss the metabolic pathways of carbohydrates, amino acids, lipids and nucleotides.
- explain the role of energy rich molecules in metabolism.

UNIT I **Carbohydrate Metabolism, ETS and Energy Rich Compounds**	**Carbohydrate Metabolism :** Glycolytic Pathway and its Regulation, Homolactic Fermentation; Alcoholic Fermentation; Energetics of Fermentation; Citric Acid Cycle and its Regulation; Gluconeogenesis; Pentose Phosphate Pathway; Glyoxalate Pathway; Reductive TCA . (Sequence of Reactions, Regulation, Energy Yield and Metabolic Disorders of the above pathways) **Electron Transport System :** Electron Transport and Oxidative Phosphorylation. Inhibitors of ETS. **Energy Rich Compounds :** ATP as Energy Currency, Structure of ATP, Hydrolysis, Other Energy Rich Compounds other than ATP like PEP, Creatine Phosphate, etc.	15	15	
UNIT II **Amino Acid Metabolism**	**Amino Acid Breakdown :** Deamination, Transamination, Urea Cycle, Breakdown of Glucogenic and Ketogenic Amino Acids. **Amino Acids as Biosynthetic Precursors :** Biosynthesis of Epinephrine, Dopamine, Serotonin, GABA, Histamine, Glutathione. (Sequence of Reactions, Regulation and Metabolic Disorders of the above pathways)	15	15	
UNIT III **Lipid and Nucleotide Metabolism**	**Lipid Metabolism :** Mobilization, Transport of Fatty Acids. Beta, Alpha and Omega Oxidation of Saturated Fatty Acids; Oxidation of Unsaturated Fatty Acids; Oxidation of Odd Chain Fatty Acids. Energy Yield, Ketone Body Breakdown to Yield Energy. (Sequence of Reactions, Regulation, Energy Yield and Metabolic Disorders of the above pathways)	15	15	

	Nucleotide Metabolism : Degradation of Purines and Pyrimidines.			

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT402	**APPLIED CHEMISTRY –II**	**2**		
Course objectives:- The objective of this course is to have a firm foundation in the fundamentals and applications of current chemical theories for the physical world. **Learning outcomes:-** By the end of the course the student will: • develop an understanding of the different aspects of analytical chemistry. • gain knowledge of natural product chemistry and related acquired skills. • gain an understanding of basic concepts in polymer chemistry and Nanomaterials.				
UNIT I **Sampling and Separation Techniques**	**Sampling :** Importance of Sampling and Sampling Techniques Types of Sampling - Random and Non-Random Sampling of Solids, Liquids and Gases. **Separation Techniques :** Types of Separation Techniques - Filtration, Zone refining, Distillation, Vacuum Distillation. Solvent Extraction - Partition Coefficient and Distribution Ratio, Extraction Efficiency, Separation Factor, Role of Complexing Agents, Chelation, Ion pair Formation, Solvation, and Soxhlation. Centrifugation - Basic principles of sedimentation.	15	15	
UNIT II **Natural Product Chemistry**	**Natural Product Chemistry :** Primary and Secondary Metabolites. Classification of Natural Products based on Bio-Synthesis. Classification of Natural Products based on Structure- Alkaloids, Phenolics, Essential oils and Steroids. Structure Determination of Natural Products. Commercial Synthesis of Natural Products. **Chromatographic Separation of Natural Products :** Gas Chromatography and its Applications. Liquid Chromatography : HPLC and its Applications. HPTLC for separation and analysis of Natural products.	15	15	

UNIT III Polymers and Nanomaterials	**Polymers :** Introduction to Polymers. Types of Polymers - Monomer, Polymer, Homopolymer, Copolymer, Thermoplastics and Thermosets, Addition and Condensation Polymers (Examples and Uses) Stereochemistry of Polymers. Biodegradable Polymers. **Nanomaterials :** Introduction to Nanomaterials. Forms of Nanomaterials : Nanoparticles, Nanofilms and Nanotubes Synthesis and Characterization of Nanomaterials. Applications of Nanomaterials.	15	15	

Course Code	Title	Credits	No. of lectures	Notional hours
USBT403	**MEDICAL MICROBIOLOGY**	**2**		

Course objectives:-

The objective of this course is to gain insight into disease factors and processes and diseases caused by microorganisms.

Learning outcomes:- By the end of the course the student will be able to:

- list the factors playing a role in causing a disease gain.
- discuss the various aspects of systemic infections including causative agents, symptoms and prophylaxis.
- gain the technical capability of handling, isolating and identifying various bacteria.

UNIT I Infectious Diseases	**Host Parasite Relationship:** Normal Flora; Factors Affecting the Course of Infection and Disease; Mechanisms of Infection and Virulence Factors. **Infection:** Patterns of Infection; Types of Infections; Signs and Symptoms; Epidemiology and Epidemiological Markers. **Diseases:** Origin of Pathogens; Vectors; Acquisition of Infection; Koch's Postulates.		15	
UNIT II Medical microbiology- Causative Organisms- I	**Skin :** *S. aureus*, *S. pyogenes*. **Respiratory Tract Infections :** *M. tuberculosis*, *S. pneumoniae*(Characteristics Transmission, Course of Infection, Lab Diagnosis, Management of TB, Prevention and Control, Immuno and Chemoprophylaxis, DOTS and MDR).		15	

	Urinary Tract Infections : *E.coli* : Characteristics, Virulence, Clinical disease, and *E.coli* Infections. *Proteus*.			
UNIT III Medical microbiology - Causative Organisms- II	**GI Tract Infections :** *Salmonella and Shigella spps*. *(*Characteristics, Virulence- Pathogenesis and Immunity, Clinical Disease, Carriers Lab Diagnosis, Phage Typing Prophylaxis and Treatment). **Sexually Transmitted Diseases :** Syphilis and Gonorrhoea. **Nosocomial Infections :** *Ps*. *aeruginosa*		15	

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT404	**ENVIRONMENTAL BIOTECHNOLOGY**	**2**		

Course objectives:-

The objective of this course is to gain awareness about different types of environmental pollution and related issues.

Learning outcomes:- By the end of the course the student will be able to:

- gain an understanding of the causes, types and control methods for environmental pollution.
- application of different life forms in environmental remediation.

UNIT I **Environmental Pollution**	**Sources of Pollution.** **Air Pollution :** Types; Sources; Classification of Air Pollutants; Air Pollution Monitoring and Control. **Water Pollution :** Causes, Types and Classification; Eutrophication; Assessment of Water Quality-Pollutant Monitoring and Control; **Soil and Solid Waste Pollution :** Characteristics of Wastes, Impacts of Solid waste on Health, Occupational Hazards and Control. **Soil Erosion :** Concept, Causes and Effects.		15	
UNIT II **Global Environmental Problems and Issues**	**Green House Effect :** Factors Responsible for Green House Effect; Green House Gases. Global Warming; Ozone Depletion; Kyoto Protocol; UV Radiation; Acid Rain.		15	

UNIT III **Bioremediation**	Concept of bioremediation. Microorganisms in Bioremediation, Myco-remediation and Phytoremediation. Bioremediation Technologies. Measuring Bioremediation in the Field. Bioaugmentation and Biostimulation. Monitoring the Efficacy of Bioremediation.		15	

Course Code	Title	Credits	No. of Lectures	Notional hours
USBT405	**BIOINFORMATICS and BIOSTATISTICS**	**2**		

Course objectives:-

The objective of this course is learning and understanding basic concepts of Bioinformatics and Biostatistics.

Learning outcomes:- By the end of the course the student will be able to:

- gain an understanding of the basic concepts of Bioinformatics and Biostatistics.
- understand the tools used in bioinformatics.
- apply the various statistical tools for analysis of biological data.

UNIT I **Introduction to Computers and Biological Databases**	**Computer Basics :** Organization of a Computer; I/O Units; Computer Memory; Processor; Binary Arithmetic; Logic Circuit; Architecture; Operating System. **Internet Basics :** Connecting to the Internet, E-mail, FTP, www, Difference between www and Internet. **Biological Databases :** Classification of Databases - Raw and Processed databases; Primary (NCBI), Secondary (PIR) and Tertiary or Composite (KEGG) databases; Structure and Sequence databases. Specialized Databases - Protein Pattern Databases; Protein Structure and Classification Databases (CATH/SCOP). **Genome Information Resources:** DNA Sequence Databases specialized Genomic Resources. Protein Databases based on Composition, Motifs and Patterns. **Protein Structure Visualization Software.**		15	
UNIT II **BLAST and Sequence Alignment**	**BLAST and Sequence Alignment :** BLAST and its Types; Retrieving Sequence using BLAST. **Pairwise Alignment :** Identity and Similarity; Global and Local Alignment; Pairwise Database Searching.		15	

	Multiple Sequence Alignment: Goal of Multiple Sequence Alignment; Computational Complexity; Manual Methods; Simultaneous Methods; Progressive Methods; Databases of Multiple Alignment; Secondary Database Searching; Analysis Packages; MSA and phylogenetic trees.			
UNIT III **Biostatistics**	Theory and Problems based on- Coefficient of Correlation and Regression Analysis; Steps in Testing Statistical Hypothesis; Parametric Tests:- Z Test – Single Mean and Two Means, t-Test – Single Mean, Paired and Unpaired; Chi-square Test.		15	

Course Code	**Title**	**Credits**	**No. of Lectures**	**Notional hours**
USBT406	**MOLECULAR DIAGNOSTICS**	**2**		

Course objectives:-

The objective of this course is learning and understanding molecular techniques and utilizing these techniques in diagnosis.

Learning outcomes:- By the end of the course the student will be able to:

- gain an understanding of the basic principles used in molecular diagnosis.
- gain critical thinking and analytical skills to understand new diagnostic methods.
- apply the knowledge and skills gained in the course should be useful in developing new diagnostic kits.

UNIT I **Basics of Molecular Diagnostics**	**Introduction to Molecular Diagnostics :** Overview of Molecular Diagnostics; History of Molecular Diagnostics; Molecular Diagnostics in post genomic era; Areas used in Molecular Diagnostics; Future prospects - Commercialising Molecular Diagnostics, personalized medicine, Theranostics. **Characterisation and analysis of Nucleic – acids and Proteins :** Extraction, Isolation and Detection of DNA, RNA and Proteins; Restriction Endonucleases and restriction enzyme mapping. **Hybridisation techniques :** Southern, Northern, Western and FISH; Markers, probes and its Clinical applications.		15	
UNIT II **Nucleic acid amplification Methods**	**Target amplification :** PCR - General Principle; Components of a Typical PCR reaction; Experimental Design; Primer Designing; Control of PCR Contamination and Mispriming; PCR Product Clean-up and Detection. **PCR Types :** Reverse Transcriptase and Real Time PCR.		15	

	Probe amplification : Ligase Chain Reaction			
UNIT III **Molecular Biology based Diagnostics**	**DNA Polymorphism and Identification:** RFLP and Parentage Testing; RFLP and Sickle-Cell Anaemia. **Molecular Diagnostics for infectious diseases :** Molecular testing for *Neisseria*, Molecular diagnosis for HIV-1; **Genetic Counselling and Molecular Diagnosis** Genetic testing- Need and uses; genetic counselling. Case studies- Diagnostic testing for Cystic fibrosis; Fragile X diagnostic and Carrier testing. **Ethical, Social and legal issues to molecular genetic testing**		15	

Course Code	**Title**	**Credits**	**No. of Lectures**	**Notional hours**
USBT407	**ENTERPRENEURSHIP DEVELOPMENT**	**2**		
Objective: To develop and systematically apply an entrepreneurial way of thinking that will allow identification and creation of business opportunities. **Learning Outcome:** By the end of the course the student will be able to: • develop an understanding of the systematic process and to select and screen a business idea. • design strategies for successful implementation of ideas. • write a business plan.				
UNIT I **Introduction to Entrepreneurship Development**	Concept of Entrepreneur; Entrepreneurship; Need and Importance; Factors Influencing Entrepreneurship; Essentials of a Successful Entrepreneur		15	
UNIT II **Setting-up of an Enterprise and Planning**	Location of Enterprise; Real Estate and Human Resource Planning, Financial Planning; Role of Government and Financial Institutions in Entrepreneurship Development; Raising Money from Venture Capitalists, Government Grants, Product Selection and Ideas; Project Planning and Formulation; Project Feasibility Assessment; Regulatory Affairs, Corporate Laws, Innovation, IPR generation and Protection, Preparation of a Business Plan, Characteristics and Importance of Planning;		15	

UNIT III **Marketing, Sales, Advertising and International Market research**	Marketing Plan for an Entrepreneur; Strategic Alliances, Advertising and Sales Promotion; Market Assessment, Need for International Market Research, Domestic vs. International Market Research, Cost and Methodology of Market Research, Desk and Field Research		15	
Internal Evaluation	Submission and Presentation of Business Proposal for any Biotechnological Product/ Enterprise			

	SEMESTER IV	
Course code	**Title**	**Credits**
USBTP401 (PRACTICALS based on USBT401 and USBT402)	1. Determination of Lactate Dehydrogenase (LDH) Activity in Blood Serum. 2. Determination of Total, LDL and HDL Cholesterol in Serum. 3. Organ Function Tests: Liver (SGPT, SGOT); Kidney (Urea from Serum). 4. Estimation of Uric acid and Creatinine in Urine. 5. Qualitative Detection of Ketone Body in Urine. 6. Isolation of Mitochondria and Demonstration of ETC using a Marker Enzyme. 7. Separation of Binary (Solid-Solid) Mixture (Min 4 Compounds). 8. Identification of Organic Compound of Known Chemical Type (Min 4 Compounds). 9. HPLC analysis and interpretation of any one secondary metabolite from plants 10. Analysis of essential oils from any plant source using GC. 11. HPTLC fingerprint analysis of any one medicinally important plant. 12. Chemical and Biological Synthesis of Silver Nanoparticles and its characterisation by UV- Vis Spectrophotometer.	**2**
Course code	**Title**	**Credits**
USBTP402 (PRACTICALS based on USBT403 and USBT404)	1. Identification of *S.aureus*-Isolation, Catalase, Coagulase Test. 2. Identification of *E.coli*-Isolation, Sugar Fermentations, IMViC. 3. Identification of *Salmonella*- Isolation, Sugar Fermentations, TSI Slant. 4. Identification of *Shigella*- Isolation, Sugar Fermentations, TSI Slant. 5. Identification of *Proteus*- Isolation, Sugar Fermentations, IMViC. 6. Identification of *Pseudomonas* - Isolation, Urease test, Oxidase Test, TSI Slant. 7. RPR Test (Kit Based). 8. Permanent Slide- *Mycobacterium*. 9. Biological Oxygen Demand (BOD). 10. Chemical Oxygen Demand (COD). 11. Isolation of Bacteria from Air by Gravity Sedimentation Method. 12. Most Probable Number (MPN) – Presumptive, Confirmed and Completed tests.	**2**

	13. Bioremediation of metal. 14. Visit to STP / CETP	
Course code	**Title**	**Credits**
USBTP403 (PRACTICALS based on USBT405 and USBT406)	1. Familiarization with NCBI, EMBL, DDBJ, PIR, KEGG Databases. 2. Use of NCBI BLAST Tool. 3. Pairwise and Multiple Sequence Alignment and Phylogeny. 4. Classification of Proteins using CATH/SCOP. 5. Visualization PDB Molecules using Rasmol/Raswin. 6. Handling and Calibration of Micropipette. 7. Isolation, Quantitative Analysis and AGE of Genomic DNA from Bacteria and Yeast. 8. Isolation and Detection of RNA from Bacteria and Yeast. 9. Restriction Enzyme Digestion. 10. RFLP- Kit Based. 11. Primer Designing through Open Online Source NCBI- BLAST. 12. DNA Amplification – PCR.	**2**

Summer Training:

1. This should be taken up in the summer over a period of one month preferably in an immunology / veterinary / virology institute or a laboratory using recombinant DNA methods.
2. The students could also be assigned to assist a clinic (in a hospital), a fermentation plant, brewery or bakery and watch the various stages in brewing and baking and post-fermentation processing. Prior arrangement must be made on the mode of interaction of the educational institute with the clinic and the industry.

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44. Phytochemical methods- J.C. Harbone
45. Plant drug analysis- Wagner and Blandt
46. Organic Chemistry, R.T. Morrison, R.N. Boyd and S.K. Bhatacharjee, 7th Edition, Pearson Education (2011).
47. Organic Chemistry, T.W.G. Solomon and C.B. Fryhle, 9th Edition, John Wiley & Sons, (2008)
48. A guide to mechanism in Organic Chemistry, 6th Edition, Peter Sykes, Pearson Education
49. Fundamentals of Organic Chemistry , G. Marc Loudon, 4th Edition Oxford
50. Organic Chemistry, L.G. Wade Jr and M.S. Singh, 6th Edition,2008 7. Organic Chemistry, Paula Y. Bruice, Pearson Education, 2008
51. Organic Chemistry, J.G. Smith, 2nd Edition Special Indian Edition, Tata 21 McGraw Hill
52. Organic Chemistry, S.H. Pine, McGraw Hill Kogakusha Ltd
53. Methods in Molecular Biophysics, Igor N S, N Zaccai & J Zaccai, (2007) Cambridge 2.
54. Advanced Methods in Protein Microsequencing, Witmann
55. Essential Biophysics, Narayanan, New Age Publ
56. Handbook of Molecular Biophysics (Methods & Application), 2009, HG Bohr, Wiley
57. Principles & techniques of Biochemistry & Molecular Biology, Wilson & Walker.

EVALUATION PATTERN

The performance of the learner shall be evaluated in TWO parts.
The learner's Performance shall be assessed by internal assessment of 25 Marks and Semester end examination (theory) of 75 marks for each term.
Practical examination will be conducted at end of each semester for 300 marks

Internal Assessment- 25 Marks

SR. No.	Particulars	Marks
1.	**Class test** Objective type questions(10) Concept based questions-Answer in one/two sentences (5) Short notes-answer any two out of three	 **5 Marks** **5 Marks** **10 Marks**
2.	Department activities, Attendance etc.	**5 Marks**
	TOTAL	**25 Marks**

Internal Assessment – 25 Marks (General Elective each semester)
For course code USBT 307 (Research Methodology) and USBT 407 (Entrepreneurship Development)

SR. No.	Particulars	Marks
1.	Submission as per instructed in theory course code USBT 307 and USBT 40	**20 Marks**
2.	Department activities, Attendance etc.	**5 Marks**
	TOTAL	**25 Marks**

Semester end exam- 75 marks

SR. No.	Particulars	Marks
	All questions are compulsory Number questions : 5 (Five) Each question carries 15 Marks	
1.	Q 1 – Objective questions based on unit I, II, III (internal options)	**15 Marks**
2.	Q 2 – Unit I	**15 Marks**
3.	Q 3 – Unit II	**15 Marks**
4.	Q 4 – Unit III	**15 Marks**
5.	Q 5 – Short notes based on Unit I, II, III (any 3 out of 5)	**15 Marks**
	TOTAL	**75 Marks**

Note:-

- All questions are compulsory with internal options within the questions.
- Each question may be sub-divided into sub questions as a, b, c, d, e etc. & the allocation of marks depends on the weightage of the topic.

Practical examination – 300 marks

SEMESTER III

USBTP301	Core subject Practicals	Practicals of USBT301 and USBT302	**100 Marks**
USBTP302	Core subject Practicals	Practicals of USBT303 and USBT304	**100 Marks**
USBTP303	Core Subject and Skill enhancement elective Practicals	Practicals of USBT305 and USBT306	**100 Marks**

SEMESTER IV

USBTP301	Core subject Practicals	Practicals of USBT301 and USBT302	**100 Marks**
USBTP302	Core subject Practicals	Practicals of USBT303 and USBT304	**100 Marks**
USBTP303	Core Subject and Skill enhancement elective Practicals	Practicals of USBT305 and USBT306	**100 Marks**

UNIVERSITY OF MUMBAI

Revised Syllabus for T.Y.B.Sc.
Programme- B.Sc.
Course- Biotechnology (USBT)
(Third Year – Sem. V & VI)

(Credit Based Semester and Grading System with effect from the academic year 2018-2019)

TYBSC Biotechnology Course Structure

Semester V

Course code USBT	Title	Theory /Practical	Marks	Credits	Nos of Lectures & Practical
501	Cell biology	Theory	100	2.5	60
502	Medical Microbiology & Instrumentation	Theory	100	2.5	60
503	Genomes and Molecular Biology	Theory	100	2.5	60
504	Marine Biotechnology	Theory	100	2.5	60
P501+502	Cell biology+ Medical Microbiology & Instrumentation	Practical	100	3.0	72
P503+504	Genomes and Molecular Biology+ Marine Biotechnology	Practical	100	3.0	72
Applied Component	Biosafety	Theory	100	2.0	48
	Biosafety	Practical	100	2.0	48
	TOTAL		**800**	**20**	**480**

Semester VI

Course code USBT	Title	Theory/ Practical	Marks	Credits	Nos of Lectures & Practical
601	Biochemistry	Theory	100	2.5	60
602	Industrial Microbiology	Theory	100	2.5	60
603	Pharmacology and Neurochemistry	Theory	100	2.5	60
604	Environmental Biotechnology	Theory	100	2.5	60
P 601-P 602	Biochemistry& Industrial Microbiology	Practical	100	3	72
P 603-P 604	Pharmacology - Neurochemistry and Environmental Biotechnology (50M)+ Project work (50M)	Practical	100	3	72
Applied component	Agribiotechnology	Theory	100	2.0	48
Applied component	Agribiotechnology	Practical	100	2.0	48
	TOTAL		**800**	20	**480**

Teaching pattern:

One (01) Credit would be of thirty- forty (30-40) learning hours; of this more than fifty percent of the time will be spent on class room instructions including practical as prescribed by the University. Rest of the time spent invested for assignments, projects, journal writing, case studies, library work, industrial visits, attending seminars / workshops, preparations for examinations etc. would be considered as notional hours. The present syllabus considers (60L as class room teaching and 15 lectures as Notional hours/ paper). Each lecture duration would be for 48 min

The names of the reference books provided in the syllabus are for guidance purpose only. Students and faculty are encouraged to explore additional reference books, online lectures, videos, science journals for latest/ additional information.

Examination pattern for:

Theory:

- The question paper for the Term End Exam would be of **100 marks** consisting of 5 Questions (20M each), of which one question would be common for all units in the syllabus.

- The question paper would be set for 150 marks including internal options.

- There shall be no internal exam for any paper.

Practical:

- Would be conducted over a period of 3 days; 50M each paper.

- Each student to perform 2 major and 2 minor practical for Sem V and 2 major and project presentation for Sem VI ,

- Viva would be conducted during the practical during Sem V; Sem VI would have ONLY project presentation

- Journals would be uniform throughout all the centres; matter would be communicated to all the centres by the syllabus committee.

- Distribution of marks for the experiments carried out during the examination:

  Sem V (50M/ paper): Major: 20M; Minor: 10M; Viva: 10M; Journal 10M.
  Sem VI (50M/paper): Major (x2): 40M; Journal: 10M; Project 50M

  The report could be around 25-30 pages with appropriate referencing and formatting.
  Marks distribution for the project would be as follows:
  25M documentation, 15M presentation, 10 M viva and interactions;

- Students would undertake a project for 1-2 months during the last semester for 50 M. The project **should** include **either** of the following:

  1. One/ more major instrumentation OR
  2. One / more major technique/s required in the field of interest OR
  3. Bioinformatics OR
  4. Biostatistics

Semester V

Course code USBT	Title	Unit	Topics	Credit	No of Lectures
501	Cell Biology	I: Cell cycle	Cell cycle Introduction: Prokaryotic and Eukaryotic- **3 Lectures;** The Early Embryonic Cell Cycle and the Role of MPF-**4 Lectures;** Yeasts and the Molecular Genetics of Cell-Cycle Control – **4 Lectures;** Apoptosis, Cell-Division Controls in Multicellular Animals- **4 Lectures**	2.5	15
		II: Cell Signalling	Cell signalling and signal transduction:Introduction General Principles of Cell Signaling - **3 Lectures;** Signaling via G-Protein-linked Cell-Surface Receptors - **3 Lectures;** Signaling via Enzyme-linked Cell-Surface Receptors - **3 Lectures;** Target-Cell Adaptation, The Logic of Intracellular - **3 Lectures;** Signaling: Lessons from Computer-based "Neural Networks"- **3 Lectures**		15
		III: Developmental Biology	Overview of how the modern era of developmental biology emerged through multidisciplinary approaches - **5 Lectures;** Stages of development- zygote, blastula, gastrula, neurula cell fate & commitment – potency- concept of embryonic stem cells, differential gene expression, terminal differentiation ,lineages of three germ layers, fate map - **6 Lectures;** Mechanisms of differentiation- cytoplasmic determinants, embryonic induction, concept of morphogen, mosaic and regulative development Pattern formation-- axis specification, positional identification (regional specification), Morphogenetic movements, Model organisms in Developmental biology - **4 Lectures**		15
		IV: Cancer Biology	Cancer: Introduction, Cancer as a Microevolutionary Process - **4 Lectures**; The Molecular Genetics of Cancer - **6 Lectures**; Cancer and Virus Cancer diagnosis and chemotherapy - **5 Lectures**		15
		Total			60

References:

1. Molecular Cell Biology. 7th Edition, (2012) Lodish H., Berk A, Kaiser C., K Reiger M., Bretscher A., Ploegh H., Angelika Amon A., Matthew P. Scott M.P., W.H. Freeman and Co., USA
2. Molecular Biology of the Cell, 5th Edition (2007) Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter. Garland Science, USA
3. Cell Biology, 6th edition, (2010) Gerald Karp. John Wiley & Sons., USA
4. The Cell: A Molecular Approach, 6th edition (2013), Geoffrey M. Cooper, Robert E. Hausman, Sinauer Associates, Inc. USA
5. Developmental Biology; Scott Gilbert; 9th Edition

Course code USBT	Title	Unit	Topics	Credit	No of Lectures
502	**Medical Microbiology and Instrumentation**	I: Virology	Introduction to viruses-Position in biological spectrum; Virus properties - **2 Lectures**; General structure of viruses Baltimore Classification and Taxonomy(ICTV) - **2 Lectures**; Cultivation of viruses - **2 Lectures**; Reproduction of ds DNA phages Hepatitis /ss RNA (influenza), animal viruses and plant (TMV)virus - **4 Lectures;** Virus purification and assays - **2 Lectures;** Cytocidal infections and cell damage - **2 Lectures;** Viroids and Prions - **1 Lecture**	2.5	15
		II: Chemotherapeutic drugs	Discovery and Design of antimicrobial agents -**1 Lecture**; Classification of Antibacterial agents, Selective toxicity, MIC, MLC - **2 Lectures** Inhibition of cell wall synthesis (Mode of action for): Beta lactam antibiotics: Penicillin, Cephalosporins; Glycopeptides: Vancomycin; Polypeptides: Bacitracin -**2 Lectures** Injury to Plasma membrane: Polymyxin – **1 Lecture**; Inhibition of protein synthesis Aminoglycosides, Tetracyclines Chloramphenicol, Macrolides-Erythromycin- **2 Lectures**; Inhibition of Nucleic acid synthesis: Quinolones, Rifampicin, Metronidazole - **2 lectures**; Antimetabolites: Sulphonamides, Trimethoprim - **1 lecture**; Drug Resistance: Mechanism, Origin and transmission of drug resistance - **1 lecture**; Use and misuse of antimicrobial agents - **1 lecture**; Antifungal drugs, Antiviral drugs - **2 lectures**		15

		III: Spectroscopy	Principle, instrumentation, working and applications of: Fluorescence Spectroscopy - **3 Lectures** Luminometry - **3 Lectures** Light scattering spectroscopy - **3 Lectures** Infrared Spectroscopy - **3 Lectures** Atomic absorption Spectroscopy - **3 Lectures**		15
		IV: Bio-analytical techniques	Principle, working and applications of: Affinity chromatography - **2 Lectures** Ion-exchange chromatography - **2 Lectures** Molecular (size) exclusion chromatography - **2 Lectures;** HPLC - Method development and validation- **3 Lectures**; Isotopes in Biology: Nature of radioactivity - **1 Lecture**; Detection Techniques using GM counter, Scintillation counter, autoradiography - **4 Lectures**; Applications of Tracer techniques in Biology - **1 Lecture**		15
		Total			60

References:

1. Principles and techniques in biochemistry and molecular biology (2010), Keith Wilson and John Walker, 7th edition, Cambridge University Press
2. Biophysics (2002) Vasantha Pattabhi and N. Gautham, Kluwer Academic Publishers
3. Physical Biochemistry: principles and applications, 2nd edition (2009), David Sheehan , John Wiley & Sons Ltd
4. HPLC method validation for pharmaceuticals: a review (2013), Harshad V. Paithankar, International Journal of Universal Pharmacy and Bio Sciences 2(4): July-August.
5. Mim's Medical Microbiology 5th edition
6. Microbiology by Prescott Harley and Klein 5th edition Mc Graw Hill
7. Medical Microbiology Jawetz,E., Brooks,G.E, Melnick,J.L., Butel,J.S Adelberg E. A 18th edition
8. Medical Microbiology by Patrick Murray 5th edition
9. Foundations In Microbiology by Talaro and Talaro Third edition W.C Brown
10. Understanding Viruses by Teri Shors

PRACTICALS

USBT P 501-502 **3 credits** **72hrs**

1. Separation of components from a mixture using Affinity chromatography (Kit may be used)
2. Separation of components from a mixture using ion exchange chromatography (Kit may be used)
3. Separation of components from a mixture using Size exclusion chromatography (Kit may be used)
4. HPLC method validation.
5. MIC and MLC of any one antibiotic
6. Antibiotic sensitivity test using agar cup method
7. Antibiotic sensitivity test using paper disc method
8. Antibiotic sensitivity test using ditch method.
9. Cancer Biology: (Field visit and 2 page report in the journal)
10. Chick embryo candling and inoculation methods Demonstration experiment
11. Book review (Emperor of all Maladies)

Course Code USBT	Title	Unit	Topics	Credit	No of Lectures
503	**Genomics and Molecular Biology**	I: Genetic engineering of plants	Genetic engineering of plants; Methodology. Plant transformation with the Ti plasmid of *A.tumefaciens*, Ti plasmid derived vector system - **4 Lectures;** Transgenic plants: Physical methods of transferring genes to plants : electroporation, microprojectile bombardment, liposome mediated, protoplast fusion- **5 Lectures;** Vectors for plant cells - **4 Lectures;** Improvement of seed quality protein **- 2 Lectures**	2.5	15
		II: Transgenic Animals	Transgenic mice- methodology-retroviral method, DNA microinjection, ES method - **5 Lectures;** genetic manipulation with cre-loxP - **2 Lectures;** Vectors for animal cells - **2 Lectures;** Transgenic animals recombination system - **2 Lectures;** Cloning live stock by nuclear transfer - **2 Lectures;** Green Fluorescent Protein - **1 Lectures;** Transgenic fish – **1 Lectures**		15
		III: Tools in Molecular Biology	Cloning vectors-Plasmids (pUC series), Cosmids, phagemids M13, shuttle vectors, YAC vectors, expression vectors pET - **4 Lectures;** Gene cloning-Isolation and purification of DNA; Isolation of gene of interest: Restriction digestion, electrophoresis, blotting, cutting, and joining DNA, methods of gene transfer in prokaryotes and eukaryotes - **3 Lectures;** Recombinant selection and screening methods: genetic, immunochemical, Southern and Western analysis, nucleic acid hybridization, HART,HRT- **2 Lectures;** Expression of cloned DNA molecules and maximization of expression - **2 Lectures;** Cloning strategies-genomic DNA libraries, cDNA libraries, chromosome walking and jumping - **4 Lectures**		15
		IV: Gene sequencing and editing	Maxam Gilbert's method, Sanger's dideoxy method, Automated DNA sequencing, Pyrosequencing - **6 Lectures;** Human genome mapping and it's implications in health and disease - **3 Lectures**; RNAi, ZNF(Zinc finger nucleases), TALENS(Transcription Activator Like Effector Nucleases), CRISPER/Cas system(Clustered Regularly Interspersed Repeats) - **6 Lectures**		15
		Total			60

References:

1. iGenetics A Molecular Approach 3rd Edition Peter J. Russell.
2. Molecular Biotechnology-Principles and Applications of Recombinant DNA Technology 3rd Edition Glick B.R., Pasternak J.J., Patten C.L.
3. Principles of Gene Manipulation 7th Edition Primrose S.B., Twyman R.M.
4. Biotechnology 3rd Edition S.S. Purohit.
5. Genomes 3rd Edition T.A. Brown.
6. Biotechnology B.D. Singh.
7. Gene Cloning and DNA Analysis 6th Edition T.A. Brown.
8. Genomics Cantor C.R., and Smith C.L. John Wiley & Sons. (1999)

Course Code USBT	Title	Unit	Topics	Credit	No. of Lectures
504	**Marine Biotechnology**	I: Marine Biotechnology- Introduction & Bioprospecting	Introduction to Marine Biotechnology- **1 lecture;** The marine ecosystem and its functioning: intertidal, estuarine, salt marsh, mangrove, coral reef, coastal &deep sea ecosystems. Hydrothermal vents- **4 lectures;** Bioprospecting, Marine Microbial Habitats and Their Biotechnologically relevant Microorganisms- **2 lectures;** Methods for Microbial Bioprospecting in Marine Environments **- 2 lectures;** Biotechnological Potential of Marine Microbes **-1 lecture;** Bioactive compounds from other Marine Organisms: fungi, Microalgae, Seaweeds, Actinomycetes, sponges - **5 lectures**	2.5	15
		II: Marine Drugs and Enzymes	Drugs from Marine organisms: Pharmaceutical compounds from marine flora and fauna - marine toxins, antiviral and antimicrobial agents - **4 lectures;** Approved Marine Drugs as Pharmaceuticals **- 2 lecture;** Marine Natural products and its Challenges **- 2 lectures;** Marine Microbial Enzymes- Marine Extremozymes and Their Significance, Current Use of Marine Microbial Enzymes - **7 lectures.**		15
		III: Marine Functional foods and Nutraceuticals	Marine Functional Foods: Marine Sources as Healthy Foods or Reservoirs of Functional Ingredients **-3 lectures;** Marine-Derived Ingredients with Biological Properties- **3 lectures;** Functional Foods Incorporating Marine-Derived Ingredients **-2 lectures;** Marine Nutraceuticals : Marine Bioactives as Potential Nutraceuticals, Functional Carbohydrates, Polyunsaturated Fatty Acids- **3 lectures;** Carotenoids, Soluble Calcium, Fish Collagen and Gelatin, Marine Probiotics **-4 lectures.**		15
		IV: Marine Bioresources and	Marine Bioresources, Marine Secondary Metabolites, Marine Proteins, Marine Lipids- **4 lectures;** Cosmetics from Marine Sources: Scenario of Marine Sources in the Cosmetic Industry, Cosmetics: Definition and Regulations,		15

		Cosmetics	Cosmeceuticals , Target Organs and Cosmetics Delivery Systems , Components of Cosmetics, Major Functions of Some Marine Components in Cosmetics and Cosmeceuticals , Treatments Based on Marine Resources , Products Based on Marine Resources **- 11 lectures.**		
		Total			60

References:

1. Kim, S.K. Springer Handbook of Marine Biotechnology; Springer: Berlin, Germany; Heidelberg, Germany, 2015.
2. Nollet, Leo M. L- Marine microorganisms- extraction and analysis of bioactive compounds-CRC Press_Taylor& Francis (2017)
3. R. S. K. Barnes, R. N. Hughes(auth.)-An Introduction to Marine Ecology, Third Edition-Wiley-Blackwell (1999)
4. Blanca Hernández-Ledesma, Miguel Herrero-Bioactive Compounds from Marine Foods-Plant and Animal Sources-Wiley-Blackwell (2013)
5. Fabio Rindi, Anna Soler-Vila, Michael D. Guiry (auth.), Maria Hayes (eds.)-Marine Bioactive Compounds_ Sources, Characterization and Applications-Springer US (2012)
6. W. Evans-Trease and Evans Pharmacognosy 15 th ed.-Saunders (2010)

PRACTICALS

USBT P 503-504 **3 credits** **72hrs**

1. Transformation in *E.coli.*
2. Genomic DNA Extraction: Animal cells.
3. Restriction enzyme digestion and ligation (Kit may be used).
4. Phage titration: *Demonstration*
5. Polymerase chain reaction. *Demonstration*
6. Gradient plate technique
7. Bacterial gene expression (Kit may be used).
8. Study of any 5 marine bacteria and algae (Macro and micro)
9. DPPH assay for antioxidant extracted from marine algae
10. Extraction of carotenoids from marine algae/Bacteria/Fungi
11. Extraction and estimation of Gelatin / Collagen.
12. Extraction of alkaloids from marine organisms and their separation by TLC.

Course	Title	Unit	Topics	Credits	Lectures
Applied component	**Biosafety**	I: Introduction to biosafety	Introduction - **1 lecture** Biological Risk Assessment, Hazardous Characteristics of an Agent- **2 lectures;** Genetically modified agent hazards - **1 lecture**; Cell cultures - **1 lecture;** Hazardous Characteristics of Laboratory Procedures - **1 lecture;** Potential Hazards Associated with Work Practices – **2 lectures;** Safety Equipment and Facility Safeguards - **2 lectures**; Pathogenic risk and management - **2 lectures**	2.0	15
		II: GLP	Concept of GLP- **1 lectures;** Practicing GLP- **1 lecture**; Guidelines to GLP - **2 lectures;** Documentation of Laboratory work - **1 lectures;** Preparation of SOPs - **2 lectures**; Calibration records - **1 lectures;** Validation of methods - **1 lectures;** Documentation of results - **1 lecture**; Audits & Audit reports - **1 lecture.**		12
		III: Detection and testing of contaminants	Microbial Contamination in food and pharma product - **3 lectures**; Some common microbial contaminants **- 3 lectures;** Microbiological Assays for pharmaceutical products **- 4 lectures**; Regulatory Microbiological testing in pharmaceuticals - **3 lectures.**		12
		IV: Biosafety in Biotechnology	Concepts on biosafety in Biotechnology - **2 lectures;** Regulating rDNA technology -**2 lectures;** Regulating food and food ingredients -**3 lectures;** Genetically engineered crops, livestock Bioethics -**3 lectures;** Contemporary issues in Bioethics **- 2 lectures.**		12
		Total			**48**

References:

1. Pharmaceutical Microbiology - Hugo, W.B, Russell, A.D 6th edition Oxford Black Scientific Publishers.
2. Biosafety in Microbiological and Biomedical Laboratories - 5th Edition, L. Casey Chosewood Deborah E. Wilson U.S. Department of Health and Human Services Centers for Disease Control and Prevention National Institutes of Health.
3. Molecular Biotechnology –Principles and Applications of Recombinant DNA Glick, B.R, Pasternak, J.J Patten, C.L 3rd edition ASM press

PRACTICALS

Applied Component- Biosafety 2 Credits 48hours

1. Validation of micropipette, measuring cylinders, colorimeters
2. Calibration of pH meter and weighing balance
3. Vitamin B12 bioassay
4. Testing for adulterants in food; ex. Starch in milk
5. Making SOP for any 2 major laboratory instruments
6. Sterility of injectables

Semester VI

Course Code USBT	Title	Unit	Topics	Credits	Lectures
601	**Biochemistry**	I: Protein Biochemistry	Protein structure: Protein Tertiary and Quaternary Structures **-2 Lectures;** Protein Denaturation and Folding – **3 Lectures**; Protein Function: Reversible Binding of a Protein to a Ligand: Oxygen-Binding Proteins – **2 Lectures;** Complementary Interactions between Proteins and Ligands: Immunoglobulins – **1 Lecture**; Protein Interactions Modulated by Chemical Energy: Actin, Myosin, and Molecular Motors **-3 Lectures**; Protein purification – **4 Lectures.**	2.5	15
		II: Metabolism	Carbohydrate biosynthesis and its regulation: Peptidoglycan in Bacteria **-2 Lectures;** Starch and sucrose in Plants **-4 Lectures;** Glycogen in Animals **- 4 Lectures;** Biosynthesis and regulation of Cholesterol, Atherosclerosis – **5 Lectures.**		15
		III: Endocrinology	Mechanism of action of group I and II hormones- **1 Lecture;** Structure, storage, release, transport, biochemical functions and disorders associated with hormones secreted by Hypothalamus **-1 Lecture;** Anterior Pituitary gland - GH, stimulating hormones) **-1 Lecture;** Posterior Pituitary gland – oxcytocin and vasopressin **-1 Lecture;** Thyroid gland – Thyroxine, calcitonin **- 2 Lectures;** Parathyroid gland – PTH **-1 Lecture;** Adrenal medulla – epinephrine and norepinehprine **-1 Lecture;** Adrenal cortex – Glucocortocoids **- 1 Lecture;** Pancreas – insulin and glucagon **- 2 Lectures;** Female Gonads – estrogen and progesterone **- 2 Lectures;** Male gonads – testosterone**- 1 Lecture;** Placenta – hCG **- 1 Lecture.**		15
		IV:	Minerals and Vitamins;		

		Nutrition	Dietary sources, bioactive form, functions and disorders associated with fat soluble (A D E K) and water soluble vitamins- **7 Lectures;** Minerals - physiological and biochemical functions of principal and trace elements. - **7 Lectures;** Malnutrition – Over nutrition (obesity) and PEM (Kwashiorkor and Marasmus)- **1 Lecture.**		15
		Total			60

References:

1. Lehninger, principles of biochemistry, 4th edition (2005), David Nelson and Michael Cox *W.H. Freeman* and Company, New York.
2. Biochemistry , 4th edition (2010), Voet and Voet, John Wiley and sons, USA
3. Harper's Illustrated Biochemistry, 27th edition, RK Murray, DK Granner, PA Mayes and VW Rodwell, McGraw Hills publication.
4. Biochemistry, 4nd edition (2017), Satyanarayana and Chakrapani, Books & Allied (P) Ltd
5. Nutrition Science, 6th edition (2017), Srilakshmi, new age international publishers.

Course Code USBT	Title	Unit	Topics	Credit	No. of Lectures
602	**Industrial Microbiology**	I: Dairy technology	Milk: Normal flora, changes in raw milk - **2 lectures;** Enumeration - **1 lecture**; Factors affecting bacteriological quality - **1 lecture**; Dairy technology Preservation methods - **2 lectures**; Pasteurization- **1 lecture**; Starter Cultures - **2 lectures;** Fermented products-Production process and spoilage of Cheese: Swiss and Cheddar - **2 lectures;** Butter - **2 lectures;** Yogurt - **1 lectures** and Buttermilk - **1 lecture.**	2.5	15
		II: Down-stream Processing (DSP)	Introduction of DSP - **2 lectures;** Foam separation - **1 lecture**; Types of Precipitation - **1 lecture**; Filtration **2 lectures**, Centrifugation - **1 lecture;** Chromatography in DSP - **2 lectures;** Cell disruption- physical and chemical methods - **2 lectures;** Solvent recovery, Membrane processes - **1 lecture;** Drying - **1 lecture**; Crystallization and Whole broth processing - **2 lectures**.		15
		III: Fermentation process	Introduction to Inoculum development - **2 lectures;** Bacterial and fungal inoculum development with one example each - **3 lectures**, scale up, scale down - **2 lectures**; Production of: Streptomycin - **1 lecture;** Protease - **1 lecture;** Mushroom - **1 lecture;** Glutamic acid - **1 lecture;** Lysine - **1 lecture,** ethanol production **1 lecture** Semi-synthetic Penicillin **1 lecture**, Biotransformation - **1 lecture.**		15
		IV: QA-QC	Concept of GMP- **1 Lectures;** Requirements of GMP implementation - **2 Lectures;** Documentation of GMP practices - **2 Lectures**; Regulatory certification of GMP - **2 Lectures;** Quality Control (QC): Concept of QC - **2 Lectures;** Requirements for implementing QC -		15

			2 Lectures; QA concepts: Concept of QA - **2 Lectures;** Requirements for implementing - **2 Lectures**.		
		Total			60

References:

1. Applied Dairy Microbiology Elmer H Marth and James L Steele Mercel Dekker Inc New York, 2nd edition
2. Microbial Technology Peppler,H.J and Perlman,D 2nd Academic Press Practicals
3. Industrial Microbiology Prescott and Dunn CBS publishers
4. Dairy technology by Yadav and Grower
5. Fermentation technology by Stanbury and Whittkar
6. Pharmaceutical Microbiology by Russel and Hugo

PRACTICALS

USBT P 601-602 **3 credits** **72hrs**

1. Estimation of Milk protein-Pynes method
2. Microbial analysis of Milk by MBRT and RRT
3. Phosphatase test in Milk
4. DMC of milk sample
5. Isolation of Normal flora from Milk and curd
6. Determination of blood glucose levels for detection of diabetes mellitus.
7. Determination of serum cholesterol (total, HDL and LDL ratio)
8. Estimation vitamin C by DCPIP method from food samples.

Course Code USBT	Title	Unit	Topics	Credits	No of Lectures
603	**Basic pharmacology and Neurochemistry**	I: General principles of Pharmacology	Mechanism of drug action - **2 Lectures;** drug receptors and biological responses - **2 Lectures;** second-messenger systems, the chemistry of drug–receptor binding - **2 Lectures;** dose–response relationship: therapeutic index - **3 Lectures;** ED, LD, - **2 Lectures;** Potency and Intrinsic Activity - **2 Lectures;** Drug antagonism - **2 Lectures.**	2.5	15
		II: Drug Absorption and Distribution	Absorption of drugs from the alimentary tract - **2 Lectures;** factors affecting rate of gastrointestinal absorption - **2 Lectures;** absorption of drugs from lungs - **1 Lecture;** skin - **1 Lecture;** absorption of drugs after parenteral administration factors influencing drug distribution - **2 Lectures;** binding of drugs to plasma proteins - **2 Lectures;** Physiological barriers to drug distribution - **3 Lectures.**		15
		III: Basic Toxicology and Regulatory Toxicology	Background Definitions - **1 Lectures;** Causation: degrees of certainty Classification - **1 Lectures;** Causes Allergy in response to drugs Effects of prolonged administration: chronic organ toxicity - **2 Lectures;** Adverse effects on reproduction - **1 Lecture;** <u>Poisons</u>: Deliberate and accidental self-poisoning Principles of treatment Poison-specific measures General measures - **2 Lectures;** Specific poisonings: cyanide, methanol, ethylene glycol, hydrocarbons, volatile solvents, heavy metals, - **3 Lectures;** herbicides and pesticides, - **2 Lectures;** biological substances (overdose of medicinal drugs is dealt with under individual agents**)** - **1 Lecture;** Incapacitating agents: drugs used for torture - **1 Lecture;** Nonmedical use of drugs - **1 Lecture.**		15
		IV: Neurochemistry	Anatomy and functioning of the brain - **2 Lectures;** Neuronal pathways - **2 Lectures;**		15

			Propogation of nerve impulses - **2 Lectures;** Neuronal excitation and inhibition - **3 Lectures;** Synapses and gap junctions - **3 Lectures;** Action of Neuro toxins and neurotransmitters - **3 Lectures.**		
		Total			60

References:

1. Textbook of Medical Physiology Guyton, A.C and Hall 11th edition J.E Saunders
2. Modern Pharmacology with clinical Applications Craig,C.R, Stitzel,R.E 5th edition
3. Clinical Pharmacology Bennet,PN,Brown,M.J, Sharma,P 11th edition Elsevier
4. Biochemistry Metzler, D.E Elsevier

Course Code USBT	Title	Unit	Topics	Credits	No of Lectures
604	**Environmental Biotechnology**	I: Renewable sources of energy	Energy sources renewable – solar energy, wind power, geothermal energy and hydropower, biomass energy - **5 Lectures;** Biogas technology- biogas plant & types, biodigester. Biogas- composition, production and factors affecting production, uses - **5 Lectures;** Biofuels – ethanol production. Microbial hydrogen production Biodiesel, Petrocrops - **5 Lectures;**	2.5	15
		II Industrial effluent treatment	Biological processes for industrial effluent treatment, aerobic biological treatment- activated sludge process, CASP, advanced activated sludge processes (any two) Biological filters, RBC, FBR - **5 Lectures;** Anaerobic biological treatment- contact digesters, packed bed reactors, anaerobic baffled digesters, UASB - **3 Lectures;** Solid waste treatment - **2 Lectures;** pollution indicators & biosensors - **2 Lectures;** biodegradation of xenobiotics- persistent compounds, chemical properties influencing biodegradability, microorganisms in biodegradation - **2 Lectures;** Use of immobilized enzymes or microbial cells for treatment - **1 Lecture.**		15
		III Wastewater treatment	Wastewater treatment- introduction, biological treatment, impact of pollutants on biotreatment, use of packaged organisms and genetically engineered organisms in waste treatment - **5 Lectures;** Heavy metal pollution – sources, microbial systems for heavy metal accumulation, techniques used for heavy metal removal - **5 Lectures;** biosorption by bacteria, fungi and algae, factors affecting biosorption limitations of biosorption - **5 Lectures.**		15
		IV Hazardous waste management	Biodegradation of waste from tanning industry - **2 Lectures;** petroleum industry - **2 Lectures;** paper & pulp industry - **2 Lectures;** Dairy - **2 Lectures;** Distillery - **2 Lectures;** Dye - **1 Lecture;** Antibiotic industry - **2 Lectures;** Removal of oil spillage & grease deposits - **2 Lectures.**		15
		Total			60

References:

1. Environmental Biotechnology Allan Scragg Oxford University press
2. Environmental Biotechnology (Basic concepts and applications) Indu Shekar Thakur IK International
3. Environmental Biotechnology (Industrial pollution management) S.D. Jogdand Himalaya Publishing House

PRACTICALS

USBT P 603-604 **3 credits** **72hrs**

1. LD 50, ED 50 evaluation using suitable models e.x daphnia
2. Study the effect of heavy metals on the growth of bacteria.
3. Determination of Total Solids from an effluent sample.
4. Study of physico-chemical (pH, color, turbidity, BOD, COD) parameters of any one industrial effluent sample
5. Estimation of chromium from Effluents (Demonstration)
6. Visit to ETP/ CETP

Course	Title	Unit	Topics	Credit	No. of Lectures
Applied component	**Agri Biotechnology**	I: Precision Agriculture and Agriculture systems	Introduction to Agriculture and Agriculture systems- **1 Lecture;** Green house Technology-- Types of green house, importance, functions and features of green house, Design criteria and calculation -**2 Lectures;** Construction material, covering material and its characteristics, growing media, green house irrigation system. nutrient management -**3 Lectures;** Greenhouse heating, cooling and shedding and ventilation system, Computer controlled environment - **3 Lectures**;, Phytotrons, fertigation and roof system -**1 Lecture;** Precision Cultivation- tools, sensors for information acquisition -**2 Lectures.**	2	12
		II: Plant stress biology	Abiotic stress –Physiological and molecular responses of plants to water stress, salinity stress, temperature stress – heat and cold, Photooxidative stress, stress perception and stress signaling pathways, Ionic and osmotic homeostasis, reactive oxygen species scavenging- **4 Lectures;** Biotic stress - plant interaction with bacterial, viral and fungal pathogens, plant responses to pathogen– biochemical and molecular basis of host-plant resistance , toxins of fungi and bacteria , systemic and induced resistance –pathogen derived resistance, signalling - **8 Lectures.**		12
		III: Molecular Markers in Plant Breeding	Genetic markers in plant breeding-- Classical markers, DNA markers (RFLP, RAPD, AFLP, SSR, SNP)- **4 Lectures;** Application of Molecular Markers to Plant Breeding [quantitative trait locus (QTL) mapping] **- 4 Lectures;** Plant DNA Barcoding- Barcoding Markers (matK, rbcl, ITS, tmH-psbA), steps, recent advances, Benefits, Limitations - **4 Lectures.**		12

		IV: Biofertilizers and Biopesticides	Biofertilizer: Nitrogen-fixing Rhizobacteria - Symbiotic Nitrogen Fixers -**2 Lectures;** Nonsymbiotic Nitrogen Fixers Plant Growth Promoting Microorganisms-Phosphate-Solubilizing Microbes (PSM), Phytohormones and Cytokinins, Induced Systemic Resistance- **2 Lectures;** Plant Growth Promotion by Fungi--Mycorrhizae Arbuscular Mycorrhizae Ectomycorrhizae **-2 Lectures;** Microbial Inoculants -- Inocula, Carriers, and Applications, Monoculture and Co-culture Inoculant Formulations Biocontrol, Polymicrobial Inoculant Formulations-**3 Lectures;** Biopesticides – types, Bacillus thuringiensis, insect viruses and entomopathogenic fungi (characteristics, physiology, mechanism of action and application) **-3 Lectures.**		12

References:

1. M. Ajmal Ali, G. Gyulai, F. Al-Hemaid -Plant DNA Barcoding and Phylogenetics, LAP Lambert Academic Publishing (2015)
2. P. Parvatha Reddy (auth.)-Sustainable Crop Protection under Protected Cultivation-Springer Singapore (2016)
3. S.B. Anderson (ed.), Plant Breeding from Laboratories to Fields, InTech,2013
4. Henry Leung, Subhas Chandra Mukhopadhyay (eds.) - Intelligent Environmental Sensing (2015, Springer International Publishing)
5. Travis R. Glare, Maria E. Moran-Diez - Microbial-Based Biopesticides_ Methods and Protocols (2016, Humana Press)
6. Altieri, Miguel A.Farrell, John G-Agroecology- The Science Of Sustainable Agriculture, Second Edition-CRC Press (2018)
7. Arie Altman, Paul Michael Hasegawa-Plant Biotechnology and Agriculture_ Prospects for the 21st Century-Academic Press (2011)

PRACTICALS

Applied component-Agri-Biotechnology

USBT P 603-604 **2 credits** **48 hrs**

1. RAPD analysis demonstration experiment
2. Isolation of Rhizobium
3. Isolation of Azotobacter
4. Isolation of Phosphate solubilising bacteria
5. Study of effect of abiotic stress on plants.
6. Rapid screening tests for abiotic stress tolerance (drought, - PEG, Mannitol &salinity NaCl)
7. Estimation of antioxidants and antioxidant enzymes - Ascorbate, Catalase, and Peroxidase
8. Visit to green house facility and submission of field visit report.

F.Y.B.A.
Subject: Economics
Microeconomics – I
Semester – I
(Academic Year: 2019 - 20)

Preamble: This course is designed to expose the students to the basic principles of microeconomic theory. The emphasis will be on the development of analytical thinking with the help of statistical tools among the students and develop the skill of application of microeconomics concepts to analyze the real life situations.

Module - I: Introduction to Microeconomics (12 Lectures)

Microeconomics: Meaning, Scope, Nature, Importance and Limitations; Basic Economic Problems; Role of Price Mechanism in a Market Economy; Positive Economics and Normative Economics; Concepts of Equation, Functions, Graphs, Diagrams, Line, Slope and Intercept

Module - II: Ten Principles of Economics (12 Lectures)

Trade-Off Faced by the Individuals; Significance of Opportunity Cost in Decision Making; Thinking at the Margin; Responses to incentives; Benefits from Exchange; Organization of Economic Activities through Markets and its Benefits; Role of Government in improving Market Outcomes; Dependence of Standard of Living on Production; Growth in Quantity of Money; Inflation and Unemployment Trade Off

Module - III: Markets, Demand and Supply (12 Lectures)

What is a Market; What is Competition; Demand Curves: Market Demand versus Individual Demand, Movements along the Demand Curve, Shifts in the Demand Curve; Supply Curves: Market Supply and Individual Supply, Shifts in Supply Curve; Market Equilibrium - Three Steps to Analyze Changes in Equilibrium; Price Elasticity of Demand, Methods of Measuring Price Elasticity of Demand – Total Outlay Method, Percentage Method and Point Method; Concepts of Income Elasticity of Demand, Cross Elasticity of Demand and Promotional Elasticity of Demand

Module IV: Consumer's Behavior (12 Lectures)

Introduction to Cardinal and Ordinal Approaches; Indifference Curve Analysis - Properties of Indifference Curves, Budget Line, and Consumer's Equilibrium; Income, Price and Substitution Effect; Derivation of Demand Curve; Consumer's Surplus: Strong Ordering and Weak Ordering

Reference

1.N.Gregory Mankiw, (2015), "Principles of Microeconomics" 7th edition- Cengage Learning.
2.Sen Anindya, (2007),"Microeconomics Theory and Applications" Oxford University press, New Delhi.
3. Salvator D, (2003) "Microeconomics Theory and Applications" Oxford University press, New Delhi.
4. M.L.Jhingan, (2006) "Microeconomics Theory", 5th edition Vrinda Publication (P) Ltd.
5. H.L.Ahuja, (2016) "Advance Economics Theory" S.Chand & Company Ltd.
6. Paul Samuelson and W. Nordhaus, (2009): Economics, 19th Edition McGrawHill Publications.

F.Y.B.A.
Subject: Economics
Microeconomics – II
Semester – II
(Academic Year: 2019 - 20)

Preamble:

As a logical sequence to Microeconomics Paper I, this paper is aimed at giving supply side knowledge of Economics to the learner which will enhance their knowledge about aspects of production, cost and revenue analysis, theories of distribution and understanding about the market structure.

Module I: Production Analysis (12 Lectures)

Production Function: Concept And Types; Concepts of Total, Average and Marginal Product; Law of Variable Proportion and Returns to Scale, Isoquant and Producer's Equilibrium

Module II: Cost & Revenue Analysis (12 lectures)

Concepts of Costs: Money and Real Cost, Social Cost, Private Cost, Explicit and Implicit Cost, Opportunity Cost; Relationship between Average, Marginal and Total Cost; Derivation of Short Run and Long Run Cost Curves; Concepts of Revenue: Types and Interrelationship

Module III: Factor Pricing (12 lectures)

Marginal Productivity Theory of Distribution; Rent: Ricardian Theory of Rent, Modern Theory of Rent, Quasi Rent; Wages: Modern Theory of Wages; Collective Bargaining; Supply Curve of Labour; Interest: Classical Theory of Interest, Loanable Funds Theory of Interest; Profit: Risk and Uncertainty Theory, Innovation Theory

Module IV: Equilibrium in Different Market Structure (12 Lectures)

Concept Of Equilibrium: TR - TC And MR - MC Approach; Features of Perfect Competition; Monopoly and Monopolistic Competition, Short Run and Long Run Equilibrium of Firm and Industry under each Market Condition; Selling Cost and Wastages under Monopolistic Competition

Note: we may include case studies and numerical examples for modules 1, 2 and 4 from examination point of view.

Reference

1. A. Koutsoyainnis, (2015), Modern Microeconomics, 2nd edition, Palgrave Macmillan.
2. Paul Samuelson and W. Nordhaus, (2009), Economics, 19th edition: Economics, McGrawHill Publications.
3. Mankiw M.G (2015), Principles of Micro economics 7th edition - Cengage Learning.
4. Anindya Sen, (2006), Microeconomics, OUP India Publisher.
5. M.L.Jhingan, (2006), "Microeconomics Theory", 5th edition,Vrinda Publication (P) Ltd.
6. H.L.Ahuja, (2016), "Advance Economics Theory" S.Chand & Company Ltd.

MICROECONOMICS –II

S.Y.B.A. SEMESTER III (Academic Year 2017-18)

&

F.Y. B. Sc. SEMESTER I (Academic Year 2016-17)

Preamble: The Course is designed to develop the student's understanding of basic tools of

microeconomic analysis. It builds on the material covered in semester 1 and is designed to

help the student apply microeconomics to the real world.

Module 1: Utility Analysis: (12 lectures)

Preferences-strong ordering-weak ordering – completeness- transitivity-rational

preferences-utility as representation of preferences-indifference curves and their

properties -budget constraint-utility maximisation and consumer's equilibrium-income

effect-substitution effect- derivation of demand curves.

Module –II: Production Analysis: (12 lectures)

Production function- Cobb-Douglas production function-short run and long run returns to

scale-Isoquants and their properties –MRTS-iso-cost curves-cost minimisation and

producer's equilibrium-derivation of factor demand curves.

Module –III: Costs and revenue: (12 lectures)

Various concepts of costs and their inter-relationship - behaviour of costs in the short run

and the long run -long run average cost curve and its derivation-implicit and explicit coststotal

revenue-marginal revenue-average revenue.

Module IV: Competitive Markets: (12 lectures)

Homogenous goods-no barriers to entry-no collusion among sellers-availability of market

information – price equals marginal cost in competitive markets- supply curve and

derivation in competitive markets- equilibrium of the firm and the industry – consumer's

surplus-producer's surplus - economic efficiency in competitive markets .

References:

1. N. Gregory Mankiw, Principles of Microeconomics, 7th edition, Cengage Learning, 2015

2. Sen Anindya (2007), Microeconomics: Theory and Applications, Oxford University Press, New

Delhi.

3. Salvatore D. (2003), Microeconomics: Theory and Applications, Oxford University Press, New

Delhi.

MACROECONOMICS –II

S.Y.B.A. SEMESTER IV (Academic Year 2017-18)

&

F.Y. B. Sc. SEMESTER II (Academic Year 2016-17)

Preamble

This paper is designed to build on the understanding of basic macroeconomic identity

introduced in sem II. The various components are detailed here in the context of a closed

economy. The objective is to enable the student to understand how interest rate and income level are determined in a closed economy and how policy may affect these outcomes.

Module 1: Money: (12 lectures)

Concept of money- supply of money- CRR, CDR, high powered money and its components- Money multiplier- current measures of money supply in India – quantity theory of money- velocity of circulation- factors affecting velocity of circulation- Fisher and Cambridge equations.

Module 2: The Money-Market: (12 lectures)

Motives for holding money- transactions motive-precautionary motive-speculative motive- interest rate as cost of holding money- liquidity trap- money-market equilibrium-derivation of LM curve-shifts in the LM curve.

Module 3: The Goods Market: (12 lectures)

Savings function-marginal propensity to save- investment demand function and its

interest elasticity- animal spirits- equilibrium in the goods market- derivation of

the IS curve-shifts in the IS curve.

Module 4: Monetary and Fiscal Policy: (12 lectures)

Simultaneous equilibrium in the goods and money markets (IS-LM equilibrium) –

determination of income and interest rates- monetary policy and its instrumentseffectiveness

of monetary policy- Fiscal policy and its instruments- effectiveness of Fiscal policy.

References:

1. N. Gregory Mankiw, Principles of Macroeconomics, 7th edition, Cengage Learning, 2015

2. Sikdar, S. (2006), Principles of Macroeconomics, Oxford University Press, New Delhi.

3. Abel, A. B., B. S. Bernanke and D. Croushore (2011), Macroeconomics, Pearson, New Delhi.

Semester III: Paper IV: Indian Economy: Contemporary Concerns

This paper will cover the material in the Economic Survey of the Government of India for that academic year. After the publication of the Economic Survey, the Board of Studies on Economics will finalize four topics from the Survey to be taught in that year. The topics for the year 2017-18 will be chapters 3,5,6,9 and 10 to be classified into four modules.

Module 1: Demonetization: To Deify or Demonize?

Objectives of demonetisation and previous instances of demonetisation - India's demonetisation as unprecedented in international economic history - Short term costs and Long term benefits of demonetization - Analytics of demonetization - Future policy measures to maximise benefits and minimise costs of demonetisation

Module 2: Fiscal Framework: The World is Changing, Should India Change Too?

Fiscal Responsibility and Budget Management (FRBM) Act - Why there is a need for counter-cyclical fiscal policy in India? - Debt dynamics with the help of equation for debt sustainability

Fiscal Rules: Lessons from the States

Fiscal Responsibility Legislation (FRL) - Impact of FRL on Budget process - Impact of FRL on Deficits - Lessons for future fiscal rules

Module 3: Universal Basic Income: A Conversation With and Within the Mahatma

The Conceptual/Philosophical case for UBI - The Conceptual Case against UBI - Arguments in Favour and Against UBI - How can UBI overcome the issues of misallocation and leakages of resources? - Can UBI improve financial inclusion? - Will UBI lead to moral hazard and reduce labour supply? - What are the guiding principles for setting up UBI? - What are the prerequisites for introducing UBI? - Is there fiscal space to finance UBI?

Module 4: Income, Health and Fertility: Convergence Puzzles

Income convergence/divergence within India - Consumption convergence/divergence within India - Health Convergence within India with room

for improvement against International standard - Total Fertility rate convergence (India and World) - Interpreting Graphs/Data regarding Income/Life Expectancy/ Infant mortality rate/Total fertility rate (For All Indian States)

Semester IV: PAPER VI

DEVELOPMENT ISSUES OF MAHARASHTRA'S ECONOMY

Module 1

Introduction to Maharashtra's Economy – Backdrop, Demography, Key Indicators of Development, Macroeconomics development of the Regions, Paradigm Shift (10 Lectures)

Module 2

Importance of Tribal Areas

Present Status, Comparison with States, PCI, Poverty, Overview of Nutrition, Health & Education, Causes of Deprivation, Reforms to be undertaken (10 Lectures)

Module 3

Water Resources

Availability of Water resources, government policy, overview of irrigation development (No division – wise discussion), overview of irrigation in Rest of Maharashtra, General Overview of Rural & Urban areas water supply, Recommendation for water distribution/ Balanced development (15 Lectures)

Module 4

Health and connectivity

Health : The Kelkar Committee approach to health, Regional disparities, Health Care Systems, Health outcomes, Recommendation and Strategies

Connectivity – Introduction, General Overview of Roads, Railways, Ports, Airports and Broadband, Resources required

(10 lectures)

Semester IV: PAPER VI

DEVELOPMENT ISSUES OF MAHARASHTRA'S ECONOMY

Module 1

Report of the High Level Committee on Balanced Regional Development Issues in Maharashtra, Planning Department, Government of Maharashtra, 2013, Pp 65-98, pp 119-131

Module 2

Report of the High Level Committee on Balanced Regional Development Issues in Maharashtra, Planning Department, Government of Maharashtra, 2013, pp 357-375

Module 3

Report of the High Level Committee on Balanced Regional Development Issues in Maharashtra, Planning Department, Government of Maharashtra, 2013,

pp 293-307, pp 330-355

Module 4

Report of the High Level Committee on Balanced Regional Development Issues in Maharashtra, Planning Department, Government of Maharashtra, 2013, pp-357-375; pp- 403-413

SEMESTER –V

ECOMIC501 MICROECONOMICS III : PAPER VII

Preamble:

The course is designed to provide sound understanding in microeconomic theory. Since

students have been taught perfect competition, this course focuses on three aspects,

which are the study of imperfect competition, general equilibrium and welfare

economics.

Module 1: Monopoly

Sources of monopoly - Profit maximising monopoly – Calculation of price, output and

profit for a monopoly- Price discrimination: First, Second and Third degree- Public

policy towards monopoly.

Module 2: Basics of Game theory

Prisoner‟s Dilemma – Dominant strategy equilibrium – Battle of sexes game – Nash

equilibrium – Extensive form games – Game tree.

Module 3: Oligopoly

The Cournot model – The Bertrand model – The Edgeworth model – The Chamberlin

model – The Kinked demand curve model – Collusion and Cartels – Price Leadership.

Module 4: General Equilibrium and Welfare Economics

Interdependence in the Economy – General Equilibrium and its Existence -The Pareto

Optimality Condition of Social Welfare, Marginal Conditions for Pareto Optimal

Resource Allocation.

Perfect Competition and Pareto Optimality – Kaldor- Hicks Compensation Criterion -

Arrow"s Impossibility Theorem.

References:

1. Koutsoyannis, Modern Microeconomics, Macmillan Press Ltd., London, 1975.

2. Mankiw, N. Gregory, Principles of Microeconomics, Cengage Learning, 2015.

3. Mansfield, Edwin, Micro-economics: Theory & Applications, 5th edition, W.W. Norton &

Company, New York, 1985.

4. Sen Anindya, Microeconomics: Theory and Applications, Second edition Oxford

University Press, New Delhi, 2007.

5. Salvatore, D. Microeconomics : Theory and Applications , New Delhi Oxford, New

Delhi, Oxford University Press 2006.

6. R.Gibbons , A Primer in Game Theory, Harvester Wheatsheaf, 1992.

ECODEV502 ECONOMICS OF DEVELOPMENT :PAPER VIII

Preamble:

This course is designed to inculcate diverse concepts related to economic growth and

development by giving special emphasis on structural issues related to the process of

development. In order to create an awareness on policy options, the pressing problems

on the path of development such as inequality, poverty and technological aspects are

dealt in.

Module1:Concepts of Economic Growth and Development:

Meaning of Growth and Development – Distinction between growth & development–

Concept of human development. HDI, GDI, Sustainable development – Green GDP –

Three core values of development – Capability Approach.

Module 2:Structural Issues in Development Process:

Big push theory – Theory of human capital – Role of Education, Health & nutrition in

economic development- Schumpeter‟s theory of development, Dual economy models of

growth, Solow‟s growth model.

Module 3:Inequality, Poverty and Development:

Measures of poverty and inequality – Kuznet‟s inverted U-hypothesis – Policy options

for poverty alleviation – Inclusive growth – Self Help Groups and Micro Finance.

Module 4:Technology and Economic Development:

Role of Infrastructure in economic development –Role of technology in economic

development, Types of technical progress –Schumacher‟s Concept of Intermediate/

Appropriate technology, Green technology.

References:

1. Todaro, Michael P. and Stephen C. Smith. Economic Development, 8e. Delhi: Pearson

Education, 2003.

2. Thirlwall, A.P. Growth and Development 8e. New York: Palgrave MacMillan, 2005.

3. Meier, Gerald M. and James E. Rauch. Leading Issues in Economic Development, 8e.

New Delhi: Oxford Univ. Press, 2006.

4. Mamoria, Joshi, Principles and practice of marketing in India, Kitab Mahal, 1979.

5. Boldwin, Economic Development: Theory, History and Policy, Willy Publishers, 1957

6. Sinha Francis, Microfinance self Help Groups in India: Living up to Their Promises,

Practical Action Publishing, England, 2009.

ECOILEC503 INDUSTIRAL AND LABOUR CONOMICS : PAPER IX

Preamble:

There has been a paradigm shift in the structure of the Indian industrial sector and the

policies governing it ever since the new era of globalisation and liberalisation has

ushered in. This paper intends to equip the students with the knowledge about the

fundamentals of Industrial Economics and also the changing policies related to the

Indian industry in the globalised era.

Module 1: Introduction

Meaning and Scope of Industrial Economics, Industrial Profile : Private sector -

Performance and Problems; Cooperatives - features, types, merits and demerits; Public

Sector - Role, Performance and Problems, Diversification and Industrial Combinations -

Motives for Mergers and Acquisitions.

Module 2: Industrial Location and Problem of Regional Imbalance

Determinants of Industrial Location, Theories of Industrial Location - Weber's and

Sargent Florence's Theories, Dispersion of Industries and the Problem of Regional

Imbalance

Module 3: Industrial Productivity and Industrial Sickness

Concept and Measurement of Industrial Productivity, Factors Affecting Industrial

Productivity, Industrial Sickness - Causes, Effects and Remedial Measures,

Rationalisation - Concept, Aspects and Impact

Module 4: Industrial Development in India

New Industrial Policy, 1991; Disinvestment Policy; FIPB Revamp- Micro, Small and

Medium Enterprises Development Act, 2006; National Manufacturing Policy,

2011,Recent Trends in India's Industrial Growth, Industrial Policy, 2012, Role of MNCs

in the Indian Economy - Merits and Demerits, Issues in Industrial Proliferation and

Environment Preservation; Pollution Control Policies.

References:

1. Agrawal A.N, Indian Economy, New Age International Publishers, New Delhi, 2011.

2. Barthwal R.R, Industrial Economics, New Age International Publishers, NewDelhi,

2007.

3. Cherunilam. F, Industrial Economics: Indian Perspective, Himalaya Publishing House,

Mumbai, 1994.

4. Datt R. and Sundaram K.P.M, Indian Economy, S.Chand& Co., New Delhi, 2009.

5. Desai S.S.M. and Bhalerao N, Industrial Economy of India, Himalaya Publishing House,

Mumbai, 2008.

6. Kuchhal S.C, Industrial Economy of India, Chaitanya Publishing House, Allahabad,1980.

ECORMB504 RESEARCH METHODOLOGY : PAPER X

Preamble:

This paper is designed with the view to introduce the concepts, principles and methods

of economic research based on qualitative and quantitative data. The course will

enable the students to get an insight into the applications of modern analytical tools

and techniques related economic decision making. The student gets an opportunity to

learn how to collect and analyze primary and secondary data. Practical sessions will

strengthen the knowledge related to computer applications to research analysis.

Module 1: Introduction to Concept of Research:

Nature, Scope & Purpose of social research - Basic assumptions of research -

Significance and objectivity in social sciences research - Types of research: pure &

applied research; formulative or exploratory research; descriptive research, historical

research, experimental research, survey research - Ethical issues and major difficulties

relating to research .

Module 2: Elements of Research Methodology:

Steps in Research process: Identification, selection and formulation of research problem –

sources of research problem – criteria of a good research problem - Review of literature -

Formulation of hypothesis - Preparing Research Design: Definition, Concepts, and types–

exploratory, descriptive and diagnostic, experimental and Analytical research designs –

Collection and analysis of the data - Interpretation and report writing.

Use of web search in research process- introduction to Internet and WWW - Using search

engine like Google, Yahoo etc. Use of advanced search techniques.

Module 3: Sources of Data for Research:

Types of data sources: Primary and Secondary - Primary data-Meaning and Collection

methods - Observational method - Interview technique - Design of Schedule and

Questionnaire - Survey method and Field Visits - Case Study as a method.

Major Sources of Secondary data: Meaning, advantages, Relevance, limitations and

cautions of secondary data.

Sampling Technique: Census and sample survey- Essentials of a good Sampling -

Advantages and limitations of sampling, Methods of sampling: Random sampling :

Simple or Unrestricted Random Sampling- Mixed or Stratified Random Sampling,

Systematic or Quasi Random sampling – Multistage or Cluster Random Sampling -

Sequential Random Sampling, Non random sampling : Judgement or Purposive

sampling–Convenience sampling accidental sampling – Quota sampling, Selecting an

appropriate sampling technique- Sampling and Non-sampling errors - Sample size.

Module 4: Processing and Analysis of Data

Classification, Tabulation and Graphical presentation of socio-economic data - An

introduction to Statistical Analytical Tools – Measures of Central Tendency – Measures

of Variation: absolute and relative measures – Quartile deviation, standard deviation,

coefficient of variation- Skewness: meaning and Measurement (Karl Pearson‟s and

Bowley‟s methods) - Basics of Computer Applications in Data organization & Data

Processing, Introduction to spreadsheet application, features and functions, Using

formulas and functions, Data storing, Features for Statistical data analysis, Graphical

representation of data, Generating charts/ graph and other features.

References:

1. Goode J. William & Hatt K. Paul, Methods in social Research, New York, McGraw-Hill,

1952.

2. Kothari, C.R., Research Methodoloy: An Introduction, Delhi, New Age, 2004.

3. Krishnaswami, O.R & M. Ranganatham ,Methodology of Research in Social Sciences,

Himalaya Publishing House, Mumbai, 2011.

4. P. Saravanavel, Research Methodoloy, KitabMahal, Allahabad, 1987.

5. Gupta S. P., Statistical Methods, Sultan Chand and Sons, New Delhi, 2014 .

6. Rajaram V., Fundamentals of computers, Prentice Hall of India, New Delhi, 1996.

ECOENVC505 ENVIRONMENTAL ECONOMICS: PAPER XI

Preamble:

This course focuses on economic causes of environmental problems. In particular,

economic principles are applied to environmental questions and their management.

Economic implications of environmental policy are addressed as well as valuation of

environmental improvements.

Module1: Introduction to Environmental Economics:

Introduction to environmental development and environmental economics, Rio-

Declaration on environmental development, Agenda 21 programme of action for

sustainable development, Social and economic dimensions, Conservation and

management of resources for development.

Module 2: The design and implementation of Environmental Policy:

Overview - Criteria for evaluating environmental policies; Standards, Pigovian taxes and

effluent fees, tradable permits, choice between taxes and quotas, implementation of

environmental policy.

Module 3: Measuring benefits of environmental improvements:

Economic value of Environment- Use and Non-use values-Measurement method:-market

based and non-market based methods, contingent valuation, travel cost method, hedonic

price method, risk assessment and perceptions.

Module 4: Environmental problems:

The global environment- Trans-boundary environmental problems, economics of climate

change, International environmental Agreements - , sustainable development: Concepts

and measures.

References:

1. Barry C. Fields: Environmental Economics : An Introduction, McGraw Hill International

Edition, 1997.

2. Charles Kolstad : Environmental Economics, Oxford University Press, New York, 2000.

3. Kaltschmitt, Martin, Streicher, Wolfgang, Wiese, Andreas, Renewable Energy:

Technology, Economics and Environment, Springer, Germany, 2007.

4. Hanley Nick, Shogren Jason and White Ben: Introduction to Environmental Economics,

Oxford University Press, 2001.

5. Smith Stephen: Environmental Economics: A very Short Introduction, 1st Edition,

Oxford University Press, New York, 2011.

6. United Nations Sustainable Development, UN Conference on Environment &

Development, Rio de Janerio, Brazil, Agenda 21,

https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf, 1992.

ECOHET506 HISTORY OF ECONOMIC THOUGHT: PAPER XII

Preamble:

This course provides basic understanding about the celebrated economists and their

contributions starting from the classical period. It throws light on the contributions of

Nobel Laureates of recent period too.

Module 1: Classical Period

Adam Smith - division of labour, theory of values, capital accumulation, distribution,

David Ricardio- Value, theory of rent, distribution. Karl Marx - dynamics of social

changes, theory of values, surplus value, profit and crisis of capitalism and

Contemporary Relevance.

Module 2: Marginalist : Marshall To Schumpeter

Role of time in price determination , economics methods, ideas of consumer's surplus,

representative firm, external and internal economies, quasi-rent, nature of profit; Pigou :

welfare economics: Schumpeter: role of entrepreneur and innovation.

Module 3: Keynesian Ideas:

Liquidity Preference Theory and Liquidity trap, Consumption Function, MPC,

Multiplier & Accelerator principles and their interaction, wage rigidities,

underemployment equilibrium, role of fiscal policy: deficit spending and public works,

multiplier principles, cyclical behaviour of the economy.

Module 4: Post- Keynesian Developments:

Hayek – Supply side economics: Arthur Laffer, Evans – Monetarism: Milton Friedman‟s

Don Patinkin – An overview of the new classical economics: Robert Lucas.

Nobel Prize Winners in Economics: A. K. Sen (1998), Joseph Stiglitz (2001), Paul

Krugman (2008), Jean Tirole (2014), Angus Deaton (2015), Richard Thaler (2017).

Reference:

1. Gide, O. and G. Rist , A History of Economic Doctrine, George Harrop Co., London,

1956.

2. Roll, E, A History of Economic Thought, Faber Landon, 1973.

3. Dasgupta A. K, Epochs of Economic Theory Oxford University Press. New Delhi,

1985.

4. Schumpeter, J.A, Ten Great Economist, Oxford University Press, New York, 1951.

5. Ghosh and Ghosh: Concise History of Economic Thought, Himalaya Publishers.

6. Puttaswamaiah K, Nobel Economists – Lives and Contributions, Indus Public Co.,

New Delhi, 1995.

TYBA (SEMESTER –VI)

ECOMA601 MACROECONOMICS III: PAPER XIII 4 100

Preamble:

This course introduces the students to formal modelling of a macroeconomic theory

with analytical tools. It focuses on goods market with fixed exchange rate, the money

market, uncovered interest rate parity and the benefits and costs of fixed and flexible

exchange rates.

Module 1: The Goods Market in the Open Economy:

Trade Balance and its implications for GDP calculations – Export and Import Functions

– The Real Exchange Rate and why it matters –Why equilibrium GDP is consistent with

a trade imbalance? – Fiscal and Exchange Rate Policy with a Fixed Exchange Rate.

Module 2: Money/Financial Markets and Mundell-Fleming Model:

The LM equation for the open economy –Uncovered Interest Parity and its implications

for exchange rate determination – The combined IS/LM/UIP model.

Fiscal and Monetary Policy under Fixed and Flexible Exchange Rates– The Mundell-

Fleming trilemma.

Module 3: Exchange Rate Regimes & Exchange Rate Crises:

The choice of regime – Fixed or Flexible – The spectrum of arrangements from Hard Peg

at one end to Fully Floating at the other; Why the Balance of Payments must always

balance under Floating Exchange Rates but need not balance under a Fixed or Managed

Exchange Rate regime.

Exchange Rate crises – The relation between Exchange Rate crises and other kinds of

crises (banking crises, financial crises, etc.).

Module 4: International Monetary History, 1900-present:

The Gold Standard – The Inter-War Period and the Great Depression – 1944, Bretton

Woods System and its collapse ; Fixing in Europe via ERM, and the Dollar Standard

elsewhere.

The Maastricht Treaty and preparations for the Euro; The Global Financial Crisis and its

consequences for the Euro; The Euro Crisis, Asia Infrastructure Investment Bank (AIIB),

New Development Bank (NDB).

References:

1. Blanchard, Oliver, Macroeconomics , Pearson education, New Delhi, India, 2008.

2. Dornbusch R S, Fischer and R Startz; Macroeconomics, 8e Tata Mc Grow Hill, New

Delhi, 2004.

3. Froyen, R. T.; Macroeconomics : Theory and Policy, Pearson Education Asia, Delhi,

2001.

4. Mankiw, Gregory; Macroeconomics, 6e, Worth Publishers, New York, 2003.

5. Salvatore, D.; International Economics, Printice Hall, New York, 1997 .

6. Robert C Feenstra & Alan M Taylor , International Trade, Worth Publishers, 2014.

ECOINT602 INTERNATIONAL ECONOMICS: PAPER XIV

Preamble:

This course develops a systematic exposition of models which explain the composition,

direction, and consequences of international trade, and the determinants and effects of

trade policy. It then builds on the models of open economy macroeconomics focussing

on national policies as well as international monetary systems. It concludes with an

analytical account of the causes and consequences of the rapid expansion of

international financial flows in recent years.

Module 1: Introduction

Importance of the study of International Economics - An overview of world trade-

Distinction between domestic & international Trade -Concepts of Cost Difference ,

Adam Smith‟s Theory of International Trade, The Ricardian Theory.

Module 2: Modern Theories of International Trade

Heckshcher- Ohlin Theory of International Trade, Factor Abundance: Two Criteria,

Leontief Paradox, Haberler‟s theory of Opportunity Cost, Law of reciprocal demand and

offer curves, Role of Factor Accumulation, Stolper-Samuelson theorem.

Module 3: Importance of Trade and Recent trends:

Monopolistic competition and trade - firm heterogeneity, FDI: The concept and role, FDI

Inflows- FDI Outflows, and the global supply chain, Business Process Outsourcing.

Module 4: Trade Policy and Regionalism

Instruments of trade policy; Why countries cooperate? -GATT, GATS, Regional Trade

Agreements - controversies in trade policy (labour standards, IPR and environment) -

ASEAN, SAARC, SAFTA, Protectionism.

References:

1. Paul Krugman, Maurice Obstfeld, and Marc Melitz, International Economics: Theory

and Policy, Addison-Wesley (Pearson Education Indian Edition), 9th edition, 2012.

2. Dominick Salvatore, International Economics: Trade and Finance, John Wiley

International Student Edition, 10th edition, 2011.

3. Gordon Hanson, „The Rise of Middle Kingdoms: Emerging Economies in Global

Trade", Journal of Economic Perspectives, Spring 2012.

4. Melitz M. and Trefler D., "Gains from Trade When Firms Matter", Journal of

Economic Perspectives, Spring 2012.

5. Kindleberger Charles P, International Economics, Homewood, USA, 1978

6. Bo Sodersten and Geofrey Reed, International Economics, Palgrave Macmillan,

1994.

ECOILEC603 INDUSTIRAL AND LABOUR ECONOMICS PAPER XV

Preamble:

Issues pertaining to the labour market, wage policy, trade unions and amicable

solutions to industrial disputes have become vital for developing countries, especially

for India, where the bulk of the labour force is employed in the unorganised sector, and

the organized sector is witnessing a phenomenon of ‘jobless’ growth. This paper

intends to provide knowledge of the same and also discusses the importance of labour

welfare and social security measures for the growing labour force in India.

Module 1 : Introduction – Indian Labour Market

Characteristics of the Indian Labour Market - Child Labour and Female Labour –

Problems and Measures- Globalisation and Indian Labour Market -Labour Market

Reforms – Exit Policy and Need for Safety Nets - Second National Commission on

Labour.

Module 2 : Trade Unionism

Definition and Functions of Trade Unions- Historical Evolution of Trade Unions in India

and Their Present Status - Problems of Trade Unions in India - Role of Outside

Leadership

Module 3 : Industrial Relations

Causes of Industrial Disputes and Their Settlement Mechanism - Collective Bargaining –

Concept, Features, Importance and Pre-requisites for Successful Collective Bargaining -

Collective Bargaining in India - Workers‟ Participation in Management –Concept,

objectives and Forms of Workers‟ Participation in India.

Module 4 : Labour Welfare and Social Security

Concept, Theories and Principles of Labour Welfare - Agencies for Labour Welfare -

Role of the Labour Welfare Officer - Social Security – Concept; Social Assistance and

Social Insurance - Social Security Measures in India - International Labour Organization

and Its Impact on Indian Labour Legislations.

References:

1. Datt R. and Sundaram K.P.M, Indian Economy, S.Chand & Co., New Delhi, 2009.

2. Mamoria C.B. and Mamoria S, Dynamics of Industrial Relations, Himalaya

Publishing House, Mumbai, 2002.

3. Mishra S.K. and Puri V.K, Indian Economy, Himalaya Publishing House, Mumbai,

2002.

4. Monappa A, Industrial Relations, Tata McGraw Hill Publishing Company Ltd., New

Delhi, 2006

5. Ratna Sen, Industrial Relations in India - Shifting Paradigms, Macmillan, New

Delhi, 2005.

ECORMB604 RESEARCH METHODOLOGY :PAPER XVI

Preamble:

This paper is designed with a goal to strengthen the critical thinking and listening

skills in conducting economic research and to device research outcomes in an

impeccable way. The entire course is based on the broad social sciences spectrum.

Module 1: Statistical applications in research:

Methods of studying Correlation- measurement of simple correlation: graphic method:

scatter diagram - coefficient of correlation - Karl Pearson and rank correlation

interpretation of r = ± 1

Linear Regression analysis: meaning, regression lines, regression coefficients, regression

equations, relationship between correlation and regression.

Analysis of Time Series – components –trend analysis- moving averages (3, 4 and 5

yearly)- method of least square.

Module 2: Index numbers:

Meaning – classification – problems encountered while constructing index numbers- uses

and limitation of index numbers, Methods of constructing index numbers: Simple index:

i) aggregate method ii) simple average of relatives method, Weighted index: Laspeyer‟s,

Paache‟s and Fisher‟s index – weighted average of relatives method, Chain based index

– concepts of Base shifting, splicing, and deflating, Consumer price index: meaning,

need and construction – methods: aggregate expenditure method and family budget

method.

Module 3: Hypothesis formulation and Hypothesis Testing:

Definition and functions of hypothesis –Criteria of workable hypothesis – forms and

sources of hypothesis- Concepts in Testing of Hypothesis: Universe / Population,

parameter and statistic, Null and Alternative Hypotheses, Levels of Significance, critical

region, Type I and Type II errors - Point and Interval Estimates.

Module 4: Research Report Writing:

Types of Research Report: Technical, Popular, Interim, Summary, Article- Format of a

Research Report- Principles of writing the Research Report: Organization and Style -

Contents-Styles of reporting- Steps in drafting Reports- Editing the final draft-Evaluating

the final draft -Organization of the Research Report: Preliminaries, Contents of Report,

Structuring the Report: Chapter format- Pagination- Identification- Using quotations-

Presenting footnotes –abbreviations- Presentation of tables and figures- Referencing-

Documentation-Use and format of appendices- Indexing - Bibliography, Appendices.

References:

1. Goode J. William & Hatt K. Paul, Methods in social Research, New York,

McGraw-Hill, 1952.

2. Kothari, C.R (2004) Research Methodology: An Introduction, Delhi, New Age,

2004.

3. Krishnaswami, O.R &, M. Ranganathan , Methodology of Research in Social Sciences, Himalaya Publishing House, Mumbai, 2011.

4. Kumar, Renjith (2009) Research Methodology: A Step by Step Guide for Research, Delhi, Pearson Education, 2009.

5. P.Saravanavel Research Methodology, KitabMahal, Allahabad, 1987.

6. Gupta S P Statistical Methods Sultan Chand and Sons, New Delhi, 1987.

ECODTEC605 DEVELOPMENT THEORY AND EXPERIENCE : PAPER XVI

Preamble:

This is the second paper of economic development sequence. The course begins with

demographic concepts and their evolution during the process of development. Then it

focuses on the theory migration and discusses the link between migration and development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The course ends with the issues related to environment and development.

Module I: Demography and Development:

Demographic concepts; birth and death rates, age structure, fertility and mortality; demographic transitions during the process of development; gender bias in preferences and outcomes andevidence on unequal treatment within households; connections between income, mortality, fertility choices and human capital accumulation.

Module II: Structural Transformation:

The Lewis model –Clark-Fisher model of structural change , Urbanization: Trends and Projections with reference to India, Urbanization and Development, Causes of urbanization, Urban informal sector, Policies for the urban informal sector, Migration and development, Economic theory of rural-urban migration: Harris-Todaro migration model

Module III: Land, Labor and Credit Markets:

Role of Agriculture in Economic Development, Market Failure and Agriculture, The distribution of land ownership; Land reform and its effects on productivity; contractual

relationships between tenants and landlords; Land Acquisition; Nutrition and Labour

Productivity; Rural Credit Market; Microfinance; Inter-linkages between Rural Factor

Markets.

Module IV: The Environment and Development:

The core of environmental problems- Rural poverty and environmental destructionindustrialization

and environmental pollution - Economic models of environmental

issues: privately owned resources, common property resources, public goods: regional

environmental degradation and the free rider problem, limitations of pubic goods

framework.

References:

1. Debraj Ray, Development Economics, Oxford University Press,2009.

2. Partha Dasgupta, Economics: A Very Short Introduction, Oxford University

Press,2007.

3. Abhijit Banerjee, Roland Benabou and Dilip Mookerjee, Understanding Poverty,

Oxford University Press,2006.

4. Amartya Sen, Development as Freedom, Oxford University Press,2000.

5. Daron Acemoglu and James Robinson, Economic Origins of Dictatorship and

Democracy, Cambridge University Press,2006.

6. Michael Todaro and Stephen Smith : Economic Development,11th edition,

Pearson

ECOITPP606 INTERNATIONAL TRADE, POLICY AND PRACTICE : PAPER- XVIII

Preamble:

This course is designed for addressing changing phase of International Trade Policy

and Practice. The main purpose of this course is to expose students to current trends

in International developments.

Module 1 :Introduction

Inter regional and international trade, Role of Dynamic factors i.e. change in Tastes,

Technology and Role of Factor Accumulation.

Foreign Exchange Rate: Concepts - Short and Forward rates - Foreign Exchange rate

determination – Fixed and flexible exchange rate – Interrelationship between exchange

rates and Interest rates.

Exchange Rate system in India, managed floating, Current and Capital Account

Convertibility and their impact, FEMA.

Module 2 : Emerging new International Economic Order

GATT, Uruguay Round, WTO, WTO Agreement, Dispute settlement Mechanism, Impact

of WTO on Emerging Economies and India, Doha Round and implications of its failure-

Emergence of Regional Free Trade agreements (FTA), Bilateral Investment Treaty (BIT), Double

Taxation Avoidance Agreement (DTAA).

Module 3 :International Financial Institutions and International Debt Problem.

IMF, World Bank, Asian Development Bank (ADB) –New Development Bank (NDB),

Asia Infrastructure Investment Bank (AIIB) and their role with special reference to India.

South East Asian Crisis and Lessons for India, Global Economic Crisis, Global Financial

Crisis of 2008, International Debt Problem – Emerging Global Financial Architecture.

Module 4: Role of Foreign Capital Flow

Factors determining Foreign Investment, Foreign Institutional Investment (FII), Qualified

Foreign Investment (QFI), Foreign Portfolio Investment (FPI), Role of FDI in Economic

Development- Factors influencing FDI inflows- Green Field and Brown field FDI in

India, Foreign Investment and Role of MNCs in India.

References:

1. Robert J Carbaugh, International Economics, South-Western Cengage Learning,

USA, 2017.

2. Paul R Krugman, Maurice Obstfeld and Melitz Mark, International Economics:

Theory and Policy, Princeton University, USA, 2015.

3. Dennis R Appleyard, Alfred J Field, International Economics, McGraw-Hill,

USA, 2013.

4. Robert J Carbaugh, International Economics(With Xtra! and Info Trac), South

Western College Pub, 2003.

5. Kindleberger Charles P., International Economics,3rd edition, R. D. Irwin,

Homewood, IL, 1963.

6. Bo Sodersten and Geofrey Reed, International Economics, 3rd Edition, Palgrave

Macmillan; (May 15, 1994)

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AC 7/4/2014
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Semester I USBO101		**L**	**Cr**
Paper I -- Plant Diversity 1		**45**	**2**
UNIT I		**15**	
ALGAE			
1	Structure, life cycle and systematic position of *Nostoc* and *Spirogyra*.		
2	Economic importance of Algae.		
UNIT II		**15**	
FUNGI			
1	Structure, life cycle and systematic position of *Rhizopus* and *Aspergillus*		
2	Economic importance of Fungi.		
3	Modes of nutrition in Fungi (Saprophytism and Parasitism).		
UNIT III		**15**	
BRYOPHYTA			
1	General characters of Hepaticae		
2	Structure, life cycle and systematic position of *Riccia*.		

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Semester I USBO102		**L**	**Cr**
Paper II – Form and Function 1		**45**	**2**
UNIT I		**15**	
CELL BIOLOGY			
1	General structure of plant cell: cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model)		
2	Ultra structure and functions of the following cell organelles: Endoplasmic reticulum and Chloroplast		
UNIT II		**15**	
ECOLOGY			
1	Energy pyramids, energy flow in an ecosystem.		
2	Types of ecosystems: aquatic and terrestrial.		
UNIT III		**15**	
GENETICS			
1	Phenotype/Genotype, Mendelian Genetics- monohybrid, dihybrid; test cross; back cross ratios.		
2	Epistatic and non epistatic interactions; multiple alleles.		

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	Semester I USBOP1	**L**	**Cr**
	PRACTICAL Paper I – Plant Diversity 1	30	1
1	Study of stages in the life cycle of *Nostoc* from fresh/ preserved material and permanent slides.		
2	Study of stages in the life cycle of *Spirogyra* from fresh/ preserved material and permanent slides.		
3	Economic importance of algae: *Ulva* (Biofuel), *Spirulina* (Neutraceutical), *Gelidium* (Agar)		
4	Study of stages in the life cycle of *Rhizopus* from fresh/ preserved material and permanent slides.		
5	Study of stages in the life cycle of *Aspergillus* from fresh/ preserved material and permanent slides.		
6	Economic importance of Fungi: Mushroom , Yeast, wood rotting fungi (any bracket fungus).		
7	Study of stages in the life cycle of *Riccia* from fresh/ preserved material.		
8	Study of stages in the life cycle of *Riccia* with the help of permanent slides.		
	PRACTICAL PAPER II- FORM AND FUNCTION 1	30	1
1	Examining various stages of mitosis in root tip cells (*Allium)*		
2	**Cell inclusions:** Starch grains (Potato and Rice); Aleurone Layer (Maize)		
3	Cystolith (*Ficus*); Raphides (*Pistia*); Sphaeraphides (*Opuntia*).		
4	Identification of cell organelles with the help of photomicrograph: Plastids: Chloroplast, Amyloplast, Endoplasmic Reticulum and Nucleus		
4	**Identification of plants adapted to different environmental conditions:** Hydrophytes: Floating: Free floating (*Pistia*/*Eichornia*); Rooted floating (*Nymphaea*); Submerged (*Hydrilla*)		
5	Mesophytes (any common plant); Hygrophytes (*Typha*/*Cyperus*)		

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6	Xerophytes : Succulent (*Opuntia*); Woody Xerophyte (*Nerium*); Halophyte (*Avicennia* pneumatophore) No sections in ecology, only identification and description of specimens. Morphological adaptations only.		
7	Calculation of mean, median and mode.		
8	Calculation of standard deviation.		
9	Frequency distribution, graphical representation of data- frequency polygon, histogram, pie chart.		
10	Study of Karyoptypes: Human: Normal male and female, *Allium cepa* .		

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	Semester II USBO201	**Hrs**	**Cr**
	Paper I -- Plant Diversity 1	**45**	**2**
UNIT I		**15**	
PTERIDOPHYTES			
1	Structure life cycle, systematic position and alternation of generations in *Nephrolepis*		
2	Stelar evolution		
UNIT II		**15**	
GYMNOSPERMS			
2	Structure life cycle systematic position and alternation of generations in *Cycas*		
3	Economic importance of Gymnosperms		
Unit III			
ANGIOSPERMS		**15**	
1.	Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes. Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, *Drosera* or insectivorous plants.		
2	Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.		
3	Study of following families: Malvaceae, Amaryllidaceae.		

	Semester II USBO202	**Hrs**	**Cr**
	Paper II – Form and Function 1	**45**	**2**
UNIT I		**15**	
ANATOMY			
1	Simple tissues, complex tissues.		
2	Primary structure of dicot and monocot root, stem and leaf.		
3	Epidermal tissue system: types of hair, monocot and dicot stomata.		

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UNIT II		**15**	
PHYSIOLOGY			
1	Photosynthesis: Light reactions, photolysis of water, photophosphorylation (cyclic and non cyclic), carbon fixation phase (C_3, C_4 and CAM pathways).		
UNIT III		**15**	
MEDICINAL BOTANY			
1	Concept of primary and secondary metabolites, difference between primary and secondary metabolites.		
2	Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica, Zinziber officinale, Curcuma longa, Santalum album, Aloe vera*.		

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	Semester II USBOP2	**Cr**
	PRACTICAL Paper I – Plant Diversity 1	**1**
1	Study of stages in the life cycle of *Nephrolepis* : Mounting of ramentum, hydathode, T.S. of rachis.	
2	T.S. of pinna of *Nephrolepis* passing through sorus.	
3	Stelar evolution with the help of permanent slides: Protostele: haplostele, actinostele, plectostele, mixed protostele, siphonostele: ectophloic, amphiphloic, dictyostele, eustele and atactostele.	
4	*Cycas:* T.S of leaflet (*Cycas* pinna)	
5	Megasporophyll, microsporophyll, coralloid root, microspore, L.S. of ovule of *Cycas* – all specimens to be shown.	
6	Economic importance of Gymnosperms: *Pinus* (turpentine, wood, seeds)	
7	Leaf morphology : as per theory	
8	Types of inflorescence: as per theory	
9	Malvaceae	
10	Amaryllidaceae	
	PRACTICALPaper II – Form and Function 1	**1**
1	Primary structure of dicot and monocot root.	
2	Primary structure of dicot and monocot stem.	
3	Study of dicot and monocot stomata.	
4	Epidermal outgrowths: with the help of mountings Unicellular: *Gossypium*/Radish Multicellular: *Lantana*/Sunflower Glandular: *Drosera* and Stinging: *Urtica* – only identification with the help of permanent slides. Peltate: *Thespesia* Stellate: *Erythrina*/*Sida acuta*/*Solanum/Helecteris*	

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	T-shaped: *Avicennia*	
5	Separation of chlorophyll pigments by strip paper chromatography.	
6	Separation of amino acids by paper chromatography.	
7	Change in colour because of change in pH: Anthocyanin: black grapes/Purple cabbage	
8	Test for tannins: tea powder/catechu.	
9	Identification of plants or plant parts for grandma's pouch as per theory.	

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DISTRIBUTION OF TOPICS AND CREDITS
F Y B Sc. BOTANY SEMESTER I

Course	Nomenclature	Credits	Topics
USBO1O1	PLANT DIVERSITY 1	02	1. Algae
			2. Fungi
			3. Bryophyta
USBO1O2	FORM AND FUNCTION I	02	1. Cell Biology
			2. Ecology
			3. Genetics
USBOP1	Plant Diversity I, form and Function I (Practical I & II)	02	

F Y B Sc BOTANY SEMESTER II

Course	Nomenclature	Credits	Topics
USBO2O1	PLANT DIVERSITY I	02	1. Pteridophytes
			2. Gymnosperms
			3. Angiosperms
USBO2O2	FORM AND FUNCTION I	02	1. Anatomy
			2. Physiology
			3. Medicinal Botany
USBOP2	Plant Diversity I, Form and Function I (Practical I & II)	02	

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References

1. College Botany Volume I and II Gangulee, Das and Dutta latest edition. Central Education enterprises
2. Cryptogamic Botany Volume I and II by G M Smith McGraw Hill.
3. Genetics by Russel. Wesley Longman inc publishers. (5th edition)
4. Plant Physiology by Taiz and Zeiger Sinauer Associates inc. publishers
5. Fundamentals of Ecology by E P Odum and G W Barrett. Thompson Asia Pvt Ltd. Singapore.
6. Cell Biology by De Robertis

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Scheme of Examinations

Internal and External Assessment as per CBSS of University of Mumbai

Note:

- Two short field excursions for habitat studies are compulsory.
  Field work of not less than eight hours duration is equivalent to one period per week for a batch of 15 students.
- A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of F.Y.B.Sc. Botany or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of F.Y.B.Sc. Botany as per the minimum requirements. In case of loss of journal a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However such a candidate will be allowed to appear for the practical examination but the marks allotted for the journal will not be granted.

University of Mumbai

No. AAMS_UGS/ICC/2022-23/108

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology is invited to this office circular No. UG/121 of 2017-18 dated 28th July, 2017 relating to the revised syllabus F.Y.B.Sc. (Biochemistry) (Sem. I & II) (CBCS).

They are hereby informed that the recommendations made by the Ad-Hoc Board of Studies in **Biochemistry** at its meeting held on 23rd June, 2022 and subsequently passed in the Faculty and then by the Board of Deans at its meeting held on 05th July, 2022 **vide** item No. 6.14(R) have been accepted by the Academic Council at its meeting held on 11th July, 2022 **vide** item No. 6.14 (R) and that in accordance therewith, the revised syllabus of F.Y.B.Sc (Biochemistry) (Six Units) (Sem. I & II) (CBCS), has been brought into force with effect from the academic year 2022-23. (The circular is available on the University's website www.mu.ac.in).

(Dr. Shailendra Deolankar)
I/c Registrar

MUMBAI – 400 032
20th October, 2022

To

The Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology.

A.C/6.14(R)/11/07/2022

****

No. AAMS_UGS/ICC/ 2022-23/108 20th October, 2022

Copy forwarded with Compliments for information to:-

1) The Dean, Faculty of Science & Technology.
2) The Chairman, Ad-Hoc Board of Studies Biochemistry.
3) The Director, Board of Examinations and Evaluation.
4) The Director, Board of Students Development.
5) The Director, Department of Information & Communication Technology.
6) The Co-ordinator, MKCL.

(Dr. Shailendra Deolankar)
I/c Registrar

Desktop/Circular Faculty of Science/priya

Copy to :-

1. **The Deputy Registrar, Academic Authorities Meetings and Services (AAMS),**
2. **The Deputy Registrar, College Affiliations & Development Department (CAD),**
3. **The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM),**
4. **The Deputy Registrar, Research Administration & Promotion Cell (RAPC),**
5. **The Deputy Registrar, Executive Authorities Section (EA),**
6. **The Deputy Registrar, PRO, Fort, (Publications Section),**
7. **The Deputy Registrar (Special Cell),**
8. **The Deputy Registrar, Fort/Vidyanagari Administration Department (FAD) (VAD), Record Section,**
10. **The Professor-cum- Director, Institute of Distance and Open Learning (IDOL Admin), Vidyanagari,**

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. **P.A. to Hon'ble Vice-Chancellor,**
2. **P.A. to Pro-Vice-Chancellor,**
3. **P.A. to Registrar,**
4. **All Deans of all Faculties,**
5. **P.A. to Finance & Account Officer, (F. &. A.O.),**
6. **P.A. to Director, Board of Examination & Evaluation,**
7. **P.A. to Director, Innovation, Incubation and Linkages,**
8. **P.A. to Director, Board of Lifelong Learning and Extension (BLLE),**
9. **The Director, Dept. Of Information and Communication Technology (DICT) (CCF & UCC), Vidyanagari,**
10. **The Director of Board of Student Development,**
11. **The Director, Department of Students Welfare (DSD),**
12. **All Deputy Registrar, Examination House,**
13. **The Deputy Registrars, Finance & Accounts Section,**
14. **The Assistant Registrar, Administrative sub-campus Thane,**
15. **The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan,**
16. **The Assistant Registrar, Ratnagiri Sub-centre, Ratnagiri,**
17. **The Assistant Registrar, Constituent Colleges Unit,**
18. **BUCTU,**
19. **The Receptionist,**
20. **The Telephone Operator,**
21. **The Secretary MUASA,**

for information.

AC - 11/07/2022
Item No. 6.14 (R)

UNIVERSITY OF MUMBAI

Revised Syllabus for
F.Y. B.Sc.
(Biochemistry)

Semester: I & II
(CBCS)

(With effect from the academic year 2022-23)

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	F.Y.B. Sc. (Biochemistry)
2	Eligibility for Admission	Ordinance no. O.2145 Circular no. UG/394 of 2004 dated 6th September 2004
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	
5	No. of Years /Semesters	Three years – Six Semesters
6	Level	~~P.G.~~/ U.G. /~~Diploma / Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly /~~ Semester **(Strike out which is not applicable)**
8	Status	Revised / ~~New~~ **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year : 2022-2023

Date : 15-07-2022

Signature :
Dr. Samidha M. Pawaskar
Chairperson of Ad-hoc/BoS of Biochemistry

Signature :
Dr. Anuradha Majumdar
Dean, Science and Technology

Preamble

Biochemistry is central to all areas of the “biological” and “life” science. It aims to provide an understanding of every aspect of the structure and function of living things at cellular level. Being an interdisciplinary subject it is spanning a wide range of areas from microbiology to plant and animal sciences to pathology of diseases and nutrition.

The impact of studies in biochemistry on modern life is enormous. Therefore, the syllabus is structured to touch upon broad base at the beginning. Unique physical and chemical characteristics of water enable it to function in ways essential to human and other life processes due to its structure and composition. Life on Earth began more than 3 billion years ago, evolving from the most basic of microbes into a dazzling array of complexity over time, which makes it necessary to study the origin of life and evolution of a modern species over span of years. After an in-depth understanding of how the first cells originated, students are introduced to detailed structural organization of basic unit of a living system “The Cell”. Biomolecules are the basic and important constituents of a living system. Hence, it is mandatory to study structure, occurrence and functions of large biomolecules like carbohydrates, lipids and proteins along with nucleic acids. In order to prepare the students for detailed course in Applied Nutrition in the higher education, the syllabus is made to understand human nutrition and its significance. In order to understand the biological processes occurring in the living body, processes as digestion, absorption, respiration and excretion are necessary to be studied. As stated earlier, life evolved from a small microbe, it is our aim to study living microscopic size organisms which includebacteria, fungi, protozoa and special type of microorganisms called extremophiles

Objectives of the first year of the course

- Develop an adequate background to enable the first-year students to study more advanced biochemistry topics.
- Acquaint the learners with the unique properties of the universal solvent - water, essential for life processes.
- Understand the life constituting bio molecules: proteins, carbohydrates, lipids, nucleic acids.
- Familiarize the learners about the origin of life and take them through the process of evolution.
- Focus on Cell as the basic unit of life which is the center for all biochemical processes.
- Familiarize the learners to the world of microorganisms which exist as independent cellular units.
- Develop an interest in the learner in nutrition for sustaining life, and physiology and functioning of life systems.
- Appreciate the importance of the broad spectrum of biochemistry.
- Provide familiarity with basic biochemistry laboratory techniques.
- Develop the practical skills of students to enhance their observational skills and to use these skills for problem solving.

Teaching pattern:

One (01) Credit would be of thirty to forty (30-40) learning hours; of this, more than fifty per cent of the time will be spent on classroom instructions including practical as prescribed by the University. Rest of the time spent invested for assignments, projects, journal writing, case studies, library work, industrial visits, attending seminars/workshops, preparations for examinations etc. would be considered as notional hours. The present syllabus considers (45 Lectures as classroom teaching and 15 lectures as Notional hours/ paper). Each lecture duration would be for 48 min. The names of the reference books provided in the syllabus are for guidance purpose only. Students and faculty are encouraged to explore additional reference books, online lectures, videos, science journals for latest/ additional information.

Scheme of Examination:

The performance of the learners shall be evaluated into TWO Parts.

1. Internal Assessment with 25 marks and

2. Semester End Examinations with 75 marks.

Practical Training will have Practical Examination for 100 marks per practical paper at the end of Semester.

The allocation of marks for the Internal Assessment and Semester End Examinations are as follows: -

Internal Examamination-25 Marks with 2 components of 15 marks and 10 marks respectively.

Semester end assessment: It is defined as the assessment of the learners on the basis of performance in thesemester end theory/ written/ practical examination.

a) Theory paper of 75 marks for duration of 2.5 hours

Q1) Objective questions based on all units with no internal options: 15 marks

a) Define the following / Answer in brief (10 marks) : (each question will carry 2 marks)
b) True or False with reasons (5 marks): (Provide 5 statements, for each the student has to state whether it is true or false and provide reasons.)

Q2) Questions based on Unit I 20 marks

(either answer any 4 out of 5 sub-questions)

Q 3) Questions based on Unit II 20 marks

(either answer any 4 out of 5 sub-questions)

Q4) Questions based on Unit III 20 marks

(either answer any 4 out of 5 sub-questions)

b) Practicals 50 marks

The Course having Practical training will have Practical Examination for 50 marks at the end of Semester, out of which 40 marks for the Practical task assigned at the time of examination. The 10 marks are allotted as Internal Assessment.

Sr. No	Evaluation type	Marks
1	Two best practicals	05
2	Journal	05

Practical External Assessment 40 marks

F. Y. B. Sc. Biochemistry Syllabus

Credit Based Credit System

To be implemented from the academic year 2022 – 2023

Semester I

Course Code	Unit	Topics	Credits	Lectures
Biomolecules and Nutrition-I				
USBCH101	**I**	Water	**2**	15
	II	Amino acids and proteins		15
	III	Carbohydrates		15
Introduction cell biology, Physiology and Microbiology-I				
USBCH102	**I**	Origin of life and Evolution	**2**	15
	II	The cell wall, cell membrane, cell organelles and cell division		15
	III	Microbiology-I		15
USBCHP01		Practicals based on both courses in theory - USBCH101 and USBCH102	**2**	2

Semester II

Course Code	Unit	Topics	Credits	Lectures
Biomolecules and Nutrition-II				
USBCH201	**I**	Lipids	**2**	15
	II	Nucleic acids		15
	III	Nutrition		15
Introduction cell biology, Physiology and Microbiology-II				
USBCH202	**I**	Physiology of digestion and absorption	**2**	15
	II	Physiology of respiration and excretion		15
	III	Microbiology-II		15
USBCHP02		Practicals based on both courses in theory - USBCH201 and USBCH202	**2**	2

F.Y.B.Sc. Biochemistry Syllabus
Restructured for Credit Credit System
to be implemented from the Academic year 2022 – 2023
Semester I
USBCH101 - Bio molecules and Nutrition-I

Course Code	Title	Credits
USBCH101	**Biomolecules and Nutrition-I**	**2 Credits (45 lectures)**
Unit I: Water **1.1** ***Water*****:** Its effect on Biomolecules, hydrogen bonding and structure, properties (surface tension, latent heat, specific heat, viscosity, dielectric constant, colligativeproperties) of water and their biological significance, water as a universal solvent. 1.1.1 Entropy and dissolution of solute 1.1.2 Effect of non-polar compounds on the structure of water 1.1.3 Weak interactions of biomolecules in aqueous solutions ***1.2 Solutions*** 1.2.1 Concepts of mole, molar, molal, molar equivalent and normal, % solution, ppm, Dalton ***1.3 Ionization of water, weak acids and weak bases*** 1.3.1 pH: pH scale, H^+ and OH^- concentrations 1.3.2 Weak acids and bases and their dissociation constants Ka & Kb 1.3.3 Buffers - definition, action, physiological buffers - phosphate and carbonate (No derivations. Numericals on above concept)		**15 Lectures**
Unit II: Amino acids and proteins ***2.1 Amino acids*** 2.1.1 Amino acid structure - D & L forms of all 20 amino acids (structure of D-amino acids and overview of D and L amino acids) 2.1.2 Detailed classification based on polarity, essential and nonessential amino acid 2.1.3 Physical properties: Zwitter ions, pI of amino acids, amino acids as ampholytes,melting point, optical rotation, UV absorption and chemical properties 2.1.4 Chemical reactions of amino acids with Ninhydrin, 2.1.5 Protein sequencing reactions: Sanger's reagent, Edman's reagent and Dansyl chloride ***2.2 Peptides and Proteins*** 2.2.1. ASBC - APS classification on the basis of shape and function 2.2.2 Primary structure - Formation and characterization of the peptide bond 2.2.3 Secondary structure - Alpha helix and beta-sheet structure 2.2.4 Tertiary (myoglobin) and Quaternary(hemoglobin)structures – Comparative overview 2.2.5 Protein denaturation- agents of denaturation 2.2.6 Protein renaturation		**15 Lectures**

Unit III: Carbohydrates. **3.1** Definition, Classification, and functions of carbohydrates (mono, oligo polysaccharides) ***3.2 Monosaccharides*** 3.2.1 Classification in terms of aldoses and ketoses 3.2.2 Occurrence,structures and significance of glucose, fructose, galactose, mannose, and ribose 3.2.3 Properties: a) Physical - isomerism D & L, optical; epimers : anomers b) Chemical reactions - i) oxidation to produce aldonic. aldaric and uronic acids (with respect to glucose); ii) reducing action in boiling alkali, enediol formation (with respect to glucose and fructose) iii) Osazone formation (with respect to glucose and fructose). iv) Orcinol (with respect to ribose) ***3.3 Disaccharides*** 3.3.1 Formation of glycosidic bonds 3.3.2 Occurrence and structure of maltose , lactose and sucrose ***3.4 Polysaccharides*** 3.4.1 Classification based on function. storage and structure a) Composition: homo & hetero. -Starch and hyaluronic acid b) Storage : starch and glycogen - action of amylase on starch c) Structural: cellulose, chitin	**15 Lectures**

USBCH102 - Introduction to Cell biology, Physiology and Microbiology-I

Course Code	Title	Credits
USBCH102	**Introduction to Cell biology, Physiology and Microbiology-I**	**2 Credits (45 lectures)**
Unit I: Origin of Life & Evolution **1.1** Big bang theory, Theories on the origin of life: Abiogenesis, Heterotroph hypothesis, RNA world, protein world, Miller's experiment, Formation of the first cell, endosymbiont theory **1.2** Evolution - Darwinian theory, Modern synthetic theory of evolution and its factors: Gene mutations(recombination), heredity, natural selection and isolation **1.3** Biological evidences: Fossil record, chemical and anatomical similarities of related life forms, geographic distribution of related species, genetic changes in living organisms overgenerations and Mechanism of evolution, Gene flow and genetic drift, Hardy-Weinberg principle		**15 Lectures**
Unit II: The cell- cell wall, cell membrane, cell organelles and cell division ***2.1 Structural organization of cells*** 2.1.1 Prokaryotic, Eukaryotic (plant & animal) and yeast cells - a comparative overview **2.2** Cell wall structure (plant), cell membrane (fluid mosaic model) Cytoskeleton: microtubules & microfilaments **2.3 *Cell organelles*: *Structure and function*** 2.3.1 Mitochondrion*:* Organization of the mitochondria genome 2.3.2 Chloroplast: Organization of the chloroplast genome,other plastids 2.3.3 Ribosome*:* 2.3.4 Endoplasmic reticulum 2.3.5 Golgi apparatus 2.3.6 Peroxisome & Lysosome 2.3.7 Nucleus: nuclear envelope, nuclear pores, nuclear matrix and Nucleolus **2.4 Mitosis and Meiosis-** Different phases and Comparative overview of mitosis and meiosis		**15 Lectures**

Unit III: Microbiology I **3.1** Historical background (contributions of Leeuwenhoek, Pasteur, Koch). **3.2** General characteristics of Bacteria: Major Characteristics, Morphological, Chemical, Cultural, Metabolic, antigenic, pathogenic and Ecological **3.3** ***Microbial Taxonomy*:** Microbial species and strains **3.4** **Classification of bacteria** based on morphology (shape and flagella), staining reaction- Acid fast and differential staining based classification, nutrition and extreme environment **3.5** ***Bacterial cell wall:*** Structure and function, components of peptidoglycan frame work (structures of NAG and NAMA not necessary) **3.6** **Extremophiles:** thermophiles, psychrophiles, halophiles,magnetotactic, radiation resistant - examples with their application **3.7** Staining methods - principles of staining - gram staining,endospore, capsule and lipids, and microscopicidentification of bacteria	**15 Lectures**

SEMESTER I - USBCHP01

PRACTICAL – I **45 Lectures hours**

1. Preparation & Standardisation of laboratory reagents
   Primary standards - 0.1N oxalic acid
   Secondary standards - 0.1N NaOH, 0.1N HCl

2. Preparation and determination of pH of buffers - acetate and phosphate

3. Determination of pKa of acetic acid

4. Qualitative tests for Carbohydrates –
   - Monosaccharides (glucose and fructose),
   - Disaccharides (lactose ,maltose and sucrose)
   - Polysaccharides (starch and dextrin)
   -

5. Qualitative test for amino acids

6. Effect of heat, organic solvents and ammonium sulphate on proteins

DEMONSTRATION EXPERIMENT

pH meter – working of a pH meter

PRACTICAL – II **45 Lectures hours**

1. Effect of isotonic, hypertonic and hypotonic solutions on cells – onion peel / Tradescantia
2. Staining of bacterial yeast cells (negative staining)
3. Staining techniques-
   - gram staining,
   - endospore,
   - capsule and
   - lipids
4. Calibration of glassware

5. Study of stages of mitosis using onion root tips

6. Permanent slides of mitosis and meiosis

DEMONSTRATION EXPERIMENT

1. Microscopy – study of a compound microscope

Semester II
USBCH201- Bio molecules and Nutrition-II

Course Code	Title	Credits
USBCH201	**Biomolecules and Nutrition-II**	**2 Credits (45 lectures)**

Unit I : Lipids — **15 Lectures**

1.1 Definition, classification (Bloor's) and functions of Lipids

1.2 Fatty' acids and Triacylglvcerol

1.2.1 Classification &Chemistry,
Saturated fatty acids - classification of C2 to C20: even carbon: Common and IUPAC names. Unsaturated fatty acids MUFA, PUFA (2.3.4 double bonds)
Omega – 3, 6,9 fatty acids. Triacyl glycerol - simple and mixed - names and structure

1.2.2 Chemical Reactions of fats
Saponification, Iodination, Ozonolysis, Auto-oxidation,
Action of heat on glycerol and choline,
Rancidity Definition & significance - Acid number, Saponification number, Iodine number, Reichert - Meissel number

1.3 Compound Lipids
Functions of glycerophospholipids (PE.PC.PL)
Phosphosphingolipids (ceramide, sphingomyelin), Glycolipids /Cerebrosides (gluco & galactocerebrosides)

1.4 Steroids Cholesterol structure and biochemical significance.

Unit II : Nucleic Acids — **15 Lectures**

2.1 Structure - Purine & Pyrimidine bases, ribose, deoxyribose, nucleosides and nucleotides (ATP, CTP, GTP, TTP, UTP) Formation of polynucleotide strand with its shorthand Representation

2.2 RNAs (various types in prokaryotes and eukaryotes) mRNA & rRNA - general account, tRNA - clover leaf model, Ribozymes

2.3 DNA

2.3.1 Physical evidence of DNA helical structure. Chargaff's rules (chemical evidence), Watson-Crick model of DNA & its features

2.3.2 Physical properties of DNA - Effect of heat on physical properties of DNA (Viscosity, buoyant density, UV absorption), Hypochromism, hyperchromism, denaturation of DNA.

2.3.3 Reactions of nucleic acids (with DPA and Orcinol)

Unit III: Nutrition — **15 Lectures**

3.1 Definition: Calorie, Joule, Food calorimetry - calorific value determination by bomb calorimeter, calorific values of proximate principles, concept of BMI, BV and PER

3.2 BMR – definition, factors affecting BMR, Significance of BMR in clinical diagnosis

3.3 SDA/DIT -General concept and significance, energy requirement of individuals for various activities- sedentary, moderate and heavy

3.4 Nutritional significance of carbohydrates, Protein, lipids, vitamins, minerals and water

3.5 Composition of balanced diet

3.6 Numerical problems based on above concepts

USBCH202 - Introduction to Cell biology, Physiology and Microbiology-II

Course Code	Title	Credits
USBCH202	**Introduction to Cell biology, Physiology and Microbiology-II**	**2 Credits (45 lectures)**
Unit I: Physiology of digestion and absorption **1.1** Parts and Functions of gastro intestinal tract (GIT) **1.2** Organs and Glands associated with GIT Secretions and Juices of GIT (Saliva, Gastric juice, Intestinal juice, pancreatic and Bile juice) **1.3** Digestion and Absorption of carbohydrates **1.4** Digestion and Absorption of Lipids **1.5** Digestion and Absorption of Proteins **1.6** Disorders - Peptic ulcer, Lactose Intolerance		**15 Lectures**
Unit II : Physiology of respiration and excretion **2.1** Respiratory system, **2.2** Breathing - inspiration and expiration, **2.3** Composition of air and partial pressure of gases **2.4** Physical exchange of gases 2.4.1 Transport of oxygen 2.4.2 Transport of carbon dioxide Respiratory disorders – cyanosis, respiratory acidosis and alkalosis ***2.5 Excretion*** 2.5.1 Structure of the nephron: Bowman's capsule & glomerulus - Structure & function, (ultrafiltration, pressures involved, GFR, regulation of GFR); Renal tubule - structure & function (proximal and distal convoluted tubules and Henle's loop) 2.5.2 Urine formation: Reabsorption / Secretion of glucose, Na+, K+. HCO3 Cl^- and H^+ : renal threshold, Excretory disorder: Nephritis		**15 Lectures**
Unit III: Microbiology II **3.1** Microbial Growth - Growth Curve, Mathematical expression, Synchronous growth, Generation time **3.2** Methods for estimation of microbial growth: Cell mass, Cell count and cell activity **3.3** Culture media (N, C, Special requirements), Natural and Synthetic media **3.4** Sterilization and Disinfection techniques **3.5** Physical Agent of sterilization - Temperature- Pressure (Hot Air Oven, Autoclave), Radiations (UV, Gamma) (examples with mechanism) Chemical agents of sterilization - Alcohol, Halogens, Formaldehyde		**15 Lectures**

SEMESTER II – USBCHP02

PRACTICAL – I 45 Lecture hours

1. Qualitative tests for lipids
   a) Miscibility test
   b) Saponification test
   c) Unsaturation test
   d) Sudan black dye test
   e) Salkowski test for cholesterol
2. Determination of SAP value of given oil sample
3. Determination of Acid value of give oil sample
4. Staining of DNA and RNA (methyl green: pyronine) using onion peel
5. Qualitative tests for DNA (DPA) & RNA (Orcinol) (Neumann's test for presence of phosphorus) -
6. Estimation of Calcium by oxalate method
7. Qualitative analysis for Proteins (albumin, peptone , gelatine and casein - any four proteins)

SEMESTER II

PRACTICAL – II 45 Lecture hours

1. Preparation of culture medium
2. Microbial examination of food, water and air
3. Identification of organs / parts of (i) digestive system (ii) respiratory system (iii) excretory system
4. Analysis of the action of salivary α - amylase action on starch- Achromic point
5. Concept of Dialysis using parchment paper –Test with $BaCl_2$ for presence of sulphate in the buffer or water outside
6. Estimation of total acidity of gastric juice
7. Urine analysis:
   - Inorganic constituents: SO_4^{-2} ($BaCl_2$), Cl^- ($AgNO_3$), Na^+, K^+ (Flame test)
   - Organic constituents: Urea, Uric acid, Creatinine
   - Abnormal constituents – glucose by Benedicts method, proteins by Hellers ring test

Suggestion: Artificial samples to be used for physiological experimrents

Suggested Reading

1. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8thedition. Lippincott Williams and Wilkins, Philadelphia.

2. Becker W. M. Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition, Pearson Benjamin Cummings Publishing, San Francisco

3. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press &Sunderland,Washington, D.C.; Sinauer Associates, MA.

4. Lehninger, Albert L, Biochemistry, Kalyani Publishers

5. Nelson, D. L. and Cox, M.M, (2008). Lehninger, Principles of Biochemistry 5th Edition, W. H. Freeman and Company, NY., USA.

6. Voet, D. and Voet, J.G. (2004) Biochemistry, 3rd Edition, John Wiley & Sons, Inc. USA.Biochemistry by Zubay, Geoffrey L.; Wm. C. Brown publishers

7. Zubay, Geoffrey L., Biochemistry; Wm.C.Brown publishers

8. Stryer, Lubert; W.H.; Biochemistry; Freeman publishers.

9. Harpers illustrated biochemistry by Murray, Robert K. etal.; Mc Graw Hill

10. Freifelder, D. (1982) Physical Biochemistry 2nd edition, W.H. Freeman and Co.NY. USA.

11. Cooper, T.G. (1977) TheTools of Biochemistry John Wiley and Sons, N.Y. USA.

12. Pattabhi. V. and Gautham N. (2002) Biophysics. Narosa Publishing House, India.

13. Roy, R.N. (2005) A Textbook of Biophysics. New Central Book Agency(P) Ltd., Calcutta, India

14. Guyton, Arthur C. and Hall, John E.;Text book of Medical physiology ; Harcourt Brace & Company Asia Pvt. Ltd.

15. Orten, J.M. and Neuhaus, O.W.; Human biochemistry; Mosby publishers.

16. Davidson, S. etal; Human nutrition and dietetics; Churchill Livingstone Publishers.

17. Joshi, Shubhangini A.; Nutrition and dietetics; Tata Mc Graw and Hill publishers.

18. Srilakshmi, B.; Nutrition Science; New Age International publishers.

19. Plummer, David T.; Introduction to practical biochemistry; Tata Mc. Graw and Hill publishers.

20. Boyer, Rodney F.Modern experimental biochemistry

21. Sawhney, S.K. and Singh, Randhir;Introductory practical biochemistry ;Narosa Publishing House.

22. Verma, P.S. and Agarwal V.K.; Cell Biology, Genetics, Molecular biology, Evolution and Ecology ; Publishers : S. Chand and Co.Ltd., (2009)

23. Essential Cell Biology Ed: Bruce Alberts, Dennis Bray, Karen Hopkin and Alexander Johnson (2009) 3rd Edition Pub: Garland Science

24. B. Hall and B. HallgrimssonStrickberger's Evolution ; 4th Edition (2008) Jones and Bartlett Publishers

25. Sean B. Carrol, Remarkable Creatures: Epic Adventures in Search of the Origin of Species (2009). Mariner Books

26. Stanier,Ingraham et al ,General Microbiology 4th & 5th Ed. 1987, Macmillan Education Ltd 6.

27. Pelczar Michael J.; Chan Jr., E.C.S. , Krieg ,Noel R.; Microbiology TMH 5th Edition .

28. Ananthanarayanan and Panniker,Textbook of Microbiology 5th Edition (1996). Orient Longman

Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

All HODs/ coordinators are instructed to fill the following as per the academic year. Each subject's program outcome/ Course outcome has to be filled. The new syllabus of all subjects has it which can be used for reference. Please fill for the following academic years and mention it correctly, even if the same syllabus was followed for subsequent academic year you will have to fill it. Following is the example for your reference:

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Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

Academic year : 2022-2023

Name of Department: English

Class: FYBA

Program Outcomes:

1. To enhance English language proficiency of students by familiarizing them with the skills of Listening, Speaking, Reading and Writing (LSRW)
2. To introduce learners to different perspectives of looking at a text or passage
3. To equip learners in the functional aspects of English so that they use the acquired language skills correctly and confidently
4. To guide learners in the effective use of the digital medium of communication

• To create interest and develop passion amongst learners towards English Literature

• To familiarize learners with salient characteristics of literary genres like short story, prose, fiction and non-fiction

• To introduce learners to various elements of selected short stories written in English and translated into English

• To acquaint learners with different forms of prose and its importance through close reading of selected works

• To understand that literature is an expression of human values and universal truths

Program Specific Outcomes:

1. The learners will learn to understand and interpret any text they are reading from different perspectives
2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.
3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.
4. The learners will develop good oral and written skills of communication in the English language.

To develop passion for reading literary works amongst students

• To make learners at ease in the process of appreciation of literature

• To enable learners to understand and analyze selected stories, prose, fiction and non- fiction masterpieces

• To imbibe the underlying philosophy and values reflected in literature

• To develop sensitivity to nature and understand the relationship between human beings and environment

SEMESTER - I

Course Code: - :UACS101	**Course Title:** Communication Skills in English

Course Outcomes:
1. The learners will learn to understand and interpret any text they are reading from different perspectives
2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.
3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.
4. The learners will develop good oral and written skills of communication in the English language.

Course Code: : UAENG 101	**Course Title:** : Introduction to Prose and Fiction Paper – I and II

Course outcomes:
The students would be able :

To develop passion for reading literary works amongst students

• To make learners at ease in the process of appreciation of literature

• To enable learners to understand and analyze selected stories, prose, fiction and non- fiction masterpieces

• To imbibe the underlying philosophy and values reflected in literature

• To develop sensitivity to nature and understand the relationship between human beings and environment

-

Course Code:	**Course Title:**

Course outcomes:
The students would be able :

-

Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
SEMESTER -II	
Course Code: UACS201	**Course Title:** Communication Skills in English
Course Outcomes: The students would be able : 1. The learners will learn to understand and interpret any text they are reading from different perspectives 2. The interest of learners in listening to and watching good quality audio and visual media will be aroused. 3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world. 4. The learners will develop good oral and written skills of communication in the English language.	
Course Code: UAENG 201	**Course Title:** Introduction to Prose and Fiction Paper – I and II
Course Outcomes: The students would be able : To develop passion for reading literary works amongst students	

• To make learners at ease in the process of appreciation of literature • To enable learners to understand and analyze selected stories, prose, fiction and non- fiction masterpieces • To imbibe the underlying philosophy and values reflected in literature • To develop sensitivity to nature and understand the relationship between human beings and environment ●

Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**

Cover Page

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	FYBA : Communication Skills in English
2	Eligibility for Admission	10+2
3	Passing Marks	40
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	1 Year (semester I and II)
6	Level	~~P.G.~~ / U.G./ ~~Diploma~~ / ~~Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	~~New~~ / Revised **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year **2021 -2022**

Date: 21/12/2020 Signature :

Name of BOS Chairperson / ~~Dean~~ : **Dr. Sudhir Nikam**

University of Mumbai

Syllabus for F.Y.B.A

Program: B.A.

Course: Communication Skills in English (Core Paper)

(Choice Based Credit System with effect from the academic year 2021-2022)

Board of Studies in English

Dr. Sudhir Nikam (Chairperson)

Dr. Rajesh Karankal (Member)

Dr. Bhagyashree Varma (Member)

Dr. B. N. Gaikwad (Member)

Dr. Satyawan Hanegave (Member)

Dr. Santosh Rathod (Member)

Dr. Deepa Mishra (Member)

Dr. Dattaguru Joshi (Member)

Dr. Deepa Murdeshwar-Katre (Member)

Syllabus Sub-Committee

Dr. Deepa Murdeshwar-Katre (Convener)	**:**	Department of English, Vartak College, Vasai Road, Dist Palghar
Dr. Susmita Dey (Member)	**:**	Department of English and Research Centre (Retd.), V. G. Vaze College, Mumbai
Dr. Sachin Labade (Member)	**:**	Department of English, University of Mumbai
Mr. Vinodsinh Patil (Member)	**:**	Department of English, Arts & Commerce College, Phondaghat, Dist.Sindhudurg
Ms Gayatri Gadgil (Member)	**:**	Department of English, D. G. Ruparel College of Arts, Science and Commerce, Mahim, Mumbai
Mrs. Shanti Polamuri (Member)	**:**	Department of English, Maharashtra College of Arts, Science and Commerce, Mumbai
Mr. Sanjay Kalekar (Member)	**:**	Department of English, DRT's A. E. Kalsekar Degree College, Kausa, Thane
Mr. Rameshwar Solanke (Member)	**:**	Department of English, Khare Dhere - Bhosale College, Guhagar, Dist.Ratnagiri
Dr. S. Vishnu Priya (Member)	**:**	Department of ELT, SDE, EFLU, Hyderabad.

Course: Communication Skills in English

(80:20 Marks Examination Pattern)

(Choice Based Credit System with effect from the academic year 2021-22)

1. Syllabus as per Credit Based Semester and Grading System:				
	i)	Name of the Programme	:	B.A.
	ii)	Course Code	:	UACS 101 & UACS 201
	iii)	Course Titles	:	Communication Skills in English
	iv)	Semester-wise Course Content	:	Enclosed the copy of syllabus
	v)	References and Additional References:		Enclosed in the Syllabus
	vi)	Credit Structure	:	No. of Credits per Semester – 02
	vii)	No. of lectures per Unit	:	15
	viii)	No. of lectures per week	:	03 lectures + 01 tutorial
2.	Scheme of Examination		:	Written Exam: 4 Questions of 20 Marks each Internal Assessment: 20 marks
3.	Special notes, if any		:	No
4.	Eligibility, if any		:	No
5.	Fee Structure		:	As per University Structure
6.	Special Ordinances / Resolutions if any		:	No

Revised Syllabus for FYBA Communication Skills in

English Paper I and Paper II

To be implemented from 2021-22 (80:20 Marks Examination Pattern)

Preamble:

The English language is the dominant medium through which one can connect to the global community. It is, therefore, vital that all learners acquire adequate skills in this language. Communication Skills in English is a core course wherein the first year learners are guided to acquire the four skills of communication viz., Listening, Speaking, Reading and Writing.

The focus of the syllabus is on building confidence in the learners in applying these skills while using the English language both academically and socially. Keeping this in mind, the units will have a multi-pronged approach. The course is graded from basic to higher levels of learning so as to help learners gradually acquire the skills. The 80:20 pattern will also help in accomplishing this goal. The tutorial activities are designed to focus on oral skill development, while the lectures are aimed at honing their cognitive, analytical, linguistic and creative skills.

It is hoped that by the end of the academic year, the learners will have developed confidence in using the English language both for oral and written communication as well as develop interest in enhancing these skills later on.

Objectives:

1. To enhance English language proficiency of students by familiarizing them with the skills of Listening, Speaking, Reading and Writing (LSRW)
2. To introduce learners to different perspectives of looking at a text or passage
3. To equip learners in the functional aspects of English so that they use the acquired language skills correctly and confidently
4. To guide learners in the effective use of the digital medium of communication.

Outcomes:

1. The learners will learn to understand and interpret any text they are reading from different perspectives
2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.
3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.
4. The learners will develop good oral and written skills of communication in the English language.

Periods: 45 lectures + 15 Tutorials (3 lectures + 1 tutorial per week per batch) per semester

All passages, stories, articles, poems selected should help the learners develop different communication skills. Learning through example and practice with a theoretical base is the intention.

Semester I

Communication Skills in English Paper I

Course Content

Unit 1: Introduction to Communication Skills **No. of lectures: 08**

1. English as an international language and varieties of English
2. Significance and ways of effective communication in English
3. Listening for academic and professional development
4. Formal and informal communication in spoken English
5. Reading for different purposes
6. Features of effective writing skills
7. Study skills in English

This unit shall work as theoretical base for the following units that are practical in nature.

Unit 2: Developing Comprehension Skills in English **No. of lectures: 12**

A. Reading Skills

1. Scanning a text for information
2. Skimming a passage to look for main ideas, understanding text type
3. Guessing meaning of an expression (word/phrase/clause)
4. Building inference skills
5. Understanding language structure (such as subject verb agreement, voice, direct and reported speech)
6. Note making
7. Summarizing

Passages from fables, folk stories, short stories, non-fiction, history, business or environment, of around 250- 300 words, could be chosen in this unit.

B. Listening Skills

1. Listening for main ideas/Gist
2. Listening for detail
3. Listening for text organization features
4. Listening for tone, accent, style and register
5. Predicting content and guessing meaning
6. Making inferences from the audio-visual text
7. Listening for opinion/argument/counter-arguments etc.
8. Taking notes

A variety of relevant audio/visual texts as samples may be drawn from various sources. Listening skills in English should be developed through various activities along with the practice done while teaching in the class.

Unit 3: Speaking Skills in English **No of lectures: 15**

A. Public Speaking in English

1. Introduction
2. Characteristics of an effective speech
3. Analysis of model speeches
4. Drafting and presenting a speech in formal and informal gatherings

B. Conversation in English

1. Opening a conversation
2. Introducing oneself in various contexts
3. Introducing others formally and informally
4. Building a conversation
5. Leaving and closing a conversation
6. Conversation in group in various situations

C. Speaking at an Event

1. Anchoring/compering an event
2. Introducing guests/ speakers/dignitaries
3. Proposing a vote of thanks

A variety of relevant texts as samples may be drawn from print and non-print sources such as books, videos, audio files etc. Speaking skills in English should be developed through various activities along with the practice done while teaching in the class.

Unit 4: Formal Writing Skills **No. of lectures: 10**

A. Letters:

1. Job applications with bio data (solicited and unsolicited)
2. RTI applications
3. Applications for duplicate documents (I-cards / mark sheet, etc.)

B. Emails:

1. Job acceptance and joining
2. Resignation
3. Complaints
4. Requests for references
5. Request for sponsorship

Tutorial Activities:

1. Use of YouTube videos for use of grammar study and practice that may be taken from the list recommended or similar relevant videos.
2. Listening to audio clips/ books to enhance listening skills
3. Reading aloud from newspapers, magazines, stories, non-fiction followed by classroom discussion on these to enhance reading and speaking skills
4. Making short presentations on given topics
5. Official letter writing/ email writing exercises

Semester II

Communication Skills in English Paper II

Course Content

Unit 1: English Usage in Communication **No. of lectures: 08**

1. Distinction between American English and British English
2. Indianism and Indian English
3. Appropriacy in the Use of English
4. Non-verbal Communication
5. Elevator Pitch
6. Information and Communication Technology and Use of English
7. Modes and Types of Interview
8. Principles of Creative Writing

This unit shall work as theoretical base for the following units that are practical in nature.

Unit 2: Enhancing Reading Competencies **No. of lectures: 12**

A variety of passages of 200-250 words may be taken such as extracts from novels, short stories, plays, magazine, newspapers, reports, documents, academic texts. The passages should have complex text type, function and lexis. The learners may be encouraged to gather meaning contextually or by referring to offline and online sources such as dictionary, thesaurus, and encyclopedia.

1. Augmenting active vocabulary
2. Understanding relations between parts of a text
3. Transferring information (Verbal to Non-Verbal)
4. Understanding concepts and arguments,
5. Developing skills in analysis and interpretation
6. Rewriting a passage from a defined perspective
7. Reading critically (presenting a reasoned argument that evaluates and analyses what you have read)

Weightage of questions on texts -

a. On vocabulary, synonyms and antonyms, prefixes and suffixes, collocations, making sentences of their own from the idioms or difficult words in the extract (50%)
b. On writing their opinions, perspectives on the passages in longer, more descriptive ways (50%)

Unit 3: Advanced Oral Communication Skills **No. of lectures: 15**

A. Presentation skills: (Formal presentations and skits)

1. Planning and structuring
2. Opening and closing a presentation
3. Use of body language
4. Use of technology in making a presentation
5. Drafting a skit (Not to be tested in theory exam)
6. Reading of a skit
7. Presenting a skit

Students are advised to prepare their own presentation scripts. Teachers should help them in drafting, reading and presenting those scripts in the class.

B. Group Discussion:

1. Formal and informal discussion
2. Elements of group discussion
3. Using appropriate language: Initiating, seeking and giving opinions, suggesting, responding to a suggestion, agreeing, disagreeing, interrupting, requesting, clarifying, summing up
4. Types of discussion:

   Giving and sharing opinions of a given topic, making decisions, problem solving (case study)

C. Interview Skills

1. Interviewing others
    - Researching the interviewee (writer, social worker, entrepreneur, actor etc.)
    - Preparing questions
    - Conducting interview
2. Attending an Interview (Job/Entrance)
    - Researching the organization
    - Reviewing job-profile and your bio-data/CV
    - Preparing for standard questions
    - Responding to questions
    - Preparing your questions to ask to the interviewer/s
3. Analyzing Interviews

Students can be tested on forming actual interview frameworks including questions. Teachers must form the groups and conduct actual interviews involving full strength of students.

Unit 4: Advanced Writing Skills **No. of lectures: 10**

A. Report Writing:

1. News report
2. Activity/Event report

B. Creative Writing:

1. Personal Essay
2. Memoir
3. Short Speech on the given occasion/ event
4. Story writing

Tutorial Activities:

1. Dialogue-writing exercises
2. Writing skits and presenting them
3. Giving speeches
4. Group discussions
5. Mock Interviews

6. Development of stories, passages from hints given, in about 200-250 words
7. Report writing tasks
8. Statement of Purpose

Evaluation Pattern:

A. Internal Evaluation (20 Marks)

		Marks	**Remarks**
1	Performance in Tutorial activities	10	**Sem I** -- Learners may be asked to make presentations, hold conversation in class, which will be assessed **Sem II** -- Learners may be asked to participate in group discussions or mock interviews in class, which will be assessed
2	Participation in classes (lectures and tutorials)	05	Learners' response to teaching, timely submission of tasks will be assessed
3.	Overall attendance (lectures and tutorials)	05	Percentage of learners' attendance in class to be considered

B. Written Examination: (80 marks)

Semester I: 4 questions carrying 20 marks each

Q. No.	Question details	Marks
1	Short Notes (4 out of 6) from Unit 1	20
2	Unseen Passage (200-250 words) (Unit 2) a. On content, the use of tenses, articles, prepositions, direct-indirect speech and concord, voice, word meanings - (50%) b. On reading sub-skills (pointing out main ideas and supporting details, making inferences) (50%)	10 10

3	Any four to be attempted from given options (based on Unit 3) a. Preparing a speech on a given topic b. Questions on introducing self and others c. Develop a conversation on a given situation d. Introducing speakers/guests in a given event e. Drafting vote of thanks at a given event	20
4	a. Job application with bio-data b. RTI letter c. Email writing (1 out of 2)	08 07 05

Semester II: 4 questions carrying 20 marks each

Q. No.	Question details	Marks
1	Short Notes (4 out of 6) on theory from Unit 1	20
2	Unseen Passage (200-250 words) (Unit 2) a. On content, synonyms and antonyms, prefixes and suffixes, collocations, making sentences of their own from the idioms or difficult words in the passage (50%) b. On other sub-skills (such as writing their opinions, perspectives on the passages in longer, more descriptive ways (50%)	10 10
3	Any Two out of Three to be attempted (based on Unit 3) a. Preparing a draft of presentation on a given topic b. Preparing a draft for a mock interview based on the given instructions c. Preparing a draft of a group discussion on a given topic & instructions	20

4.	a. Report writing (1 out of 2) b. Personal essay/Memoir c. Story Writing/Speech	08 07 05

Recommended Reading:

- Bellare, Nirmala. *Reading & Study Strategies*. Books. 1 and 2. Oxford University Press, 1997, 1998
- Bellare, Nirmala. *Easy Steps to Summary Writing and Note-Making*. Amazon Kindle Edition, 2020
- Comfort, Jeremy, et al. *Speaking Effectively: Developing Speaking Skills for Business English*. Cambridge University Press, 1994.
- Das, Bikram K., et. al. *An Introduction to Professional English and Soft Skills*. Cambridge University Press India Pvt. Ltd., 2010
- Das, Yadjnaseni & R. Saha (eds.) *English for Careers*. Pearson Education India, 2012.
- Devlin,Joseph. *How to Speak And Write Correctly*. New York, The Christian Herald, 1910
- Dimond-Bayir, Stephanie. *Unlock Level 2 Listening and Speaking Skills Student's Book and Online Workbook: Listening and Speaking Skills Student's Book+ Online Workbook*. Cambridge University Press, 2014.
- Doff, Adrian and Christopher Jones. *Language in Use (Intermediate and Upper Intermediate)*. CUP, 2004.
- Glendinning, Eric H. and Beverley Holmstrom. Second edition. *Study Reading: A Course in Reading Skills for Academic Purposes.* CUP, 2004
- Goodale, Malcolm. *Professional Presentations Video Pack: A Video Based Course*. Cambridge University Press, 1998.
- Grellet, F. *Developing Reading Skills*. Cambridge: Cambridge University Press, 1981

- Grussendorf, Marion. *English for Presentations*. Oxford University Press, 2007.Hamp-Lyons, Liz and Ben Heasiey. Second edition. *Study Writing: A Course in Writing Skills for Academic Purposes*. CUP, 2006
- Kumar, Sanjay and Pushp Lata. *Communication Skills.* Second Edition. New Delhi, 2011. Oxford University Press, 2015
- Lewis, N. *How to Read Better & Faster*. New Delhi, Goyal Publishers & Distributors Pvt. Ltd, 2006.
- McCarthy, Michael and Felicity O'Dell. *English Vocabulary in Use.* Cambridge: Cambridge University Press, 2001.
- Mohan, RC Sharma Krishna. *Business Correspondence and Report Writing*. Third edition. Tata McGraw-Hill Education, 2002.
- Murphy, Raymond, et al. *Grammar in use: Intermediate*. Cambridge University Press, 2000
- Richards, Jack C., and Chuck Sandy. *Passages Level 2* Student's Book. Cambridge University Press, 2014.
- Sadanand, Kamlesh & S. Punitha. Spoken English: A Foundation Course. (Part 1 & 2). Orient Blackswan. 2009.
- Sasikumar, V., et al. *A Course in Listening & Speaking I*. 2005. Cambridge University Press India Pvt. Ltd. (under the Foundation Books Imprint), 2010
- Savage, Alice, et al *Effective Academic Writing*. Oxford: OUP, 2005
- Sethi, J. *Standard English and Indian usage: Vocabulary and grammar*. PHI Learning Pvt. Ltd., 2011.
- Taylor, Grant. *English Conversation Practice*. 1967. Tata McGraw-Hill, 2013
- Turton, Nigel D. *A B C of Common Grammatical Errors*. 1995. Macmillan India Ltd., 1996
- Vas, Gratian. *English Grammar for Everyone*. Mumbai, Shree Book Centre, 2015
- Watson, T. *Reading Comprehension Skills and Strategies: Level 6*. Saddleback Educational
- Publishing, 2002
- Wright. Andrew, et al. *Games for Language Learning*: *Cambridge Handbooks for Language Teachers* (Third Edition). 2006. Cambridge (UK), Cambridge University Press, 2010

Web link Resources:

1. A rendezvous with Simi Garewal: Ratan Tata: https://www.youtube.com/watch?v=ozetTgOHu78&t=510sHere Ratan Tata discusses his personal life, his expectations, his experience as a CEO of Tata and sons.
2. A rendezvous with Simi Garewal: Kiran Bedi: https://youtu.be/vX2NyKvEAXQ
   In this video, Kiran Bedi shares her daring adventures, her field, her passion for career with Simi Garewal.
3. In Conversation: Rajiv Mehrotra with J.R.D.Tata: https://youtu.be/68otfg601HI
   J. R. D. Tata discloses his dream of India, his experiences with Pandit Nehru, Mahatma Gandhi, Sardar Patel and his contribution to modern India.
4. The Tharoor Guide To Indian English: https://youtu.be/NsyI9LIXbFM

   Shashi Tharoor talks of new words like “defenstrate”, “brinjol”; talks about Indian English, ethnicity and so on.
5. Dr.A.P.J Abdul Kalam on Discovery, invention and innovation:https://youtu.be/9CKCfiX3uO0
   Dr. Kalam addresses IIT Delhi students.
6. Malala Yousafzai’s speech on the occasion of her Nobel Peace Prize (2014) on education:https://youtu.be/c2DHzlkUI6s
7. Kailash Satyarthi’s speech on the occasion of Nobel Peace Prize (2014) on the innocence of children; he gives voice to voiceless in his speech:https://youtu.be/wt0LSCEuc_M
8. Speech by Mr. Ratan Tata: https://youtu.be/m7-tKX7aZXM
9. “I Have a Dream” speech by Martin Luther King Jr. HD (subtitled) https://www.youtube.com/watch?v=vP4iY1TtS3s
   “I Have a Dream" is a public speech that was delivered by American civil rights activist Martin Luther King Jr. during the March on Washington for Jobs and Freedom on August 28, 1963, in which he called for civil and economic rights and an end to racism in the United States.
10. Speech by Emma Watson on Gender Equality: https://youtu.be/nIwU-9ZTTJc
11. Imaginative science video: Could humans live in underwater cities? https://youtu.be/GUGtU7Ii1yk
12. A conversation about household appliances: https://youtu.be/rAPl0fSborU
13. Video on psychology: Why do we dream? https://youtu.be/2W85Dwxx218
14. Video on space: Solar system 101: https://youtu.be/libKVRa01L8
15. Video on evolution: How Apocalypses paved the way for Humans https://youtu.be/libKVRa01L8
16. Video on biology: Why Bats Aren't as Scary as You Think https://youtu.be/D6e_qh3YRPs
17. Video on social media: What is a social media influencer? https://youtu.be/39A3og7enz8
18. Tips on communication (TED Talk): The Secrets of Learning a New Languagehttps://youtu.be/o_XVt5rdpFY
19. Expressing opinions: If Cinderella Were a Guy:https://youtu.be/p4OyCNctKXg
20. Telling stories without words: Partly Cloudy https://youtu.be/ix13P9NqBjo
21. Telling stories without words: Tree of Unity https://youtu.be/sAo41Gyl6hY

22. Bonding over the Radio: A special storytelling series by the much loved author Ruskin Bond: akashvaniair
https://youtu.be/oxf60BlR2Q4
https://youtu.be/ISX7rUOJOms
https://youtu.be/rrC_s0XPXKI
https://youtu.be/FUML3q1ncF0
https://youtu.be/3by_ninqRzg
23. Video on the English language: Where did English come from?
https://youtu.be/YEaSxhcns7Y
24. Video on biology: The science of skin colour: https://youtu.be/_r4c2NT4naQ
25. Video on advertising: The Science of Persuasion https://youtu.be/cFdCzN7RYbw
26. "The Happy Prince" Oscar Wilde Michael Mills Classic Animated Short 1974
https://www.youtube.com/watch?v=q3RZh1yaqxM

Learners may be encouraged to watch animated stories such as this one and questions asked later on.

Cover Page

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	FYBA Optional English: 'Introduction to Prose and Fiction'
2	Eligibility for Admission	10+2
3	Passing Marks	40
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	1 Year (Semester I and II)
6	Level	~~P.G.~~ / U.G./ ~~Diploma~~ / ~~Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	~~New~~ / Revised **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year **2021-2022**

Date: 21/12/2020 Signature :

Name of BOS Chairperson / ~~Dean~~ : **Dr. Sudhir Nikam**

University of Mumbai

Syllabus for F.Y.B.A

Program: B.A.

Course: Introduction to Prose and Fiction

(Choice Based Credit System with effect from the academic year 2021-2022)

Board of Studies in English

Dr. Sudhir Nikam (Chairperson)

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Dr. Deepa Murdeshwar-Katre (Member)

Syllabus Sub-Committee

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Dr. Rajesh Yeole	**:**	Member, Head, Department of English, Changu Kana Thakur A.C.S.College, New Panvel,
Ms. Sumali Bose	**:**	Member, Department of English, N.E.S Ratnam College, Mumbai
Dr. Shweta Salian	**:**	Member, Department of English, Mithibai College, Mumbai
Dr. Satyajit Kosambi	**:**	Member, Department of English, Sathaye College, Mumbai
Dr. Bharat Tupere	**:**	Member, Department of English, Sant Rawool Maharaj College, Kudal

Course: Introduction to Prose and Fiction

(100 Marks Examination Pattern)

(Choice Based Credit System with effect from the academic year 2021-22)

1. Syllabus as per Credit Based Semester and Grading System:				
	i)	Name of the Programme	:	B.A.
	ii)	Course Code	:	UAENG 101 & UAENG 201
	iii)	Course Titles	:	Introduction to Prose and Fiction Paper – I and II
	iv)	Semester-wise Course Content	:	Enclosed the copy of Syllabus
	v)	References and Additional References:		Enclosed in the Syllabus
	vi)	Credit Structure	:	No. of Credits per Semester – 03
	vii)	No. of lectures per Unit	:	15
	viii)	No. of lectures per week	:	04
2.	Scheme of Examination		:	Written Exam: 5 Questions of 20 Marks each
3.	Special notes, if any		:	No
4.	Eligibility, if any		:	No
5.	Fee Structure		:	As per University Structure
6.	Special Ordinances / Resolutions if any		:	No

Revised Syllabus for FYBA Optional English

Introduction to Prose and Fiction Paper I and II

To be implemented from 2021-22 (100 Marks Examination Pattern)

Objectives of the Course:

- To create interest and develop passion amongst learners towards English Literature
- To familiarize learners with salient characteristics of literary genres like short story, prose, fiction and non-fiction
- To introduce learners to various elements ofselected short stories written in English and translated into English
- To acquaint learners with different forms of prose and its importance through close reading of selected works
- To understand that literature is an expression of human values and universal truths

Course Outcomes:

- To develop passion for reading literary works amongst students
- To make learners at ease in the process of appreciation of literature
- To enable learners to understand and analyze selected stories, prose, fiction and non-fiction masterpieces
- To imbibe the underlying philosophy and values reflected in literature
- To develop sensitivity to nature and understand the relationship between human beings and environment

Semester I

Optional English: Introduction to Prose and Fiction Paper I

Course Content

Unit 1: **No. of lectures: 15**

Development of Short Story, Elements of Short Story: Plot, Character, Setting, Narrative, Development of Essay, Features of Prose writing, Types of Prose, Autobiography

Unit 2: **No. of lectures: 15**

- O' Henry : "The Cop and the Anthem"
- Ray Bradbury : "A Sound of Thunder"
- Rabindranath Tagore : "The Kabuliwala"
- Bernard Malamud : "The Jewbird"
- Baburao Bagul : "Mother"
- Ken Liu : "The Paper Menagerie"

Unit 3: **No. of lectures: 15**

- Sir Francis Bacon : "Of Marriage and Single Life" and "Of Revenge"
- Charles Lamb : "The Two Races Of Men "
- Ralph Waldo Emerson : "Self – Reliance"
- W.E.B. Du Bois : "Strivings of the Negro People"
- Shobha De : From "Speedpost": "Dear Arundhati"Aug'99 and "Dear Aditya" June'99
- Subroto Bagchi : From *Go kiss the world:* "Learning to Listen" (p. 145-150) and "Who Is a Good Leader?" (p. 150-155)

Evaluation: First Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

Semester II

Optional English: Introduction to Prose and Fiction Paper II

Course Content

Unit 1: **No. of lectures: 15**

Novella, Aspects of Novel, Children's Fiction, Adventure Novel, Mystery novel, Science Fiction, Social Novel, Philosophical Novel, Historical Novel

Unit 2: **No. of lectures: 15**

- John Steinbeck*: The Pearl*

  OR

- Ruskin Bond: *The Blue Umbrella*

Unit 3: **No. of lectures: 15**

- R.K. Narayan: *The Financial Expert*

  OR

- Isaac Asimov: *Fantastic Voyage*

Evaluation: Second Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

References:

Abrams, M.H. *Glossary of Literary Terms*. India, Macmillan Publishers, 2000.

Albert, E. *History of English Literature*, India, Oxford University Press, 2009.

Athenian Society. *Drama, Its History*, England, Nabu Press, 2012.

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Bennett, Andrew and Nicholas Royle. *Introduction to Literature Criticism and Theory*. Great Britain: Pearson Education Limited, 2004.

Brooks, Cleanth and Warren, Robert Penn. *Understanding Fiction*, Printice Hall.

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Chakrabarti, Piyas. *Anthem Dictionary of Literary Terms and Theory.* Delhi: Anthem Press, 2006.

Edmond Gore and Alexander Holmes. *What is Poetry*? England, Nabu Press, 2010.

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Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus For F.Y.B.A.
Program: B.A.
Course: Marathi (Compulsory)
Sem. I & Sem. II

(CBCS)

2018-19
2019-20
2020-21

रामनिरंजन झुनझुनवाला कला,विज्ञान आणि वाणिज्य महाविद्यालय (स्वायत्त)

F.Y.B.A. Marathi (Compulsory) Syllabus Semester I & II

DISTRIBUTION OF TOPICS AND CREDITS

FYBA Marathi (Compulsory) Syllabus Semester I

Course code	Nomenclature	Credits	Topics
RJAUMARC101	मराठी अनिवार्य	२	१. वडीलधारी माणसे २. व्यावहारिक मराठी

FYBA Marathi (Compulsory) Syllabus Semester II

Course code	Nomenclature	Credits	Topics
RJAUMARC201	मराठी अनिवार्य	२	१.'नापास मुलांची गोष्ट' २. व्यावहारिक मराठी

रामनिरंजन झुनझुनवाला कला,विज्ञान आणि वाणिज्य महाविद्यालय (स्वायत्त)

F.Y.B.A. Marathi (Compulsory) Syllabus Semester I & II

F.Y.B.A. **प्रथम वर्ष** **कला शाखा**	**मराठी अनिवार्य** **MARATHI – Compulsory**
	प्रथम वर्ष बी. ए. मराठी अनिवार्य या विषयासाठी २०१८- २०१९, या शैक्षणिक वर्षापासून नेमलेला अभ्यासक्रम :- प्रथम वर्ष बी. ए. मराठी अनिवार्य या अभ्यासक्रमात दोन नवीन पाठ्यपुस्तकांचा तसेच व्यावहारिक मराठीच्या घटकविषयांचा समावेश करण्यात आला आहे. या अभ्यासक्रमाची श्रेयांकन पद्धतीनुसार रचना करण्यात आली आहे. वरील अभ्यासक्रम दोन सत्रांत विभागलेला असून, नेमलेल्या विशिष्ट तासिकांमध्ये तो शिकविला जाणे आवश्यक आहे.तसेच त्याच्या चाचणी परीक्षा घेणे आवश्यक आहे. **अभ्यासपत्रिकेची उद्दिष्टे (Learning Objective):** १. साहित्यकृतींचे वाचन आणि आस्वाद या प्रक्रियांची तोंडओळख करून देणे. २. शुद्धलेखनकौशल्य,वृत्त-वृत्तांतलेखन, इतिवृत्तलेखन,जाहिरातलेखन इत्यादी लेखनकौशल्यांचा विकास करणे. ३. भाषिक लेखनकौशल्यांचे उपयोजन करता येण्याजोग्या पत्रकारिता, जाहिरात,प्रसारमाध्यमे,प्रकाशन अशा क्षेत्रांचा परिचय करून देणे. ४. साहित्याविषयी विद्यार्थ्यांची अभिरूची विकसित करणे. **अभ्यासपत्रिकेची निष्पत्ती(Course Outcome):** १. विद्यार्थ्यांना साहित्य वाचनाची आवड निर्माण होणे आणि त्यांनी साहित्यकृतींच्या सौंदर्याचा आस्वाद घ्यायला शिकणे. २.विद्यार्थ्यांना स्वतःची लेखनकौशल्ये आणि सर्जनशीलतेचा शोध लागणे व त्या क्षमतांचा विकास होणे.

सत्र- १		**तासिका L**	**श्रेयांक Cr**
मराठी अनिवार्य	**Paper Code: RJAUMARC101**	**४०**	**०२**
घटक- १		**२०**	**०१**
वडीलधारी माणसे, लेखिका शांता शेळके, सुरेश एजन्सीज- (लेख पहिला -'वहिनी' हा लेख वगळून उर्वरित दहा लेख) ***गुण ३०***			
घटक- २		**२०**	**०१**
व्यावहारिक मराठी - (४ घटकविषय) गुण ३०			
१.	मराठी लेखनाचे नियम व विरामचिन्हे		
२.	वर्तमानपत्रासाठी वृत्तलेखन.		
३.	वृत्तांतलेखन.		
४.	अर्जलेखन.		

रामनिरंजन झुनझुनवाला कला,विज्ञान आणि वाणिज्य महाविद्यालय (स्वायत्त)

F.Y.B.A. Marathi (Compulsory) Syllabus Semester I & II

F.Y.B.A.

MARATHI - Compulsory

प्रथम वर्ष कला शाखा

मराठी अनिवार्य

SEM - I (RJAUMARC101)

परीक्षा योजना-

१. २ तास कालावधीची ६० गुणांची सत्रांत परीक्षा व प्रत्येकी २० गुणांच्या दोन अंतर्गत परीक्षा होतील.
२. सत्रांत परीक्षा उत्तीर्ण होण्यासाठी किमान ४०% गुण मिळवणे आवश्यक आहे.
३. सत्रांत परीक्षेला बसण्यास पात्र ठरण्यासाठी दोनपैकी किमान एक अंतर्गत परीक्षा देणे अनिवार्य आहे.
४. ATKT परीक्षेसाठी विषम-विषम सम-सम पॅटर्न अवलंबिला जाईल.
५. प्राचार्यांच्या सोबत विचारविनिमयाने घेतलेला विभागप्रमुखांचा निर्णय अंतिम व बंधनकारक राहील.

प्रथम सत्रांत परीक्षा - गुण ६०

वरील अभ्यासपत्रिकेचे प्रथम सत्रान्त प्रश्नपत्रिकेचे स्वरूप पुढीलप्रमाणे ठरविण्यात आले आहे.

प्रश्न १ -- घटक क्र. १ वर आधारित पर्याय देऊन एक प्रश्न - गुण १०.
प्रश्न २ - घटक क्र. १ वर आधारित पर्याय देऊन एक प्रश्न - गुण १०
प्रश्न ३ - घटक क्र. १ वर आधारित चार पैकी दोन टिपा - गुण १०
प्रश्न ४ - मराठी लेखनाचे नियम व विरामचिन्हे या उपघटकावर आधारित अंतर्गत पर्यायांसह २ प्रश्न - गुण ८
प्रश्न ५- वर्तमानपत्रासाठी वृत्तलेखन या उपघटकावर अंतर्गत पर्यायांसह एक प्रश्न - गुण ७
प्रश्न ६ - वृत्तांतलेखन या उपघटकावर अंतर्गत पर्यायांसह एक प्रश्न - गुण ८
प्रश्न ७ -अर्जलेखन या उपघटकावर अंतर्गत पर्यायांसह एक प्रश्न - गुण ७

अंतर्गत मूल्यमापन - गुण ४०

श्रेयांकन व्यवस्थेचा एक आवश्यक भाग म्हणून प्रत्येकी २० गुणांच्या दोन चाचणी परीक्षा होतील. या चाचणी परीक्षांचे स्वरूप पुढीलप्रमाणे -

चाचणी परीक्षा / प्रकल्प / सादरीकरण / संगणकीय सादरीकरण इत्यादी. - गुण २०

सत्र- २		**तासिका L**	**श्रेयांक Cr**
मराठी अनिवार्य	**Paper Code: RJAUMARC201**	**४०**	**०२**
घटक- १		**२०**	**०१**
'नापास मुलांची गोष्ट'-ऋतुरंग प्रकाशन, संपा. अरुण शेवते. ***गुण ३०*** (पुढील व्यक्तींचे आत्मकथनात्मक लेखन अभ्यासार्थ नेमले आहे - म. गांधी, कुसुमाग्रज,दया पवार, ना. सी. फडके, सी.रामचंद्र, शांता शेळके, सुशीलकुमार शिंदे, चंद्रशेखर धर्माधिकारी)			
घटक- २		**२०**	**०१**
व्यावहारिक मराठी - (४ घटकविषय) - गुण ३०			
१.	उताऱ्याचे आकलन.		
२.	वर्तमानपत्रासाठी जाहिरातलेखन		
३.	सारांशलेखन.		
४.	निबंधलेखन.		

रामनिरंजन झुनझुनवाला कला,विज्ञान आणि वाणिज्य महाविद्यालय (स्वायत्त)

F.Y.B.A. Marathi (Compulsory) Syllabus Semester I & II

F.Y.B.A.

MARATHI - Compulsory

प्रथम वर्ष कला शाखा

मराठी अनिवार्य

SEM - II (RJAUMARC201)

परीक्षा योजना-

१. २ तास कालावधीची ६० गुणांची सत्रांत परीक्षा व प्रत्येकी २० गुणांच्या दोन अंतर्गत परीक्षा होतील.
२. सत्रांत परीक्षा उत्तीर्ण होण्यासाठी किमान ४०% गुण मिळवणे आवश्यक आहे.
३. सत्रांत परीक्षेला बसण्यास पात्र ठरण्यासाठी दोनपैकी किमान एक अंतर्गत परीक्षा देणे अनिवार्य आहे.
४. ATKT परीक्षेसाठी विषम-विषम सम-सम पॅटर्न अवलंबिला जाईल.
५. प्राचार्यांच्या सोबत विचारविनिमयाने घेतलेला विभागप्रमुखांचा निर्णय अंतिम व बंधनकारक राहील.

द्वितीय सत्रांत परीक्षा - गुण ६०

वरील अभ्यासपत्रिकेचे द्वितीय सत्रान्त प्रश्नपत्रिकेचे स्वरूप पुढीलप्रमाणे ठरविण्यात आले आहे.

प्रश्न १ घटक क्र. १ वर आधारित पर्याय देऊन एक प्रश्न - गुण १०.
प्रश्न २ घटक क्र. १ वर आधारित पर्याय देऊन एक प्रश्न - गुण १०
प्रश्न ३ घटक क्र. १ वर आधारित चार पैकी दोन टिपा - गुण १०
प्रश्न ४ उताऱ्याचे आकलन या उपघटकावर आधारित अंतर्गत पर्यायांसह एक प्रश्न.-गुण८
प्रश्न ५ वर्तमानपत्रासाठी जाहिरातलेखन या उपघटकावर अंतर्गत पर्यायांसह एक प्रश्न.- गुण ७
प्रश्न ६ - सारांशलेखन या उपघटकावर अंतर्गत पर्यायांसह एक प्रश्न .- गुण ५
प्रश्न ७ - निबंधलेखन या उपघटकावर चार विषयांपैकी एका विषयावर निबंध लिहिणे.- गुण १०

अंतर्गत मूल्यमापन - गुण ४०

श्रेयांकन व्यवस्थेचा एक आवश्यक भाग म्हणून प्रत्येकी २० गुणांच्या दोन चाचणी परीक्षा होतील.या चाचणी परीक्षांचे स्वरूप पुढीलप्रमाणे -

चाचणी परीक्षा / प्रकल्प / सादरीकरण / संगणकीय सादरीकरण इत्यादी. - गुण २०

संदर्भासाठी पुस्तके -

१) ललित गद्याचे तात्त्विक स्वरूप आणि लघुनिबंधाचा इतिहास -आनंद यादव

२) ललित गद्य ते मुक्त गद्य - वि. शं. चौघुले,

३) मराठी वाङ्मयाचा इतिहास, खंड ६, भाग २, संपादक- गो. म. कुळकर्णी व व.दि. कुळकर्णी, साहित्य परिषद, पुणे.

४) मराठीवाङ्मयकोश-खंड ४, (समीक्षा-संज्ञा), समन्वयक संपादक- डॉ. विजया राजाध्यक्ष, महाराष्ट्र राज्य साहित्य संस्कृती मंडळ, मुंबई, २००२.

५) वाङ्मयीन संज्ञा-संकल्पना कोश- प्रभा गणोरकर, वसंत आबाजी डहाके व इतर(संपा), पॉप्युलर प्रकाशन, मुंबई, २००१.

६) व्यावहारिक मराठी,ल. रा.नसिराबादकर, फडके प्रकाशन, कोल्हापूर

७) व्यावहारिक मराठी अध्यापनाच्या दिशा, डॉ. वसंत शेकडे (संपा.)ऋतू प्रकाशन, अहमदनगर, २०१२

UNIVERSITY OF MUMBAI
No. UG/107 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Com. (Financial Markets) degree programme **vide** this office Circular No. UG/27 of 2015 dated 22nd July, 2015 the Principals of affiliated Colleges in Commerce are hereby informed that the approved by the Academic Council at its meeting held on 24th June, 2016 **vide** item No. 4.78 and that in accordance therewith, the revised syllabus as per Choice Based Credit System for B.Com (Financial Markets))for (Sem. I to VI) - Course Structure (Sem. I & II), which is available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

(Dr.M.A. Khan)
REGISTRAR

MUMBAI – 400 032
October, 2016

To,

The Principals of affiliated Colleges in Commerce and the Heads of recognized Institutions concerned.

A.C/4.78 /24/06/2016

****

No. UG/107-A of 2016-17 MUMBAI-400 032 25 October, 2016

Copy forwarded with compliments for information to:-

1) The Dean, Faculty of Commerce,
2) The Director, Board of College and University Development,
3) The Controller of Examinations,
4) The Professor-cum- Director, Institute of Distance and Open Learning (IDOL),
5) The Co-Ordinator, University Computerization Centre.

(Dr.M.A. Khan)
REGISTRAR

PTO..

AC 24-06-2016
Item No. 4.78

University of Mumbai

B.Com. (Financial Markets) Programme
Three Year Integrated Programme- Six Semesters
Course Structure

Under Choice Based Credit *System*

To be implemented from Academic Year- 2016-2017
Progressively

Board of Studies-in-Accountancy, University of Mumbai

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Financial Markets)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting- I	**03**	1	Financial Accounting- II	**03**
2	Introduction to Financial system	**03**	2	Principles of Management	**03**
3	Business Mathematics	**03**	3	Business Statistics	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Environment	**03**	6	Environmental Science	**03**
7	Business Economics - I	**03**	7	Computer Skills - I	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course - II
2	Foundation Course in NSS - I	2	Foundation Course in NSS - II
3	Foundation Course in NCC - I	3	Foundation Course in NCC - II
4	Foundation Course in Physical Education - I	4	Foundation Course in Physical Education - II
Note: Course selected in Semester I will continue in Semester II			

S.Y.B.Com. (Financial Markets)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1, 2 & 3	*Any three courses from the following list of the courses ourses	**09**	1,2 & 3	*Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
4	Taxation	**02**	4	Computers in Investment	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
5	Management Accounting	**03**	5	Corporate Finance	**03**
6	Business Law-1	**03**	6	Business Law-2	**03**
7	Money Market	**03**	7	Foreign Exchange Markets	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)***		****List of DisciplineRelated Elective(DRE) Courses for Semester IV (Any Three)***	
1	Debt Markets-1	1	Debt Markets-2
2	Equity Markets-1	2	Equity Markets-2
3	Commodities Markets	3	Commodities Derivatives
4	Investment Banking	4	Merchant Banking
5	Treasury Management	5	Personal Financial Planning
Note: Course/ Subject selected in Semester III will continue in Semester IV			

T.Y.B.Com. (Financial Markets)

(To be implemented from Academic Year- 2018-2019)

No. of Courses	Semester V	Credits	No. of Courses	Semester VI	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2,3 & 4	*Any four courses from the following list of the courses	**12**	1,2,3 & 4	*Any four courses from the following list of the courses	**12**
2	***Core Courses (CC)***		***2***	***Core Courses (CC)***	
5	Corporate Accounting	**04**	5	Corporate Restructuring	**04**
3	****Project Work***		***3***	****Project Work***	
6	Project Work I	**04**	6	Project Work II	**04**
	Total Credits	**20**		**Total Credits**	**20**

Note: *Project work is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/ difficult problem. Project work would be of 043 credits. A project work may be undertaken in any area of Elective Courses/ study area*

****List of Elective Courses for Semester V (Any Four)***		****List of Elective Courses for Semester VI (Any Four)***	
1	Treasury Management	1	Venture Capital and Private Equity
2	Technical Analysis	2	Mutual Fund Management
3	Financial Derivatives	3	Financial Journalism
4	OrganisationalBehaviour	4	Strategic Corporate Finance
5	Marketing for financial services	5	Econometrics for Finance
6	Financial Analysis and Business Valuation	6	Security Analysis & Portfolio Management
Note: Course/ Subject selected in Semester V will continue in Semester VI			

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses
of
B.Com. (Financial Markets)
Programme
First Year
Semester I and II

Under Choice Based Credit, Grading and Semester *System*

To be implemented from Academic Year- 2016-2017

Board of Studies-in-Accountancy, University of Mumbai

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

F.Y.B.Com.(Financial Markets)

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1	Financial Accounting - I	**03**	1	Financial Accounting - II	**03**
2	Introduction to Financial Systems	**03**	2	Principles of Management	**03**
3	Business Mathematics	**03**	3	Business Statistics	**03**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***		***2A***	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**	4	Business Communication - II	**03**
2B	****Skill Enhancement Courses (SEC)***		**2B**	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**	5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Business Environment	**03**	6	Environmental Science	**03**
7	Business Economics - I	**03**	7	Computer Skills - I	**03**
	Total Credits	**20**		**Total Credits**	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***		*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - I	1	Foundation Course- II
2	Foundation Coursein NSS– I	2	Foundation Coursein NSS - II
3	Foundation Coursein NCC– I	3	Foundation Coursein NCC - II
4	Foundation Course inPhysical Education - I	4	Foundation CourseinPhysical Education - II
Note: Course selected in Semester I will continue in Semester II			

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting - I	**03**
2	Introduction to Financial Systems	**03**
3	Business Mathematics	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication - I	**03**
2B	****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Business Environment	**03**
7	Business Economics - I	**03**
	Total Credits	**20**

****List of Skill Enhancement Courses (SEC) for Semester I (Any One)***	
1	Foundation Course - I
2	Foundation Course in NSS - I
3	Foundation Course in NCC - I
4	Foundation Course in Physical Education - I

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1.Financial Accounting - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Nature and purpose of Accounting	10
2	Books of Accounts	15
3	Introduction to Financial Statements	15
4	Preparation of Final Accounts	20
	Total	**60**

Sr. No.	Modules / Units
1	**Nature, Purpose of Accounting**
	Meaning and scope of Accounting: Need, development & Definition of Accounting, persons interest in Accounting disclosure, branches of accounting Accounting concepts and Accounting Standards
2	**Books of Accounts**
	Journals, ledger, subsidiary books Trial Balance, Financial Accounting framework
3	**Introduction to Financial Statements**
	Bank Reconciliation statements Treatment of Capital & Revenue Depreciation Accounting; methods of recording depreciation and methods of providing depreciation as per AS-4
4	**Preparation of Final Accounts**
	Final Accounts of Sole Traders- Manufacturing Account, Trading, Profit & Loss Account and Balancesheet Final Accounts of Partnership Firm, Manufacturing Account, Trading, Profit & Loss Account and Balancesheet

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2.Introduction to Financial Systems

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Financial System	15
2	Financial Markets	15
3	Financial Regulators	15
4	Financial Instruments	15
	Total	**60**

Sr. No.	Modules / Units
1	**Overview of Financial System**
	An introduction to the financial system, Overview of financial system, Functions of a financial system, Evolution of financial systems (capital market oriented), Financial systems in India compared with those in developed nations and developing nations, Constituents of the financial system and interrelationships between various components
2	**Financial Markets**
	Capital markets, Money Markets, Foreign Exchange Market, Commodity Markets, Derivative Markets, Meaning, classification and structure, sub-segments, Role played, participants
3	**Financial Regulators**
	Meaning and features of financial regulators, Role and functions of financial regulators, Kinds of financial regulators, markets regulated by each regulator
4	**Financial Instruments**
	Meaning and classification of financial instruments (multiple ways of classifying financial instruments), Types of financial instruments, Evaluation of financial instruments (risk return trade-off), Characteristics of financial instruments, New financial instruments

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3.Business Mathematics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Ratio, Proportion and Percentage	15
2	Profit and Loss	15
3	Interest and Annuity	15
4	Shares and Mutual Fund	15
	Total	**60**

Sr. No.	Modules / Units
1	**Ratio, Proportion and Percentage**
	Ratio- Definition, Continued ratio, Inverse Ratio, Proportion - Continued proportion, Direct proportion, Inverse proportion, Variation - Inverse variation, Joint variation Percentage- Meaning and computation of percentage
2	**Profit and Loss**
	Terms and formulae, Trade discount, Cash discount, problems involving cost price, selling price, trade discount, cash discount. Introduction to Commission and brokerage – problems on commission and brokerage
3	**Interest and Annuity**
	Simple interest, compound interest, Equated monthly instalments, reducing balance and flat rate of interest Annuity immediate- present value and future value Stated annual rate and effective annual rate
4	**Shares and Mutual Fund**
	Shares- Concept, face value, market value, dividend, Equity shares, preference shares, bonus shares, Mutual Fund- Simple problems on calculation of net income after considering entry load, exit load, dividend, change in net asset value

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I

with Effect from the Academic Year 2016-2017

4. Business Communication - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Theory of Communication	10
2	Obstacles to Communication in Business World	10
3	Business Correspondence	12
4	Language and Writing Skills	13
	Total	**45**

Sr. No.	Modules / Units
1	**Theory of Communication**
	Concept of Communication: Meaning, Definition, Process, Need, FeedbackEmergence of Communication as a key concept in the Corporate and Global worldImpact of technological advancements on Communication **Channels and Objectives of Communication**: **Channels-** Formal and Informal- Vertical, Horizontal, Diagonal, Grapevine **Objectives of Communication**: Information, Advice, Order and Instruction, Persuasion, Motivation, Education,Warning, and Boosting the Morale of Employees(A brief introduction to these objectives to be given) **Methods and Modes of Communication:** Methods: Verbal and Nonverbal, Characteristics of Verbal Communication Characteristics of Non-verbal Communication, Business Etiquette Modes: Telephone and SMS Communication 3 (General introduction to Telegram to be given) Facsimile Communication [Fax] Computers and E- communication Video and Satellite Conferencing
2	**Obstacles to Communication in Business World**
	Problems in Communication /Barriers to Communication: Physical/ Semantic/Language / Socio-Cultural / Psychological / Barriers, Ways to Overcome these Barriers **Listening:** Importance of Listening Skills, Cultivating good Listening Skills – 4 **Introduction to Business Ethics:** Concept and Interpretation, Importance of Business Ethics, Personal Integrity at the workplace, Business Ethics and media, Computer Ethics, Corporate Social Responsibility Teachers can adopt a case study approach and address issues such as the following so as to orient and sensitize the student community to actual business practices: Surrogate Advertising, Patents and Intellectual Property Rights, Dumping of Medical/E-waste, Human Rights Violations and Discrimination on the basis of gender, race, caste, religion, appearance and sexual orientation at the workplace Piracy, Insurance, Child Labour
3	**Business Correspondence**
	Theory of Business Letter Writing: Parts, Structure, Layouts—Full Block, Modified Block, Semi - Block Principles of Effective Letter Writing, Principles of effective Email Writing, **Personnel Correspondence:** Statement of Purpose, Job Application Letter and Resume, Letter of Acceptance of Job Offer, Letter of Resignation [Letter of Appointment, Promotion and Termination, Letter of Recommendation (to be taught but not to be tested in the examination)]

Sr. No.	Modules / Units
4	**Language and Writing Skills**
	Commercial Terms used in Business Communication **Paragraph Writing:** Developing an idea, using appropriate linking devices, etc Cohesion and Coherence, self-editing, etc [Interpretation of technical data, Composition on a given situation, a short informal report etc.] **Activities** ▪ Listening Comprehension ▪ Remedial Teaching ▪ Speaking Skills: Presenting a News Item, Dialogue and Speeches ▪ Paragraph Writing: Preparation of the first draft, Revision and Self – Editing, Rules of spelling. ▪ Reading Comprehension: Analysis of texts from the fields of Commerce and Management

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5. Foundation Course - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Overview of Indian Society	05
2	Concept of Disparity- 1	10
3	Concept of Disparity-2	10
4	The Indian Constitution	10
5	Significant Aspects of Political Processes	10
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Indian Society**
	Understand the multi-cultural diversity of Indian society through its demographic composition: population distribution according to religion, caste, and gender; Appreciate the concept of linguistic diversity in relation to the Indian situation; Understand regional variations according to rural, urban and tribal characteristics; Understanding the concept of diversity as difference
2	**Concept of Disparity- 1**
	Understand the concept of disparity as arising out of stratification and inequality; Explore the disparities arising out of gender with special reference to violence against women, female foeticide (declining sex ratio), and portrayal of women in media;Appreciate the inequalities faced by people with disabilities and understand the issues of people with physical and mental disabilities
3	**Concept of Disparity-2**
	Examine inequalities manifested due to the caste system and inter-group conflicts arising thereof; Understand inter-group conflicts arising out of communalism; Examine the causes and effects of conflicts arising out of regionalism and linguistic differences
4	**The Indian Constitution**
	Philosophy of the Constitution as set out in the Preamble; The structure of the Constitution-the Preamble, Main Body and Schedules; Fundamental Duties of the Indian Citizen; tolerance, peace and communal harmony as crucial values in strengthening the social fabric of Indian society; Basic features of the Constitution
5	**Significant Aspects of Political Processes**
	The party system in Indian politics; Local self-government in urban and rural areas; the 73rd and 74th Amendments and their implications for inclusive politics; Role and significance of women in politics

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NSS - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NSS	10
2	Concept of Society and Social Issues in India	15
3	Indian Constitution and Social Justice	10
4	Human Personality and National Integration	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NSS**
	Introduction to National Service Scheme(NSS) Orientation and structure of National Service Scheme(NSS) National Service Scheme(NSS)- its objectives The historical perspective of National Service Scheme(NSS) National Service Scheme(NSS)- Symbol and its meaning National Service Scheme(NSS)- its hierarchy from national to college level **National Service Scheme(NSS) Regular activities** Distribution of working hours- Association between issues and programs- community project- urban rural activities, Association- modes of activity evaluation
2	**Concept of Society and Social Issues in India**
	History and philosophy of social sciences in India Concept of society- Development of Indian society - Features of Indian Society- Division of labour and cast system in India **Basic social issues in India** Degeneration of value system, Family system, Gender issues, Regional imbalance
3	**Indian Constitution and Social Justice**
	Indian Constitution Features of Indian Constitution - Provisions related to social integrity and development **Social Justice** Social Justice- the concept and its features Inclusive growth- the concept and its features
4	**Human Personality and National Integration**
	Dimensions of human personality Social Dimension of Human personality- Understanding of the socity Physical Dimension of Human personality- Physical Exercise, Yoga, etc. **National integration & Communal Harmony** National Integration- its meaning, importance and practice Communal Harmony- its meaning, importance and practice

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in NCC - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to NCC, National Integration & Awareness	10
2	Drill: Foot Drill	10
3	Adventure Training, Environment Awareness and Conservation	10
4	Personality Development and Leadership	10
5	Specialized Subject: Army/ Navy/ Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to NCC, National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. • Genesis, Aims, Objectives of NCC & NCC Song • Organisation& Training • Incentives & Benefits • Religions, Culture, Traditions and Customs of India • National Integration: Importance and Necessity • Freedom Struggle
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • General and Words of Command • Attention, Stand at Ease and Stand Easy, Turning and Inclining at the Halt • Sizing, Forming Up in Three Ranks and Numbering, Open and Close Order March and Dressing • Saluting at the Halt, Getting On Parade, Dismissing and Falling Out • Marching, Length of Pace and Time of Marching in Quick Time and Halt, Slow March and Halt • Turning on the March and Wheeling. • Saluting on the March. • Formation of squad and Squad Drill.
3	**Adventure Training, Environment Awareness and Conservation**
	Adventure Training **Desired outcome**: The students will overcome fear & inculcate within them the sense of adventure , sportsmanship , espirit-d-corp and develop confidence , courage , determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing,Scuba Diving etc **Environment Awareness and Conservation** Desired outcome: The student will be aware of the conservation of natural resources and protection of environment. • Natural Resources – Conservation and Management • Water Conservation and Rainwater Harvesting

Sr. No.	Modules / Units
4	**Personality Development and Leadership**
	Desired outcome: The student will develop an all-round personality with adequate leadership traits to deal / contribute effectively in life. • Introduction to Personality Development • Factors Influencing /Shaping Personality: Physical, Social, Physiological, Philosophical and Psychological • Self Awareness Know yourself/ Insight • Change Your Mind Set • Communication Skills: Group Discussion / Lecturettes (Public Speaking) • Leadership Traits • Types of Leadership
5	**Specialized Subject: Army Or Navy Or Air**
	<u>Army</u> **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Armed Force** • Basic organisation of Armed Forces • Organisation of Army • Badges and Ranks **B. Introduction to Infantry and weapons and equipments** • Characteristics of 7.62mm SLR Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning **C. Military history** • Biographies of renowned Generals (Carriapa / Sam Manekshaw) • Indian Army War Heroes- PVCs **D. Communication** • Types of Communications • Characteristics of Wireless Technologies (Mobile, Wi-Fi etc.) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • History of the Indian Navy-Pre and Post Independence, Gallantry award winners • Organization of Navy- NHQ, Commands, Fleets, Ships and shore establishments • Types of Warships and their role • Organization of Army and Air Force- Operational and Training commands • Ranks of Officers and Sailors, Equivalent Ranks in the Three Services **B. Ship and Boat Modelling** • Principles of Ship Modelling • Maintenance and Care of tools

Sr. No.	Modules / Units
	C. Search and Rescue • SAR Organization in the Indian ocean **D. Swimming** Floating for three minutes and Free style swimming for 50 meters ***OR*** **AIR** **A. General Service Knowledge** • Development of Aviation • History of IAF **B. Principles of Flight** • Introduction • Laws of Motion • Glossary of Terms. **C. Airmanship** • Introduction • Airfield Layout • Rules of the Air • Circuit Procedure • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Introduction to Aero-engines

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education - I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Basic Relevant concepts in Physical Education	10
2	Components of Physical Fitness	15
3	Testing Physical Fitness	10
4	Effect of Exercise on various Body System	10
	Total	**45**

Sr. No.	Modules / Units
1	**Introduction to Basic Relevant concepts in Physical Education**
	• Dimensions and determinants of Health, Fitness & Wellness • Concept of Physical Education and its importance • Concept of Physical Fitness and its types • Concept of Physical Activity, exercise and its types & benefits
2	**Components of Physical Fitness**
	• Concept of components of Physical Fitness • Concept and components of HRPF • Concept and components of SRPF • Importance of Physical Education in developing physical fitness components.
3	**Testing Physical Fitness**
	• Tests for measuring Cardiovascular Endurance • Tests for measuring Muscular Strength& Endurance • Tests for measuring Flexibility • Tests for measuring Body Composition
4	**Effect of Exercise on various Body System**
	• Effect of exercises on Musculoskeletal system • Effect of exercises on Circulatory System • Effect of exercises on Respiratory System • Effect of exercises on Glandular System

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

6.Business Environment

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Business and its Environment	15
2	Business and Society	15
3	Contemporary Issues	15
4	International Environment	15
	Total	**60**

Sr. No.	Modules / Units
1	**Business and its Environment**
	a) Business Objectives, Dynamics of Business and its Environment, Types of Business Environment b) Environmental Analysis: Importance, Factors, PESTEL Analysis, SWOT Analysis
2	**Business and Society**
	a) Business Ethics: Nature and Scope of Ethics, Ethical Dilemmas, Corporate Culture and Ethical Climate b) Development of Business Entrepreneurship: Entrepreneurship and Economic Development, Micro, Small and Medium Enterprises Development (MSMED) Act, 2006, Entrepreneurship as a Career Option c) Consumerism and Consumer Protection: Consumerism in India, Consumer Protection Act 1986
3	**Contemporary Issues**
	a) Corporate Social Responsibility and Corporate Governance: Social Responsibility of Business, Ecology and Business, Carbon Credit b) Social Audit: Evolution of Social Audit, Benefits of Social Audit, Social Audit v/s Commercial Audit
4	**International Environment**
	a) Strategies for going Global: MNCs and TNCs, WTO b) Foreign Trade in India- Balance of Trade, FDI Investment Flows and its Implication for Indian Industries

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester I with Effect from the Academic Year 2016-2017

Core Courses (CC)

7.Business Economics - Paper I

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	10
2	Demand Analysis	10
3	Supply and Production Decisions and Cost of Production	15
4	Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition	15
5	Pricing Practices	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Scope and Importance of Business Economics - basic tools- Opportunity Cost principle- Incremental and Marginal Concepts. Basic economic relations - functional relations: equations- Total, Average and Marginal relations- use of Marginal analysis in decision making, The basics of market demand, market supply and equilibrium price- shifts in the demand and supply curves and equilibrium
2	**Demand Analysis**
	Demand Function - nature of demand curve under different markets Meaning, significance, types and measurement of elasticity of demand (Price, income cross and promotional)- relationship between elasticity of demand and revenue concepts **Demand estimation and forecasting:** Meaning and significance - methods of demand estimation: survey and statistical methods *(numerical illustrations on trend analysis and simple linear regression)*
3	**Supply and Production Decisions and Cost of Production**
	Production function: short run analysis with Law of Variable Proportions- Production function with two variable inputs- isoquants, ridge lines and least cost combination of inputs- Long run production function and Laws of Returns to Scale - expansion path - Economies and diseconomies of Scale. **Cost concepts:** Accounting cost and economic cost, implicit and explicit cost, fixed and variable cost - total, average and marginal cost - Cost Output Relationship in the Short Run and Long Run *(hypothetical numerical problems to be discussed)*, LAC and Learning curve - Break even analysis *(with business applications)*
4	**Market structure: Perfect competition and Monopoly and Pricing and Output Decisions under Imperfect Competition**
	Short run and long run equilibrium of a competitive firm and of industry - monopoly - short run and long- run equilibrium of a firm under Monopoly **Monopolistic competition:**Equilibrium of a firm under monopolistic competition, debate over role of advertising *(topics to be taught using case studies from real life examples)* **Oligopolistic markets:** key attributes of oligopoly - Collusive and non collusive oligopoly market - Price rigidity - Cartels and price leadership models *(with practical examples)*
5	**Pricing Practices**
	Cost oriented pricing methods: cost – plus (full cost) pricing, marginal cost pricing, Mark up pricing, discriminating pricing, multiple – product pricing - transfer pricing *(case studies on how pricing methods are used in business world)*

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Elective Courses (EC)***	
1	Financial Accounting- II	**03**
2	Principles of Management	**03**
3	Business Statistics	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Communication -II	**03**
2B	*****Skill Enhancement Courses (SEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Environmental Science	**03**
7	Computer Skills - I	**03**
	Total Credits	**20**

*****List of Skill Enhancement Courses (SEC) for Semester II (Any One)***	
1	Foundation Course - II
2	Foundation Course - NSS - II
3	Foundation Course - NCC - II
4	Foundation Course - Physical Education - II

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

1. Financial Accounting -II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Shares and Debentures	15
2	Corporate Accounting	15
3	Share Valuation	15
4	Indian Accounting Standards	15
	Total	**60**

Sr. No.	Modules / Units
1	**Shares and Debentures**
	Issue of Shares & Debentures: Types of Shares & Debentures (in India) Accounting Treatments for issue of shares & debentures with new market and SEBI rules
2	**Corporate Accounting**
	Capitalisation of reserves & issue of Bonus Shares Preparation of corporate financial statements in vertical form.
3	**Share Valuation**
	Valuation of Shares. Buy-back of shares & own debentures. Investment Accounting
4	**Indian Accounting Standards**
	AS, GAAP & their impact on Income Statement & B/S. Latest Development: Computerization of accounting & accounting

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

2. Principles of Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction	15
2	Planning and decision making	15
3	Organising	15
4	Management Control	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction**
	Nature and process of management, basic management roles and skills, nature of managerial work, approaches to management, classical behavioural, systems and contingency approaches, contemporary issues and challenges
2	**Planning and decision making**
	concept, purpose and process of planning, kinds of plans, strategies, policies and planning, premises, goal setting, MBO, decision making, conditions, forms of group decision making in organisation
3	**Organising**
	fundamentals of organising, bases of departmentation, distribution of authority, coordination, organisation structure, and design, leadership- nature and significance, leading and managing, leadership styles, leadership theories
4	**Management control**
	Nature, purpose and process of controlling, kinds of control system, prerequisites of effective control systems, resistance to control, controlling techniques

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester II with Effect from the Academic Year 2016-2017

Elective Courses (EC)

3. Business Statistics

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Population and Sample	12
2	Measures of Central Tendency	12
3	Measures of Dispersion	12
4	Correlation and regression (for ungrouped data)	12
5	Linear Programming Problems	12
	Total	**60**

Sr. No.	Modules / Units
1	**Population and sample**
	Definition of statistics, scope of statistics in Management and financial markets, Concept of population and sample with illustration Methods of sampling- SRSWR, SRSWOR, stratified, systematic (description of sampling procedures only) Data condensation and graphical methods: Raw data, attributes and variables, classification, frequency distribution, cumulative frequency distribution Graphs- Histogram and frequency polygon Diagrams- Multiple bar, pie, subdivided bar
2	**Measures of Central tendency**
	Criteria for good measures of central tendency, arithmetic mean, median mode for grouped and ungrouped data, combined mean
3	**Measures of Dispersion**
	Concept of dispersion, absolute and relative measures of dispersion, range variance, standard deviation, coefficient of variation, quartile deviation, coefficient of quartile deviation
4	**Correlation and regression (for ungrouped data)**
	Concept of correlation, positive and negative correlation, Karl Pearson's Coefficient of Correlation, meaning of regression, two regression equations, Regression coefficients and properties
5	**Linear Programming Problems**
	Meaning of LPP, Formulation of LPP, solution by graphical methods, problems relating to two variables only

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Ability Enhancement Courses (AEC)

4. Business Communication - II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Presentation Skills	10
2	Group Communication	15
3	Business Correspondence	10
4	Language and Writing Skills	10
	Total	**45**

Sr. No.	Modules / Units
1	**Presentation Skills**
	Presentations: (to be tested in tutorials only) 4 Principles of Effective Presentation Effective use of OHP Effective use of Transparencies How to make a Power-Point Presentation
2	**Group Communication**
	Interviews: Group Discussion Preparing for an Interview, Types of Interviews – Selection, Appraisal, Grievance, Exit **Meetings:**Need and Importance of Meetings, Conduct of Meeting and Group Dynamics Role of the Chairperson, Role of the Participants, Drafting of Notice, Agenda and Resolutions **Conference:**Meaning and Importance of Conference Organizing a Conference Modern Methods: Video and Tele – Conferencing **Public Relations:** Meaning, Functions of PR Department, External and Internal Measures of PR
3	**Business Correspondence**
	Trade Letters: Order, Credit and Status Enquiry, Collection (just a brief introduction to be given) **Only following to be taught in detail:-** Letters of Inquiry, Letters of Complaints, Claims, Adjustments Sales Letters, promotional leaflets and fliers Consumer Grievance Letters, Letters under Right to Information (RTI) Act [Teachers must provide the students with theoretical constructs wherever necessary in order to create awareness. However students should not be tested on the theory.]
4	**Language and Writing Skills**
	Reports: Parts, Types, Feasibility Reports, Investigative Reports **Summarisation:** Identification of main and supporting/sub points Presenting these in a cohesive manner

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Skill Enhancement Courses (SEC)

5. Foundation Course – II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Globalisation and Indian Society	07
2	Human Rights	10
3	Ecology	10
4	Understanding Stress and Conflict	10
5	Managing Stress and Conflict in Contemporary Society	08
	Total	**45**

Sr. No	Modules /Units
1	**Globalisation and Indian Society**
	Understanding the concepts of liberalization, privatization and globalization;Growth of information technology and communication and its impact manifested in everyday life; Impact of globalization on industry: changes in employment and increasing migration; Changes in agrarian sector due to globalization; rise in corporate farming and increase in farmers' suicides.
2	**Human Rights**
	Concept of Human Rights; origin and evolution of the concept; The Universal Declaration of Human Rights;Human Rights constituents with special reference to Fundamental Rights stated in the Constitution
3	**Ecology**
	Importance of Environment Studies in the current developmental context; Understanding concepts of Environment, Ecology and their interconnectedness; Environment as natural capital and connection to quality of human life; Environmental Degradation- causes and impact on human life;Sustainable development- concept and components; poverty and environment
4	**Understanding Stress and Conflict**
	Causes of stress and conflict in individuals and society; Agents of socialization and the role played by them in developing the individual; Significance of values, ethics and prejudices in developing the individual; Stereotyping and prejudice as significant factors in causing conflicts in society. Aggression and violence as the public expression of conflict
5	**Managing Stress and Conflict in Contemporary Society**
	Types of conflicts and use of coping mechanisms for managing individual stress; Maslow's theory of self-actualisation;Different methods of responding to conflicts in society; Conflict-resolution and efforts towards building peace and harmony in society

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Skill Enhancement Courses (SEC)

5. Foundation Course in NSS II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Socio-economic Survey and Special Camp	10
2	Orientation of the College Unit and Communication Skills	15
3	Rapport with Community and Programme Planning	10
4	Government Organisations /Non-Government Organisations	10
	Total	**45**

Sr. No.	Modules / Units
1	**Socio-economic Survey and Special Camp**
	Socio economic survey Socio-economic survey- its meaning and need, Process of Socio-economic survey- design of questionnaire; data collection, data analysis and report writing **Special camping activity** Concept of camp- Identification of community problems- Importance of group living- Team building- Adoption of village- Planning for camp- pre camping, during the course of camp and post camping activities
2	**Orientation of the College Unit and Communication Skills**
	Training and orientation of the program unit in the college Leadership training – formation of need based programmmes- Concept of campus to community(C to C) activities **Communication skills and Documentation** Communication skills- the concept, Verbal, Non-Verbal communication The documentation- Activity Report Writing – basics of NSS accounting – Annual Report – Press note and preparation
3	**Rapport with Community and Programme Planning**
	Working with individual group and community Ice breaking- interaction games – conflict resolution **Program planning** Programme planning- the concept and its features, requirements for successful implementation of program- program flow charting- feedback
4	**Government Organisations /Non-Government Organisations**
	Structure of Government Organisations and Non-Government Organisations Government organisations (GO)- its meaning -Legal set up, functioning, Sources of funding Non-Government organisations (NGO)- its meaning -Legal set up, functioning, Sources of funding National Service Scheme(NSS)- Government organisations (GO) and Non-Government organisations (NGO) **Government schemes for community development** Schemes os Government welfare departments for community development- provisions & examples

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Skill Enhancement Courses (SEC)

5.Foundation Course inNCC- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	10
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	05
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Civil Defence Organisation and Its Duties/ NDMA • Types of Emergencies/ Natural Disaster • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. • 'Avan' model of NCC **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social service and its need, about NGOs and shall participate in community action programmes for betterment of the community. • Basics of Social Service, Weaker Sections of Our Society and Their Needs • Social/ Rural Development Project: MNREGA, SGSY, NSAP etc. • Contribution of Youth towards Social Welfare • Civic Responsibilities • Causes & Prevention of HIV/AIDS; Role of Youth
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Structure and Functioning of the Human Body • Hygiene and Sanitation (Personal and Food Hygiene) • Infectious & Contagious Diseases & Their Prevention
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Attention, Stand at Ease and Stand Easy • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • Ground / Take Up Arms • Present From the Order and Vice-versa • General Salute, Salami Shastra
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • Characteristics of a Rifle / Rifle Ammunition and its Fire Power • Stripping, Assembling, Care and Cleaning and Sight Setting of .22 rifle • Stripping, Assembling, Care and Cleaning of 7.62mm SLR • Loading, Cocking and Unloading • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions • Short range firing, Aiming- II -Alteration of sight

Sr. No.	Modules / Units
5	**Specialized Subject: Army Or Navy Or Air**
	Army **Desired outcome:** The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects **A. Map reading** • Introduction to types of Maps and Conventional signs • Scales and Grid system • Topographical forms and technical terms • Relief, contours and Gradients • Cardinal points and Types of North • Types of bearings and use of Service Protractor • Prismatic compass and its use and GPS **B. Field Craft and Battle Craft** • Introduction • Judging distance • Description of ground • Recognition, Description and Indication of landmarks and targets ***OR*** **Navy** **A. `Naval Communication** • Introduction to Naval Modern Communication, Purpose and Principles ▪ Introduction of Naval communication ▪ Duties of various communication sub-departments • Semaphore ▪ Introduction of position of letters and prosigns ▪ Reading of messages ▪ Transmission of messages **B. Seamanship** • **Anchor work** ▪ Parts of Anchor and Cable, their identification • **Rigging** ▪ Types of ropes and breaking strength- stowing, maintenance and securing of ropes ▪ Practical Bends and Hitches: Reef Knot, Half hitch, Clove Hitch, Rolling Hitch, Timber Hitch, Bow Line, Round Turn and Two half hitch and Bow line on the Bight and its basic elements and uses. ▪ Introduction to Shackles, Hooks, Blocks and Derricks, Coiling Down and Splicing of rope **C. Boat work** • Parts of Boat and Parts of an Oar • Instruction on boat Pulling- Pulling orders • Steering of boat under oars, Practical instruction on Boat Pulling, Precautions while pulling

Sr. No.	Modules / Units
	OR **Air** **A. Air frames** • Aircraft Controls • Landing Gear **B. Instruments** • Basic Flight Instruments **C. Aircraft Particulars** • Aircraft Particulars (Type specific) **D. Aero modelling** • History of Aero modelling • Materials used in Aero modelling • Type of Aero models • Flying/ Building of Aero models

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Skill Enhancement Courses (SEC)

5.Foundation Course in Physical Education- II

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Development of Fitness	10
2	Health, Fitness and Diseases	15
3	Yoga Education	10
4	Daily Schedule of Achieving Quality of Life and Wellness	10
	Total	**45**

Sr. No.	Modules / Units
1	**Development of Fitness**
	• Benefits of physical fitness and exercise and principles of physical fitness • Calculation of fitness index level 1-4 • Waist-hip ratio Target Heart Rate, BMI and types and principles of exercise (FITT) • Methods of training – continues, Interval, circuit, Fartlek and Plyometric
2	**Health, Fitness and Diseases**
	• Definition of obesity and its management • Communicable diseases, their preventive and therapeutic aspectS • Factors responsible for communicable diseases • Preventive and therapeutic aspect of Communicable and non- communicable diseases
3	**Yoga Education**
	• Meaning and history of yoga • Ashtang yoga and types of yoga • Types of Suryanamaskar and Technique of Pranayam • Benefits of Yoga
4	**Daily Schedule of Achieving Quality of Life and Wellness**
	• Daily schedule based upon one's attitude, gender, age &occupation. • Basic – module: - Time split for rest, sleep, diet, activity & recreation. • Principles to achieve quality of life:- positive attitude, daily regular exercise, control over food habits & healthy hygienic practices.

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Core Courses (CC)

6.Environmental Science

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Environment: An overview	15
2	Natural Resources	15
3	Environment and Economic Activities	15
4	Environment Management	16
	Total	**60**

Sr. No.	Modules / Units
1	**Environment : An overview**
	Environment- structure, components and typology Ecosystem as part of environment- Functioning and levels of organisation Biodiversity- Classification, value, threats to biodiversity
2	**Natural Resources**
	Definition, importance and classification of natural resources Utilisation o and conservation of water, forest, soil and energy resources Issues associated with natural resources
3	**Environment and Economic Activities**
	Economic activities-nature and pattern- primary,secondary and tertiary Environmental problems associated with economic activities Case studies with reference to India
4	**Environment Management**
	Environment management- Concept, need and relevance of environmental education Environmental Impact Assessment, Environmental audit Role of technology in Environment Management- GIS,GPS, Remote sensing as tools

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Core Courses (CC)

7.Computer skills -1

Modules at a Glance

Sr. No.	Modules	No. of Lectures IncludingPracticals
1	Computer Hardware	10
2	Windows	10
3	Internet	10
4	Word - 2013	15
4	Excel -2013	15
	Total	**60**

Sr. No.	Modules / Units
1	**Computer Hardware**
	Personal Computers- identification/demonstration of different storage Devices like CD and CD drive, hard disk- HDD, storing and retrieving data from various storage devices, identification of various input and output devices. Primary memory, RAM and ROM- Processor- CPU, it's speed- machine cycle, ports, computer buses, Different types of printers. Introduction to trouble shooting of personal computers.
2	**Windows**
	Introduction, features, various versions of windows, My computer, my documents, recycle bin, network neighbourhood, start menu, taskbar, file and folder operation (creating, copying, moving, deleting), system tools, creating shortcuts,
3	**Internet**
	What is internet, most popular internet services , functions of internet like email, WW, FTP, usenet, Instant messaging, internet telephony, using address book, working with task list, scheduling appointments, reminders, events
4	**Word – 2013**
	Getting started, The Word window, New documents, Document navigation, Editing text, Working with text, Undo and Redo commands, Cut, copy, and paste, Find and replace Text formatting, Character formatting, Tab settings, Paragraph formatting, Paragraph spacing and indents Tables, Creating tables, Working with table content, Changing the table structure Page layout, Headers and footers, Page setup Graphics, Adding graphics and clip art, Working with graphics Proofing, printing, and exporting, Spelling and grammar, AutoCorrect, Printing and exporting documents
5	**Excel- 2013**
	Fundamentals of Excel, Cut, Copy, Insert, Delete, Paste Special, Custom Formatting , Undo, Redo, Excel Formulas – Basic, Useful functions and Paste Function, Calc, Comments, Drawing toolbar, Edit, Replace, Delete, Clear, Essential Printing, Data Sorting, Hiding, AutoFormats, Protection, Basic Charts, Basic Formatting, If Function

Revised Syllabus of Courses of B.Com.(Financial Markets) Programme at Semester I with effect from the Academic Year 2016-2017

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Introduction to Financial Systems
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- *Management of Small-Scale Industries by Vasant Desai, Himalaya Publishing House, Mumbai*
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Revised Syllabus of Courses of B.Com.(Financial Markets) Programme at Semester II with effect from the Academic Year 2016-2017

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Revised Syllabus of Courses of B.Com.(Financial Markets) Programme at Semester I and II with effect from the Academic Year 2016-2017

Scheme of Evaluation

The performance of the learners will be evaluated in two Components. One component will be the Internal Assessment component carrying 25% marks and the second component will be the Semester-wise End Examination component carrying 75% marks. The allocation of marks for the Internal Assessment and Semester End Examinations will be as shown below:-

A) Internal Assessment: **25 %**

Question Paper Pattern
(Internal Assessment- Courses without Practical Courses)

Sr. No.	Particular	Marks
1	**One class test (20 Marks)**	
	Match the Column/ Fill in the Blanks/ Multiple Choice Questions ***(½ Mark each)***	05 Marks
	Answer in One or Two Lines (Concept based Questions) ***(01 Mark each)***	05 Marks
	Answer in Brief (Attempt Any Two of the Three) ***(05 Marks each)***	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

Question Paper Pattern
(Internal Assessment- Courses with Practical Courses)

Sr. No.	Particular	Marks
1	**Semester End Practical Examination (20 Marks)**	
	Journal	05 Marks
	Viva	05 Marks
	Laboratory Work	10 Marks
2	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities articulation and exhibit of leadership qualities in organizing related academic activities	05 Marks

B) Semester End Examination: 75 %

i) Duration: The examination shall be of 2 ½ Hours duration

ii) Theory question paper pattern

- There shall be five questions each of 15 marks.
- All questions shall be compulsory with internal choice within the questions.
- Question may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the topic.
  (Detail question paper pattern has been given separately)

Passing Standard

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learners shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 30 Out of 75) separately, to pass the course and minimum of Grade E to pass a particular semester A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern
(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 ½ Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5 Marks.

UNIVERSITY OF MUMBAI
No. UG/ 69 of 2016-17

CIRCULAR:-

A reference is invited to the Syllabi relating to the B.Sc. degree course , **vide** this office Circular No. UG/131 of 2011, dated 13th June, 2011 and the Principals of affiliated Colleges in Science are hereby informed that the recommendation made by Board Studies in Physics at its meeting held on 24th May, 2016 has been accepted by the Academic Council meeting held on 24th June, 2016 **vide** item No. 4.50 and that in accordance therewith, the revised syllabus as per the Credit Based Semester and Grading System for F.Y. B.Sc. Physics (Sem.I & II), which are available on the University's web site (www.mu.ac.in) and that the same has been brought into force with effect from the academic year 2016-17.

19/9/16

(Dr.M.A.Khan)
REGISTRAR

MUMBAI – 400 032
21st September, 2016

To,

The Principals of the affiliated Colleges in Science.

A.C/4.50/24.06.2016

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No. UG/69-A of 2016 MUMBAI-400 032 21st September, 2016

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1) The Deans, faculties of Science,
2) The Chairman, Board of Studies in Physics,
3) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
4) The Director, Board of College and University Development,
5) The Co-Ordinator, University Computerization Centre,
6) The Controller of Examinations.

19/9/16

(Dr.M.A.Khan)
REGISTRAR

PTO..

UNIVERSITY OF MUMBAI

Syllabus for Sem I & II
Program: B.Sc.
Course: Physics

(Credit Based Semester and Grading System for Academic year 2016-17)

Syllabusfor B.Sc. Physics(Theory&Practical)
Aspercreditbasedsystem
FirstYearB.Sc.2016–2017.

TherevisedsyllabusinPhysicsasper creditbasedsystemfortheFirstYearB.Sc.Course willbeimplementedfromtheacademicyear**2016–2017.**

Preamble:

The systematic and planned curricula from these courses shall motivate and encourage learners to understand basic concepts of Physics.

Objectives:

- To develop analytical abilities towards real world problems
- To familiarize with current and recent scientific and technological developments
- To enrich knowledge through problem solving, hands on activities, study visits, projects etc.

Course code	Title	Credits
	Semester I	
USPH101	Classical Physics	2
USPH102	Modern Physics	2
USPHP1	Practical I	2
		Total= 06
	Semester II	
USPH201	Mathematical Physics	2
USPH202	Electricity and Electronics	2
USPHP2	Practical II	2
		Total=06

SEMESTER-I

Name of the Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	I	Physics
CourseCode	Title	Credits	
USPH101	**Classical Physics**	2for USPH101	

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand Newton's laws and apply them in calculations of the motion of simple systems.
2. Use the free body diagrams to analyzetheforces on the object.
3. Understand the concepts of friction and the concepts of elasticity, fluid mechanics and be able to perform calculations using them.
4. Understand the concepts of lens system and interference.
5. Apply the laws of thermodynamics to formulate the relations necessary toanalyze athermodynamic process.
6. Demonstrate quantitative problem solving skills in all the topics covered

Unit:I **15lectures**

1. Newton’s Laws**:**

Newton’s first, second and third laws of motion, interpretation and applications, pseudo forces, Inertial and non-inertial frames of reference.Worked out examples (with friction present)

2. Elasticity:

Review of Elastic constants Y, K, η and σ;Equivalence of shear strain to compression and extension strains. Relations between elastic constants, Couple for twist in cylinder.

3. Fluid Dynamics**:**

Equation of continuity, Bernoulli’s equation, applications of Bernoulli’s equation, streamline and turbulent flow, lines of flow in airfoil, Poiseuille’s equation.

Unit:II **15lectures**

1. Lens Maker's Formula (Review), Newton’s lens equation,magnification-lateral, longitudinal and angular.

2. Equivalent focal length of two thin lenses, thick lens, cardinal points of thick lens, Ramsdenand Huygens eyepiece.
3. Aberration: Spherical Aberration, Reduction of Spherical Aberration, Chromatic aberration and condition for achromatic aberration.
3. Interference: Interference in thin films, Fringes in Wedge shaped films, Newton's Rings (Reflective).

UNIT III **15 lectures**

1. Behavior of real gases and real gas equation, Van der Waal equation
2.Thermodynamic Systems, Zeroth law of thermodynamics, Concept of Heat, The first law, Non Adiabatic process and Heat as a path function, Internal energy, , Heat Capacity and specific heat, Applications of first law to simple processes, general relations from the first law, Indicator diagrams, Work done during isothermal and adiabatic processes, Worked examples, Problems.

Note:Agoodnumberofnumericalexamplesareexpectedtobecoveredduringthe prescribed lectures.

References:

1. Halliday, Resnick and Walker, Fundamental of Physics (extended) – (6th Ed.), John Wiley and Sons.
2. H. C. Verma, Concepts of Physics – (Part–I), 2002 Ed. BharatiBhavan Publishers.
3. Iradov
4. Brijlal,Subramanyam and Avadhanulu A Textbook of Optics, 25th revised ed.(2012) S. Chand
5. Brijlal, Subramanyam and Hemne, Heat Thermodynamics and Statistical Physics, S Chand, Revised, Multi-coloured,2007 Ed.
6. Jenkins and White, Fundamentals of Optics by (4th Ed.), McGraw Hill International.

Additional References :

1. Thornton and Marion, Classical Dynamics – (5th Ed)
2. D S Mathur, Element of Properties of Matter, S Chand & Co.
3. R Murugeshan and K Shivprasath, Properties of Matter and Acoustics S Chand.
4. M W Zemansky and R H Dittman, Heat and Thermodynamics, McGraw Hill.
5. D K Chakrabarti, Theory and Experiments on Thermal Physics, (2006 Ed) Central books.
6. C L Arora, Optics, S Chand.
7. Hans and Puri, Mechanics –, 2nd Ed. Tata McGraw Hill

SEMESTER-I

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	I	Physics
CourseCode	Title	Credits	
USPH102	**Modern Physics**	2for USPH102	

Learning Outcomes:

After successful completion of this course students will be able to

1. Understand nuclear properties and nuclear behavior.
2. Understand the type isotopes and their applications.
3. Demonstrate and understand the quantum mechanical concepts.
4. Demonstrate quantitative problem solving skills in all the topics covered.

Unit I **15lectures**

1. Structure of Nuclei:Basic properties of nuclei, Composition, Charge, Size, Rutherford's expt. for estimation of nuclear size, density of nucleus, Mass defect and Binding energy, Packing fraction, BE/A vs A plot, stability of nuclei (N Vs Z plot) and problems.
2. Radioactivity: Radioactive disintegration concept of natural and artificial radioactivity, Properties of α, β, γ-rays, laws of radioactive decay, half-life, mean life (derivation not required), units of radioactivity, successive disintegration and equilibriums, radioisotopes. Numerical Problems.
3. Carbon dating and other applications of radioactive isotopes (Agricultural, Medical, Industrial, Archaeological -information from net).

Unit II **15 lectures**

Interaction between particles and matter, Ionization chamber, Proportional counter and GM counter, problems

Nuclear Reactions: Types of Reactions and Conservation Laws. Concept of Compound and Direct Reaction, Q value equation and solution of the Q equation, problems.

Fusion and fission definitions and qualitative discussion with examples.

Unit III **15 lectures**

1. Origin of Quantum theory, Black body (definition), Black Body spectrum, Wien's displacement law, Matter waves, wave particle duality, Heisenberg's uncertainty Principle. Davisson-Germer experiment, G. P. Thompson experiment.
2. X-Rays production and properties. Continuous and characteristic X-Ray spectra, X-Ray Diffraction, Bragg's Law, Applications of X-Rays.
3. Compton Effect, Pair production, Photons and Gravity, Gravitational Red Shift.

Note: Agoodnumberofnumericalexamplesareexpectedtobecoveredduringthe prescribed lectures

References:

1. Kaplan: Nuclear Physics, Irving Kaplan, 2nd Ed. Narosa Publishing House
2. SBP: Dr. S. B. Patel, Nuclear Physics Reprint 2009, New Age International
3.BSS: N Subrahmanyam, Brijlal and Seshan, Atomic and Nuclear Physics Revised Ed. Reprint 2012, S. Chand
4. Arthur Beiser, Perspectives ofModernPhysics : Tata McGraw Hill

Additional References:

1 S N Ghosal, Atomic Physics S Chand
2 S N Ghosal, Nuclear Physics 2nd ed. S Chand

SEMESTER-I

Name of the Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	I	Physics
CourseCode	Title	Credits	
USPHP1	**Practical I**	2	

Leaning Outcome:

On successful completion of this course students will be able to:

i) To demonstrate their practical skills.
ii) To understand and practice the skills while doing physics practical.
iii) To understand the use of apparatus and their use without fear.
iv) To correlate their physics theory concepts through practical.
v) Understand the concepts of errors and their estimation.

A. <u>Regularexperiments:</u>

1	J by Electrical Method: To determine mechanical equivalent of heat (Radiation correction by graph method)
2	Torsional Oscillation: To determine modulus of rigidity η of a material of wire by torsional oscillations
3	Bifilar Pendulum
4	Spectrometer: To determine of angle of Prism.
5	Y by vibrations: To determine Y Young's Modulus of a wire material by method of vibrations- Flat spiral Spring
6	To determine Coefficient of Viscosity (η) of a given liquid by Poisseuli's Method
7	Surface Tension/ Angle of contact
8	Combination of Lenses To determine equivalent focal length of a lens system by magnification method.
9	Spectrometer: To determine refractive index μ of the material of prism
10	To study Thermistor characteristic Resistance vs Temperature
11	Constant volume/constant pressure
12	Newton's Rings To determine radius of curvature of a given convex lens using Newton's rings.
13	Wedge Shaped Film

B. Skill Experiments:

1.	Use of Verniercalipers, Micrometer Screw Gauge, Travelling Microscope
2.	Graph Plotting : Experimental, Straight Line with intercept, Resonance Curve etc.
3.	Spectrometer: Schuster's Method
4.	Use of DMM
5	Absolute and relative errors calculation.

C) Any one out of following isequivalent to two experiments from section A and/ or B

1. Students should collect the information of at least five Physicists with their work. Report that in journal.
2. Students should carry out mini-project upto the satisfaction of professor In-charge of practical.
3. Study tour. Students participated in study tour must submit a study tour report.

Minimum 8experimentsfrom the listshouldbecompletedinthe first semester. Any four skill experimentsaretobereportedinjournalCertifiedjournalis a must tobeeligibletoappearforthesemesterendpractical.

Theschemeofexaminationfortherevisedcoursein Physicsat theFirstYearB.Sc.Semester endexaminationwillbeasfollows.

SemesterEnd Practical Examination:
Schemeof examination:

There will be no internal assessment for practical.
Acandidatewillbeallowedtoappearforthesemester end practical examinationonlyifthecandidatesubmits aCertified journalatthetimeofpracticalexaminationofthe semester oracertificatefrom theHeadoftheDepartment /Institute totheeffectthathecandidate hascompleted the practicalcourseofthatsemesterofF.Y.B.Sc.Physicsasperthe minimumrequirement. The duration of the practical examination will be two hours per experiment. There will be two experiments through which the candidate will be examined in practical. The questions on slips for the same should be framed in such a way that candidate will be able to complete the task and should be evaluated for its skill and understanding of physics.

SEMESTER II

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	II	Physics
CourseCode	Title	Credits	
USPH201	**Mathematical Physics**	2for USPH201	

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basic mathematical concepts and applications of them in physical situations.
2. Demonstrate quantitative problem solving skills in all the topics covered.

Unit I **15 lectures**

1. Vector Algebra :

Vectors, Scalars, Vector algebra, Laws of Vector algebra, Unit vector, Rectangular unit vectors, Components of a vector, Scalar fields, Vector fields, Problems based on Vector algebra.

Dot or Scalar product, Cross or Vector product, Commutative and Distributive Laws, Scalar Triple product, Vector Triple product (Omit proofs). Problems and applications based on Dot, Cross and Triple products.

2. Gradient, divergence and curl:

The ∇ operator, Definitions and physical significance of Gradient, Divergence and Curl; Distributive Laws for Gradient, Divergence and Curl (Omit proofs); Problems based on Gradient, Divergence and Curl.

Unit: II **15lectures**

1. Differential equations**:**

Introduction, Ordinary differential equations, First order homogeneous and non- homogeneous equations with variable coefficients, Exact differentials, General first order Linear Differential Equation, Second-order homogeneous equations with constant coefficients. Problems depicting physical situations like LC and LR circuits, Simple Harmonic motion (spring mass system).

2. Transient response of circuits: Series LR, CR, LCR circuits. Growth and decay of currents/charge.

Unit:III **15lectures**

1. Superposition of Collinear Harmonic oscillations: Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats).

2. Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal an unequal frequency and their uses
3. Wave Motion: Transverse waves on string, Travelling and standing waves on a string. Normal modes of a string, Group velocity, Phase velocity, Plane waves, Spherical waves, Wave intensity.

Note: Agoodnumberofnumericalexamplesareexpectedtobecoveredduringthe prescribed lectures

References:

1.MS:Murray R Spiegel, Schaum's outline of Theory and problems of Vector Analysis, Asian Student Edition

2. CH**:** Charlie Harper, Introduction to Mathematical Physics , 2009 (EEE) PHI Learning Pvt. Ltd.

3. CR: D. Chattopadhyay, P C Rakshit , Electricity and Magnetism 7th Ed. New Central Book agency.

4. Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.

5. The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.

6. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.

Additional References:

1. BrijLal**,N.** Subrahmanyam **,** JivanSeshan, Mechanics and Electrodynamics, , (S. Chand) (Revised & Enlarged ED. 2005)
2. A K Ghatak, Chua, Mathematical Physics, 1995, Macmillan India Ltd.
3. Ken Riley**, Michael** Hobson **and Stephen** Bence, Mathematical Methods for Physics and Engineering, Cambridge (Indian edition).
4. H. K. Dass, Mathematical Physics, S. Chand & Co.
5. Jon Mathews & R. L. Walker, Mathematical Methods of Physics: W A Benjamin Inc.

SEMESTER II

Nameofthe Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	II	Physics
CourseCode	Title	Credits	
USPH202	**Electricity and Electronics**	2for USPH202	

Unit I : 15 lectures

1. Alternating current theory:(Concept of L, R, and C: Review)

AC circuit containing pure R, pure L and pure C, representation of sinusoids by complex numbers, Series L-R, C-R and LCR circuits. Resonance in LCR circuit (both series and parallel), Power in ac circuit. Q-factor.

2. AC bridges: AC-bridges: General AC bridge, Maxwell,de-Sauty, Wien Bridge , Hay Bridge.

Unit II: Electronics 15 lectures

1.Circuit theorems: (Review: ohm's law, Kirchhoff's laws)
Superposition Theorem, Thevenin's Theorem, Ideal Current Sources, Norton's Theorem, Reciprocity Theorem, Maximum Power Transfer Theorem.
Numericals related to circuit analysis using the above theorems.
2.DC power supply:Half wave rectifier , Full wave rectifier, Bridge rectifier, PIV and Ripple factor of full wave rectifier, Clipper and Clampers(Basic circuits only), Capacitor Filter.
Zener diode as voltage stabilizer.
3.Digital electronics : Logic gates(Review), NAND and NOR as universal building blocks. EXOR gate: logic expression, logic symbol, truth table, Implementation using basic gates and its applications, Boolean algebra, Boolean theorems. De-Morgan theorems, Half adder and Full adder

Unit III : Electrostatics and Magnetostatics 15 lectures

1.The Electric Field : Introduction, Coulomb's Law, The Electric Field, Continuous charge Distribution, Electric Potential, Introduction to Potential, Comments on Potential,
The Potential of a Localized Charge Distribution
2.Work and Energy in Electrostatics**:** The Work Done to Move a charge, The Energy of a Point Charge Distribution
3.Magnetostatics**:** Magnetic Fields
4.TheBiotSavart Law**:** Steady Currents,The Magnetic Field of a Steady Current

Helmholtz coil and solenoid.

Note: Agoodnumberofnumericalexamplesareexpectedtobecoveredduringthe prescribed lectures

References :

CR: D. Chattopadhyay, P C Rakshit , Electricity and Magnetism 7th Ed. New Central Book agency.

TT :B.L. Theraja and A.K. Theraja , A Textbook of Electrical Technology Vol. I , S. Chand Publication

BN :Boylestad and Nashelsky, Electronic devices and Circuit Theory: 7th edition, Prentice Hall of India.

VKM: V K Mehta and R Mehta Electronics Principals, MulticolouredRevised 11th Ed. reprint in 2012 ,S Chand.

David J. Griffiths : Introduction to Electrodynamics, Prentice Hall India (EEE) 3rd Ed.

A B Bhattacharya, Electronics Principlesand Applications, Central publisher.

A P Malvino, Digital Principles and Applications: Tata McGraw Hill

Tokhiem, Digital electronics, 4thed, McGraw Hill International Edition.

SEMESTER II

Name of the Programme	Duration	Semester	Subject
B.Sc.inPhysics	Sixsemesters	II	Physics
CourseCode	Title	Credits	
USPHP2	**Practical II**	2	

Leaning Outcome:

i) To understand and practice the skills while doing physics practical.
ii) To understand the use of apparatus and their use without fear.
iii) To correlate their physics theory concepts through practical.
iv) Understand the concepts of errors and their estimation.

A) Regular experiments:

1	Flywheel
2	To study Zener Diode as Regulator
3	To study load regulation of a Bridge Rectifier
4	LR Circuit: To determine the value of given inductance and phase angle
5	CR Circuit: To determine value of given capacitor and Phase angle
6	Frequency of AC Mains: To determine frequency of AC mains.
7	LCR series Resonance: To determine resonance frequency of LCR series circuit.
8	To study NAND and NOR gates as Universal Building Blocks
9	To study EX-OR Gate, half adder and full adder and verify their truth tables.
10	To verify De Morgan's Theorems
11	Thevenin's Theorem: To verify Thevenin's theorem for DC circuits
12	Norton's Theorem: To verify Norton's Theorem for DC circuits
13	LDR Characteristics: To study the dependence of LDR resistance on intensity of light.

B) List of Demo-experiments: (Min. four)

1.	Angular Momentum conservation (Rotating Platform)
2.	Light dependent switch
3.	Laser beam divergence, Intensity
4.	Use of Oscilloscope
5	Charging and discharging of a capacitor

6	Use of PC for graph plotting
7	Clipper and Clamper circuits.

C) Any one out of following isequivalentto two experiments from section A and/ or B

1. Students should collect the information of at least fourPhysics events and their outcome. Report that in journal.
2. Students should carry out mini-project up to the satisfaction of professor In-charge of practical
3. Study tour. Students participated in study tour must submit a study tour report.

Minimum 8experimentsfrom the listshouldbecompletedinthe first semester. Any four skill experimentsaretobereportedinjournalCertifiedjournalis musttobeeligibletoappearforthe semester endpractical.

Theschemeofexaminationfortherevisedcoursein Physicsat theFirstYearB.Sc.Semester endexaminationwillbeasfollows.

SemesterEnd Practical Examination:
Schemeof examination:

There will be no internal assessment for practical

A candidate will be allowed to appear for the semester end practical examination only if the candidate submits a Certified journal at the time of practical examination of the semester or a certificate from the Head of the Department /Institute to the effect that the candidate has completed the practical course of that semester of F.Y.B.Sc. Physics as per the minimum requirement. The duration of the practical examination will be two hours per experiment. There will be two experiments through which the candidate will be examined in practical. The questions on slips for the same should be framed in such a way that candidate will be able to complete the task and should be evaluated for its skill and understanding of physics

AC 27/2/13
Item No. 4.12

UNIVERSITY OF MUMBAI

Syllabus for sem V & VI
Program: B.Sc.
Course: Horticulture
Applied Component

(Credit Based Semester and Grading System with effect from the academic year 2013–2014)

T.Y.B.Sc. Applied Component Horticulture Syllabus
Credit Based and Grading System
To be implemented from the Academic year 2013-2014

SEMESTER V

Course Code	UNIT	TOPICS	Credits	L / Week
USACHO501	HORTICULTURE & GARDENING -I		2	4
	I	INTRODUCTION TO HORTICULTURE	2	1
	II	PROPAGATION PRACTICES		1
	III	MANURES, FERTILIZERS AND DISEASES		1
	IV	GARDEN OPERATIONS FOR HORTICULTURE		1
USACHO5P1	Practicals based on all courses in theory		2	4

SEMESTER VI

Course Code	UNIT	TOPICS	Credits	L / Week
USACHO601	HORTICULTURE & GARDENING - II		2	4
	I	LANDSCAPE GARDENING	2	1
	II	HORTICULTURE PRODUCE		1
	III	COMMERCIAL PRODUCTION		1
	IV	POST HARVEST TECHNOLOGY & ENTREPRENEURSHIP IN HORTICULTURE		1
USBO6P1	Practicals based on all the courses in theory		2	4

SEMESTER V
THEORY

Course Code	Title	Credits
USACHO501	**HORTICULTURE AND GARDENING –I**	**2 Credits (60 lectures)**
Unit 1 INTRODUCTION TO HORTICULTURE • Definition, importance and objectives of Horticulture, branches of Horticulture, Pomology, Olericulture, Landscape Gardening, Nurseries and development • .Allied branches – Apiculture – Bee box, honey bee life cycle and role of apiculture in pollination, Sericulture – Silkworm life cycle, different types with host plant, Social Forestry, Exhibition: aims and objectives. • Important Horticulture Research Institutes and Government Schemes for strategy plantations o Konkan Krishi Vidyapeeth – Dapoli o National Research Centre for grapes. o Regional Fruit Research centre Pune o Horticulture Training Centre (H.T.C.) – Talegaon. o Central Potato Tuber Research Institute (CPTRI) – Shimla • Horticulture Consultancy • Strategy plantation – Lakhibaug Yojana		**15 L**
Unit 2 PROPAGATION PRACTICES • **By Seeds** Advantages and disadvantages, method of seed propagation Production of seeds, Handling, Collection and Storage Sowing, Transplanting of seedlings and Hardening Seed treatment to control diseases Seedling diseases and their control. • **By specialized Vegetative structures** Bulbs, Tubers, Corms, Rhizomes, Root stock, runners, Offsets and suckers. • **Artificial methods of plant propagation** o Cutting– Root cutting, Stem cuttings, and leaf cuttings. Use of PGR's for rooting. o Layering – Definition, Types: Simple, compound, (Serpentine) Tip, Trench, Mound, Air Layering. o Grafting-Definition, advantages and disadvantages. Types: Splice, Whip/ Tongue, side, veneer, cleft, bark, epicotyls, approach, repair grafting – enarching, bridge and bracing. o Budding – Definition, advantages and disadvantages. Types: T-budding, shield, patch , ring budding. o Developing new varieties: Technique of Emasculation and bagging, role of polyploidy n production of seedless varieties in		**15 L**

plants. • **Application of Tissue Culture in relation to Horticulture.**	
UNIT-3 MAURES, FERTILIZERS AND DISEASES • **Manures**: Definition, importance, important manures FYM(compost), oil cakes, green manure, organic manures and vermicompost. • **Fertilizers**: Definition, Types – Straight, Compound and mixed. Nitrogenous (NH4)2 SO4, Urea, Ca (NO3)2, NH4Cl, Phosphatic (Superphosphate, Bone meal), Potassic (Muriate of potash, K2SO4 • **Biofertilizers**: Bacteria, Cyanobacteria, Mycorrhiza, Sea weeds. • **Diseases:** Horticultural plant diseases and their control. Fungal diseases- Rust, Smut, Powdery mildew.Bacterial – Citrus canker, Bacterial wilt. Viral – TMV, Leaf curl. • **Pests** – common pests on horticultural crops – Aphids, beetle, stem borer, caterpillars and rats. • **Friends of farmers:** Eartworm, snakes and predaceous fungi.	**15 L**
UNIT 4 GARDEN OPERATIONS FOR HORTICULTURE • Selection of site, Preparation of soils for garden • Mulching, top- dressing, blanching • Sowing, transplanting, tree transplanting, • Irrigation, - Overhead, Surface, Underground • Weeding and pruning, - Principles, Objectives and general technique. • Water management and conservation through horticulture, Dry land Horticulture. • **Organic Farming** Definition, Scope, Indian scenario, Future scope	**15 L**

Practicals

	Semester V USACHO5P1	**Cr**
	PRACTICAL	**2**
	Garden implements and their uses .	
	Different types of pots & Potting medium , Potting and repotting	
	Propagation practices by seed, Vegetative propagation , cutting ,layering , budding, grafting .	
	Identification of :	

	Fertilizers – Identification by physical and chemical methods –Urea , Ammonium sulphate , Potassium sulphate, super phosphate . Manures – Identification of plants as green manure – *Glyricidia , Crotolaria, Leucaena* . Biofertilizers – Identification (material as slides) VAM, *Nostoc ,Rhizobium* .	
	Soil pH, Use of soil testing Kit, electrical conductivity, pH of water, liquid fertilizers .	
	Method of preparing bonsai, Bottle Garden / Terrarium, Hanging baskets ,Dish garden .	
	Diseases and pests Fungal – Powdery mildew ,Rust ,Wilt, Blight, Smut, Bacterial – Canker ,Wilt Viral – Leaf curl ,yellow vein Mosaic Insects – Sucking, Biting, Chewing, Borers & Ants . Non Insects pests- Nematodes, Rodents.	
	Preparation of natural insecticides – Neem arka , Dashparni arka, Seetaphal powder, Tobacco extracts .	
	Project – Each student should individually present a project related to any topic related to Horticulture .It should be duly certified presented at practical examination.Project presentation college at level compulsory.	

SEMESTER VI
THEORY

Course Code	Title	Credits
USACHO601	**HORTICULTURE AND GARDENING –II**	**2 Credits (60 lectures)**
Unit 1 LANDSCAPE GARDENING • Principles of landscaping & garden design. • Indoor plants & Indoor gardens- Hydroponics, Terrarium/ Bottle garden,		**15 L**

Dish garden. • Important garden features- Paths & Avenues, Hedges & Edges, Lawn, Flowerbeds, Arches& Pergolas, Fencing, Water bodies, Rock garden & Plants suitable for different locations & climates. • Lawn- Purpose of preparation of lawn, Method of preparation of lawn & management of lawn & lawn plants. • Soil manipulation for plantation of desirable varieties. • Mughal, Buddist, Botanical garden, Vertical wall garden & Theme park • Important Gardens of India—Shalimar (Shrinagar), Vrindavan(Mysore), Veer Jijamata Udyan(Mumbai)	
Unit 2 - HORTICULTURE PRODUCE • **High –tech Horticultural production-** Green house technology- Meaning, types, layout & construction, irrigation systems. Care & attention. Hardening of plants. Space gardens. • **Floriculture** – Scope & importance, soil and climatic requirement and cultivation practices and Economics of green house production of Gerbera, Carnation, Roses, Orchids. Propagation techniques, packing and marketing, enhancing and delaying period of bloom by special methods. Floral decoration, Florist shop management.	**15 L**
UNIT-3 COMMERCIAL PRODUCTION • **Commercial production of the following** – in relation to propagation, post plantation care, harvesting, post harvest management & varieties. o Tubers- potato o Vegetables- Tomato o Fruits- Mango, Grapes & Coconut- products like coco peat/ Coir etc. o Spices/condiments- chilly o Medicinal plants- *Aloe vera, Stevia rebaurdina*(Madura) o Aromatic plant- *Citronella*, Patchouli	**15 L**
UNIT 4 POST HARVEST TECHNOLOGY & ENTREPRENEURSHIP IN HORTICULTURE • **Maturity**- Factors responsible for maturity & ripening methods used for delaying ripening. • **Harvest**- Time of harvest, harvesting and handling of harvested products • **Storage of fresh produce**- Types of storage of fruits & vegetables	**15 L**

• **Fruit & vegetables preservation technology**. • **Marketing**- grading, packing & transportation. Ways of increasing the market value and shelf life of horticultural produce. • **Horticultural business, management and Entrepreneurship development** Horticulture as a business definition and nature, organization, planning and operation of Horticulture farm business.	

Practicals

	Semester VI USACHO6P1	Cr
	PRACTICAL	**2**
	Preparation of garden layout	
	List of plants suitable for garden locations- 2-3 plants for each location .	
	Identification of important horticultural plants 1. Herbs – foliage any 2 and flowering any 2 2. Shrubs – foliage any 2 flowering any 2 3. Trees – foliage any 2 and flowering any 2 4. Climbers – any 2 5. Lianas – any 2 6. Epiphytes – any 2 7. Creepers –any 2 8. Trailers – any 2 9. Aquatic plants – any 3 (preferably various habitat) 10. Succulents – any 2 11. Weeds –any 10	
	Flower arrangements –Indian (Gajara , veni, garland , bouquet - Baskets , hand ,torch type , table floral arrangement), Japanese and western all type	
	Preparation of Jams, Jellies, Squashes/ Syrups, Pickle, sauces	
	Fruit & vegetable carving & Bio-jewelery	
	Green house plants- Information regarding to soil, temperature, irrigation, fertilizer requirements and propagation methods for *Anthurium, Gerbera,* Orchids, Tuberose, Carnation, Roses, *Capsicum*	

	Preparation of garden layout	
	List of plants suitable for garden locations- 2-3 plants for each location .	

Visits : To Garden /Parks / Nurseries/ Exhibition / Horticulture industries / Research Station and record of visits should be duly certified and presented at practical examination.

Modality of Assessment :

Theory Examination Pattern:

A) Internal Assessment - 40% **40 marks.**

Theory **40 marks**

Sr No	Evaluation type	Marks
1	One Assignments/Case study/Project	10
2	One class Test (multiple choice questions / objective)	20
3	Active participation in routine class instructional deliveries(case studies/ seminars//presentation)	05
4	Overall conduct as a responsible student, manners, skill in articulation, leadership qualities demonstrated through organizing co-curricular activities, etc.	05

B) External examination - 60 %

Semester End Theory Assessment - 60% **60 marks**

i. Duration - These examinations shall be of two hours duration.

ii. Theory question paper pattern :-

1. There shall be **five** questions each of **12** marks. On each unit there will be one question & fifth one will be based on all the four units .
2. All questions shall be compulsory with internal choice within the questions. Each question will be of **24** marks with options.
3. Questions may be sub divided into sub questions a, b, c & d only, each carrying **six** marks **OR** a, b, c, d,e & f only each carrying **four** marks and the allocation of marks depends on the weightage of the topic.

Practical Examination Pattern:

(A)Internal Examination:-

There will not be any internal examination/ evaluation for practicals.

(B) External (Semester end practical examination) :-

Sr.No.	Particulars	Marks
1.	Laboratory work	80
2.	Journal	10
3.	Viva	10

Assessment pattern for semester end / External practical examination of 80 marks shall be finalized in the workshop of the subject

Semester end practical examination in applied component shall be conducted by the concerned department of the Institute/ College at the end of each semester and the marks of the candidates are to be sent to the University in the prescribed format.

Semester V:

Practical examination will be held at the college / institution at the end of the semester.

The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from Head of the Department/ Co-ordinator of the department ; failing which the student will not be allowed to appear for the practical examination.

Semester VI

Practical examination will be held at the college / institution at the end of the semester. The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from Head of the Department/ Co-ordinator of the department ; failing which the student will not be allowed to appear for the practical examination.

UNIVERSITY OF MUMBAI
No. UG/59 of 2018-19

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office circular No. UG/354 of 2008, dated 2nd August, 2008 relating to syllabus of Bachelor of Arts.

They are hereby informed that the recommendations made by the Board of Studies in English at its meeting held on 25th May, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.4 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.A. in English – Sem V & VI has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
6th ~~June~~ July, 2018

(Dr. Dinesh Kamble)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.4/14/06/2018

****

No. UG/ 59 -A of 2018

MUMBAI-400 032

6th ~~June~~ July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in English,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
6) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

SYLLABUS

T.Y.B.A. - English

Semester V & VI

Revised Syllabus as per CBCS pattern

(w.e.f. Academic Year - 2018-19)

T.Y.B.A. – English - Semester V & VI

Revised Syllabus as per CBCS pattern

(w.e.f. Academic Year 2018-19)

Paper No.	Name of the Course	Semester	Paper Code	Name of the Paper
Paper IV	16th to 18th Century English Literature	Sem - V	UAENG501	16th to 18th Century English Literature - I
		Sem - VI	UAENG601	16th to 18th Century English Literature - II
Paper V	Literary Criticism	Sem - V	UAENG502	Literary Criticism - I
		Sem - VI	UAENG602	Literary Criticism - II
Paper VI-A	Grammar and Art of writing	Sem - V	UAENG503A	Grammar and Art of writing - I
		Sem - VI	UAENG603A	Grammar and Art of writing – II
Paper VI-B	Translation Studies: Theory and Practice	Sem - V	UAENG503B	Translation Studies: Theory and Practice - I
		Sem - VI	UAENG603B	Translation Studies: Theory and Practice - II
Paper VI-C	Popular Culture	Sem - V	UAENG503C	Popular Culture - I
		Sem - VI	UAENG603C	Popular Culture - II
Paper VII	19th Century English Literature	Sem - V	UAENG504	19th Century English Literature - I
		Sem - VI	UAENG604	19th Century English Literature - II
Paper VIII	20th Century British Literature	Sem - V	UAENG505	20th Century British Literature – I
		Sem - VI	UAENG605	20th Century British Literature – II
Paper IX-A	Literature and Gender	Sem - V	UAENG506A	Literature and Gender - I
		Sem - VI	UAENG606A	Literature and Gender - II
Paper IX-B	Drama and Theatre	Sem - V	UAENG506B	Drama and Theatre - I
		Sem - VI	UAENG606B	Drama and Theatre - II
Paper IX-C	Film and Literature	Sem - V	UAENG506C	Film and Literature - I
		Sem - VI	UAENG606C	Film and Literature - II
Paper IX-D	Literature of Protest	Sem - V	UAENG506D	Literature of Protest - I
		Sem - VI	UAENG606D	Literature of Protest - II

University of Mumbai

Syllabus for T.Y.B.A. English Paper IV

Semester: V & VI

Course: Core Paper

Course Title: 16th to 18th Century English Literature

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG501 & UAENG601
	iii)	Course Title :	16th to 18th Century English Literature
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	20
	viii)	No. of lectures per week :	04
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	5 Questions of 20 marks each.
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA Paper IV

Course: 16th to 18th Century English Literature

Course Codes: UAENG501& UAENG601

Objectives of the Course:

1) To introduce students to English Literature of the 16th, 17th and 18thcenturies.
2) To show them how background influences shaped the writer's thinking.
3) To present them to the literary masters who dominated the scene
4) To familiarize students with different writing styles that each age adopted.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) To understand the distinctive features of English literature of the 16th, 17th and 18th centuries
2) To comprehend how background influences shaped the writer's thinking.
3) To recognize and appreciate the literary masters who dominated the scene.
4) To grasp the different writing styles that each age adopted.

Semester V: 16th to 18th Century English Literature –I		
Course code- UAENG501	**04Credits**	**Total Lectures: 60**

Unit 1: Important Concepts & Terms: **20 Lectures**

A. <u>The Elizabethan Age (1550-1603)</u>
   i) Renaissance, Humanism and Reformation.
   ii) Elizabethan Poetry – Sonnets, Epic and Pastoral
   iii) Elizabethan Drama
   iv) University Wits.

B. <u>The Jacobean Period (1603-1650)</u>
   i) Characteristics of the Jacobean Period
   (Major influences and its impact on literature)
   ii) Metaphysical Poetry
   iii) Jacobean Drama- (Revenge Tragedy and Comedy)

Unit 2: William Shakespeare: Hamlet **20 Lectures**

OR

William Shakespeare: Comedy of Errors

Unit 3: Selected Verse from the Elizabethan and Jacobean periods.**20 Lectures**

Elizabethan Period:

a. Sir Philip Sidney from Astrophel and Stella sonnet sequence.
   Sonnet 37 "My mouth doth water and my breast doth swell".
   39 "Come Sleep! O Sleep, the certain knot of peace".

b. Edmund Spenser: from The Shepheardes Calender
   "April Eclogue".
   "November Eclogue".

c. William Shakespeare:
   Sonnet 116 "Let me not to the marriage of true minds"
   Sonnet 138 "When my love swears that she is made of truth"

Jacobean Period:

a. John Donne:"A Valediction Forbidding Mourning".
   Holy Sonnet 10 –"Death Be Not Proud".
b. George Herbert: "The Pulley".
   "Love".
c. Andrew Marvell:"The Coronet".
   "On a Drop of Dew".

Semester VI: 16th to 18th Century English Literature –II
Course code- UAENG601 **04Credits** **Total Lectures: 60**

Unit 1: Background and Important Concepts: **20 Lectures**

A. The Restoration Period (1660-1700)
   i) Characteristics of Restoration Period
      (Major events of the age and their impact on literature)
   ii) Restoration Poetry- (Epic, Mock epic, Satire)
   iii) Restoration Drama- Comedy of Manners, Heroic Tragedy
   iv) Diary Writing

B. Neo-Classical Period (1700-1798)
   i) Neo-Classical/Augustan
   ii) Age of Satire
   iii) Rise of the Periodical Essay and the Novel

Unit 2: John Dryden: All for Love **20 Lectures**
OR
Oliver Goldsmith: She Stoops to Conquer

Unit 3: Selected Verse from the Puritan Era, the Restoration Period and the 18th Century **20 Lectures**

Restoration Period:

a. John Milton: from Paradise Lost Book I

(105-124) 105- And shook his throne. What though the field he lost?
124- Sole reigning holds the tyranny of Heaven.

(242-270) 242- Is this the region, this the soil, the clime
270- Regained in Heaven, or what more lost in Hell?

(315-356) 315- Of Hell resounded: 'Princes, Potentates.
356- Forthwith, from every squadron and each band.

b. Alexander Pope: The Rape of the Lock- Canto II Lines 1-54
(1) Not with more Glories, in th' Etherial Plain,
(54) Th' impending Woe sate heavy on his Breast

c. John Dryden: "The Fire of London"

Semester End Examination Pattern: 100 Marks 03 Hours

The Semester End Examination for 100 marks will have 5 questions (with internal choice) of 20 marks each.
Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (two out of four) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)- Unit 2
Q.5 Short Notes (2 out of 4)- Unit 3

References:

1. Alpers, Paul E. Elizabethan Poetry: Modern Essays in Criticism (OUP: 1967)
2. Daiches, David. A Critical History of English Literature (Secker and Warburg: London, 1960)
3. Ford, Boris Ed. **The New Pelican Guide to English Literature:**
   The Age of Shakespeare Vol. 2 (Penguin, 1993)
   From Donne to Marvell Vol. 3 (Penguin, 1990)
4. Keast, William B. Seventeenth Century English Poetry: Modern Essays in Criticism (OUP: 1971)
5. King, Bruce. Seventeenth Century English Literature(*M*acmillan:1983).
6. Leggatt, Alexander. English Drama: Shakespeare to The Restoration 1590-1660 (Longman: Literature in English Series, 1988)
7. Perfitt, George. English Poetry of the Seventeenth Century (Longman: Literature in English Series,1992)
8. Parry, Graham.The Seventeenth Century: The Intellectual and Cultural Context of English Literature. 1603-1700 (Longman: Literature in English Series, 1989)
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10. Ricks, Christopher. The Penguin History of English Literature Vol.3. (Penguin, 1993)
11. Roston, Murray. Sixteenth Century English Literature (Macmillan, 1983)
12. Baugh, Albert C. A Literary History Of England, The Restoration and

Eighteenth Century (1660-1789), 2nd Edition, (London, Routledge and Kegan Paul, 1967)

13. Clifford, James L. Ed. Eighteenth Century English Literature: Modern Essays in Criticism(OUP, 1959)
14. Craig, Hardin. Ed. **A History of English Literature Series.** Literature of the Restoration and the Eighteenth Century 1660-1798.Vol III (London, Macmillan, 1969)
15. Ford, Boris. Ed. **The Pelican Guide To English Literature:** From Dryden to Johnson, Vol.4, (Penguin, 1982) & From Blake to Byron, Vol.5, (Penguin, 1982)
16. Jack, Ian. Augustan Satire: Intention and Idiom in English Poetry 1660-1750 (OUP, 1978)
17. Roger. The Penguin History of English Literature: Dryden to Johnson. Vol.4, (Penguin, 1993)
18. Probyn, Clive T.English Fiction of The Eighteenth Century 1700-1789 (Longman Literature in English Series, 1987)
19. Novak, Maximillian E. Eighteenth Century English Literature, (Macmillan, 1983)
20. Sambrook, James.The Eighteenth Century: The Intellectual and Cultural Context of English Literature 1700-1789. (Longman Literature in English Series, 1986)
21. Sutherland, James. A Preface to Eighteenth Century Poetry, (OUP, 1975).

Syllabus Prepared by:

Dr. Marie Fernandes,	St. Andrew's College	:	Convener
Dr. Sr. Ananda Amritmahal,	Sophia College	:	Member
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UNIVERSITY OF MUMBAI

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Core Paper

Course Title: Literary Criticism

Course Codes: UAENG502 & UAENG602

(Choice Based Credit System with effect from the academic year 2018-19)

1.		Syllabus as per **Choice Based Credit System**	
	i)	Name of the Programme	T. Y. B. A. English
	ii)	Course Code	UAENG502&UAENG602
	iii)	Course Title	Literary Criticism
	iv)	Semester-wise Course Contents	Enclosed the copy of syllabus
	v)	References and Additional References	Enclosed in the Syllabus
	vi)	Credit Structure No. of Credits per Semester	 04
	vii)	No. of lectures per Unit	15
	viii)	No. of lectures per week	04
	ix)	No. of Tutorials per week	--
2.		Scheme of Examination	5 Questions of 20 marks each
3.		Special notes, if any	No
4.		Eligibility, if any	No
5.		Fee Structure	As per University Structure
6.		Special Ordinances / Resolutions, if any	No

Syllabus for TYBA

Course: Literary Criticism

Course Code: UAENG502 & UAENG602

Objectives of the Course:

1) To introduce the learners to important critical terms

2) To make them aware of the nature and function of literature and criticism

3) To impart the technique of close reading of literary texts

4) To enable them to understand various literary theories and critical approaches

5) To familiarize the learners with the tenets of practical criticism

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) use some important critical terms

2) become aware the nature and function of literature and criticism

3) impart the technique of close reading of literary texts

4) understand the various literary theories and critical approaches

5) be familiar with the tenets of practical criticism

Semester V Paper V: Literary Criticism - I
Course Code: UAENG502 04 Credits Total Lectures: 60

UNIT I: Critical Terms (15 lectures)

(i) Simile, (ii) Imagery, (iii) Symbol, (iv) Paradox, (v) Ambiguity, (vi) Myth

UNIT II: Nature and Function of Literature (15 lectures)

i. Literature as Imitation (Plato-Aristotle debate)
ii. Literature and Imagination (the Romantic Idea of the Imagination)
iii. Literature as an expression of the writer's personality
iv. Function of Literature (aesthetic, moral and cognitive functions)

UNIT III: Nature and function of Literary Criticism (15 lectures)

i. Nature of Literary Criticism
ii. Functions of Literary Criticism (Explication, Analysis, Interpretation, Evaluation, Theorizing)
iii. A survey of the Role of a Critic

UNIT IV: Practical Criticism: Scansion (15 lectures)

Two short passages of poetry (6 to 10 lines each) will be set for scansion. Students should scan the poem, identify the base metre (iamb, trochee), variations (pyrrhic, spondee, anapaest, dactyl, cretic, amphibrach, etc.), rhyme scheme, stanza forms if any, and the metrical peculiarities such as end-stopped lines, run-on lines, elision, caesura and other basic concepts of versification.

(5 marks for scanning and identifying the base metre, 4 marks for identifying modulations and other metrical peculiarities and 1mark for rhyme scheme)

Semester End Examination Pattern 100 Marks 03 Hours

Semester End Examination for 100 marks will have 5 questions (with internal choice) of 20 marks each

Q.1 Short Notes (2 out of 4) – Unit I
Q.2 Essay type Question (1 out of 2) – Unit II
Q.3 Essay type Question (1 out of 2) – Unit III
Q.4 Short Notes: (2 out of 4) – Unit II and III
Q.5 Scansion of two extracts from poetry of about 6-10 lines each

Semester VI Paper V: Literary Criticism - II
Course Code: UAENG602 04 Credits Total Lectures: 60

UNIT I: Literary Movements (15 lectures)

i. Classicism, ii. Romanticism, iii. Realism, iv. Naturalism, v. Symbolism, vi. Aestheticism

UNIT II: Critical Approaches: (15 lectures)

i. New Criticism
ii. Structuralism
iii. Psychoanalytic Criticism
iv. Archetypal Criticism

UNIT III: Critical Approaches (15 lectures)

i. Marxist Criticism
ii. Feminist Criticism
iii. Postcolonial Criticism
iv. Eco Criticism

UNIT IV: Practical Criticism (15 lectures)

Critical Appreciation of an unseen poem: A short poem of about 20 lines will be set for appreciation. The title of the poem will be given. The unit will test the students' responsiveness to the poem and their linguistic ability in analysing the poem. Students are expected to mobilize the techniques of close reading and their understanding of literary devices like imagery, metaphor and other poetic devices while learning this unit.

Semester End Examination Pattern 100 Marks 3 Hours

Semester End Examination for 100 marks will have 5 questions (with internal choice) of 20 marks each
Q.1 Short Notes (2 out of 4) – Unit I
Q.2 Essay type Question (1 out of 2) – Unit II
Q.3 Essay type Question (1 out of 2) – Unit III
Q.4 Essay type Question (2 out of 4) – Unit II & III
Q.5 Critical Appreciation of an unseen poem

References:

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Abrams, M. H. *The Mirror and the Lamp: Romantic Theory and Critical Tradition*. Oxford: OUP, 1971

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3rd ed. Lexington: University of Kentucky Press, 1993.

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Dr. Pratima Das,	C.H.M. College, Ulhasnagar	:	Member
Ms. Saradha Balasubramanian,	K. C. College, Churchgate:		Member
Ms. Shanti Polamuri,	Maharashtra College, Byculla	:	Member

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester V & VI

Course: Elective Paper

Course Title: Grammar and the Art of Writing

(Choice Based Credit System with effect from the Academic Year 2018-19)

1. Syllabus as per Credit Based Semester and Grading System:

i)	Name of the Programme	:	T.Y.B.A. English
ii)	Course Code	:	UAENG503A & UAENG603A
iii)	Course Title	:	TYBA English Paper VI -- Grammar and the Art of Writing
iv)	Semester wise Course Contents	:	Enclosed the copy of syllabus
v)	References and Additional References:		Enclosed in the Syllabus
vi)	Credit Structure	:	
No. of Credits per Semester		:	03
vii)	No. of lectures per Unit	:	15
viii)	No. of lectures per week	:	03
2.	Scheme of Examination	:	4 Questions of 20 marks each and a project of 20 marks
3.	Special notes, if any	:	No
4.	Eligibility, if any	:	No
5.	Fee Structure	:	As per University Structure
6.	Special Ordinances / Resolutions if any:		No

Syllabus for TYBA
Course: GRAMMAR AND THE ART OF WRITING
Course Codes: UAENG503A & UAENG603A

Objectives:

1. To develop amongst learners an insight into the process of word formation and transformation
2. To develop amongst them an insight into the sounds, stress patterns and intonations in the English language to improve their speaking skills
3. To develop among them an insight into the structure of the English language and to provide knowledge of the rules of grammar
4. To help them learn grammatical analysis and description and the skills of sentence transformation
5. To introduce the mechanics of writing for effective writing for various domains

Outcome of the Course:

After the completion of the course, students are expected to be able to:

1. Gain a basic understanding of phonetics, morphology and word transformation
2. Have improved speaking skills
3. Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation
4. Write effectively in various domains.

SEMESTER- V: Paper VI – Grammar and the Art of Writing – I		
Course Code: UAENG503a	**3 Credits**	**Total Lectures: 45**

Phonetics, Morphology, Grammar and the Art of Writing

Unit I: Phonetics and Morphology **15 lectures**

A. Phonetics

- Phoneme and its distinctive features
- English Vowels and Consonants (Difference between BRP and Indian English)
- Diphthongs
- Consonant Clusters
- Transcription using phonetic script

B. Morphology

- Morph, Allomorph and Vowel Mutation
- Free and Bound Morphemes
- Root and stem
- Inflection and Derivation
- Morphological Analysis

Unit 2: Grammar: Words and Phrases **15 lectures**

- Open word classes: nouns, adjectives, verbs, adverbs
- Closed word classes: pronouns, determiners, operator verbs, prepositions, conjunctions, enumerators, interjections
- Noun Phrase, Genitive Phrase, Prepositional Phrase, Adjective Phrase and Adverb Phrase
- Verb Phrase

Unit 3: Art of Writing **15 lectures**

I. Discourse Analysis

- Tenor
- Mode
- Domain

Domain and language change – journalism, advertising and literature, scientific and technical writing

II. Mechanics of Writing

- Understanding paragraph divisions and topic sentences of paragraphs

III. Writing for Print Media

- Print – News Report

Evaluation Pattern:
1) Semester End Examination: 80 Marks - 2 1/2 Hours
2) Project: 20 Marks

1) Semester End Examination (80 marks):

Q.1	a. Phrase analysis	20 marks
Q.2	a. Verb Phrases	06 marks
	b. Morphological analysis	14 marks
Q.3	a. Stress Marking and Intonation	10 marks
	b. Transcription	10 marks
Q. 4.	Writing a news report on the basis of the facts given	20 marks

2) Project work (20 marks):

Students should be tested on –

1. Breaking a passage of about 250-300 words into appropriate paragraphs, picking up the topic statement of each paragraph 10 marks

AND

2. Identifying the register of a passage about 250-300 words 10 marks

SEMESTER- VI: Grammar and the Art of Writing – II		
Course Code: UAENG603A	**3 Credits**	**Total Lectures: 45**

Grammar and the Art of Writing

Unit I: Grammar **20 lectures**

I. Clauses:

- Clause elements and subject –verb concord
- Basic clause patterns
- Types of clauses : finite – non-finite (tensed – tenseless), independent – dependent (Main – Subordinated)
- Kinds of subordinate clause : Noun clause, Prepositional Clause , Relative clause , Adverb Clause, Comparative Clause
- Co-ordinated Clauses

II. Sentences:

- Basic and Derived structures
  Following rules to be studied – Fronting, Inversion, Passive reconsideration, Substitution of PP for Indirect Object, Tag Questions, Postponement of the post-modifier, Cleft Sentence, Existential Sentence and Extraposition.

Unit 2: Art of Writing

Mechanics of Writing **05 lectures**

- Characteristics of typical writing and typical speech
- Cohesion and Coherence
- Correct use of Articles, Prepositions, Adverbs, Adjectives
- Common Errors – Grammatical, Syntactical, Lexical, Punctuation, Logical
- Writing a Thesis Statement

Rhetorical Structures **10 lectures**

- Classification, Comparison – Contrast, Cause – Effect, Chronological and Spatial Ordering, Order of Importance, Statement and Elaboration, Restatement, Exemplification, Listing
- Understanding connotations, Using bias-free language, Avoiding jargon and archaic/ outdated language, Eliminating repetition and redundancy, Content Analysis, and Rhetorical Devices

Unit 3: Types/ Domains of Writing **10 lectures**

- Argumentative/ reflective writing
- Analytical writing
- Creative / Figurative writing
- Advertisement /Body Copy writing

Evaluation Pattern:
1) Semester End Examination: 80 Marks - 2 1/2 Hours
2) Project: 20 Marks

1) Semester End Examination Pattern (80 marks)

Q 1.	Identifying elements of the Clause (SPOCA)	20 marks
Q 2.	a. Identifying MCL and SCL	10 marks
	b. Basic and Derived Structures	10 marks
Q. 3.	a. Identifying errors in the given passage.	08 marks
	b. Rewriting the passage to make it more fluent and coherent.	12 marks
Q.4.	Forming a thesis statement on the given topic (1 out of 3) and developing it in about 150 words and specifying its rhetorical structures.	20 marks

2) Project work (20 marks):

Students should be tested on

1. Writing a Literary Passage (creative/ figurative) of about 250-300 words 10 marks

AND

2. Writing an advertisement copy on the basis of facts provided 10 marks

Prescribed Text:

1. Leech, Geoffrey, Deuchar, Margaret and Hoogenraad, Robert, *English Grammar for Today: A New Introduction*. London: Macmillan, 1973

Additional Reading:

1 Quirk, R. and Greenbaum. S. *A University Grammar of English*, Longman, 1973
2 Rajimwale, Sharad. *Elements of General Linguistics, Vol. I*, New Delhi: Rama Brothers
3 Varshney, Dr. R.L. *An Introductory Text Book of Linguistics and Phonetics*, New Delhi: Prakash Book Depot

Recommended Books for Further Reading:

1. Payne, Lucile Vaughan. *The Lively Art of Writing*. New York: Mentor, 1969
2. Kleiser, Grenville. *The Art of Writing*. New Delhi: A P H, 2011
3. Trimble, John R.*Writing with Style, Conversations on the Art of Writing*. New Jersey: Prentice Hall, 1975
4. Bailey, Stephen. *Academic Writing: A Handbook for International Students*. New York: Routledge , 2011
5. Huddleson, Rodney and Pullum, Geoffrey. *A Student's Introduction to English Grammar*. New Delhi: Cambridge University Press, 2005
6. Leech, Geoffrey and Svartvik, Jan. *A Communicative Grammar of English*. New York: Routledge, 1975
7. Singh Sukhdev and Singh Balbir. *Grammar of the Modern English Language: A Resource Book*. New Delhi: Cambridge University Press India Pvt. Ltd., 2012
8. Turton, Nigel D. *A B C of Common Grammatical Errors*. New Delhi: Macmillan India Ltd., 1996
9. Sethi, J. and Dhamija, P.V. *A Course in Phonetics and Spoken English*. New Delhi: Prentice-Hall of India Private Ltd., 2006
10. Jones, Daniel. *Everyman's English Pronunciation Dictionary* The English Language Books Society, ELBS
11. Gimson, A. C. *An Introduction to the Pronunciation of English*. ELBS
12. Rahman, Tariq. *A General Introduction to Linguistics*. Orient Blackswan
13. Crystal, David. *The Cambridge Encyclopedia of Language*. Cambridge University Press
14. Crystal, David. *A Little Book of Language*. Orient Blackswan.
15. Sreedharan, V. *How to Write Correct English.* New Delhi: Goodwill Publishing House
16. Lowe, Michelle and Graham, Ben. *Language and Power: A Resource Book for Students.* Orient Longman, 1998
17. Simpson, Paul and Mayr, Andrea. *Language and Power: A Resource Book for Students.*Routledge, Taylor & Francis Group, 2010
18. Mohan, Krishna and Raman, Meenakshi. *Advanced Communicative English: A Comprehensive Course for Undergraduate Learners*. New Delhi: Tata McGraw Hill Education Private Limited, 2010
19. Gurman, Pamela J. *Strategies for Successful Writing: Written Communication in the Modern World*. Pearson Custom Publishing.
20. Grammar Handbook (Capella University) available in pdf format at http://www.capella.edu/interactivemedia/onlinewritingcenter/downloads/grammar.pdf
21. Brighton, Laurel J. *The Structure of Modern English: A Linguistic Introduction* available in pdf format at http://npu.edu.ua/!e-

book/book/djvu/A/iif_kgpm_The%20Structure%20of%20Modern%20English.pdf
22. A Course in English Phonetics for English EFL Students available in pdf format at file:///C:/ADMIN/Desktop/A_Course_in_English_Phonetics%20(1).pdf

Syllabus prepared by:

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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Paper

Course Title: Translation Studies: Theory and Practice

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG503B& UAENG603B
	iii)	Course Title :	Translation Studies : Theory and Practice
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each and a project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Translation Studies: Theory and Practice

Course Codes: UAENGUAENG503B&UAENG603B

Objectives of the Course:

1. To make students aware of various types of translation
2. To enable students to undertake translation of literary texts
3. To enable students to use translation in official contexts and mass media
4. To help students to avail of job opportunities

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Understand variety of translations
2) Able to undertake Literary Translation work at primary level.
3) Able to undertake translation in official contexts and mass media
4) Equipped to take up jobs.

Semester V: Translation Studies : Theory and Practice

Course code- UAENG503B04 CreditsTotal Lectures: 45

Unit 1: Terms & Concept: 15 Lectures

1. Translation
2. Transliteration
3. Source Language Text and Target Language Text
4. Loss and Gain in Transaction
5. Creative & Free Translation
6. Word to word & Structural Translation

Unit 2: Indian Theories of Translation: 15 Lectures

1. Bhartrhari's Sphota and Translation
2. Theory of Auchitya and Translation
3. Sri. Aurobrindo Ghosh's Theory of Translation
4. Rabindranath Tagore's Theory of Translation

Unit 3: Translated Non- Fictional texts 15 Lectures

1. Annihilation of Caste (Pages 1-5) (English to Marathi/ Hindi)

2. 1958 Literary Conference Speech by Anna Bhau Sathe (Marathi / Hindi to English)

Evaluation Pattern:1) Semester End Examination: 80 Marks - 2 1/2 Hours
2) Project: 20 Marks

Semester End Examination:

Q.1. 2 Short Notes based on Unit-I (2 out of 4)
Q.2. Essay type question based on Unit-II (One out of two)
Q.3. Essay type question based on Unit-III (One out of two)
Q.4. Translation of Unseen Non-literary passage from English into Hindi/Marathi

Project Work (20 marks):

A Non-literary passage of about 500 words from Hindi or Marathi to be translated into English by the students. It should also include the introduction of the SL text, list of the problems faced and the loss and gain in the process of translation.

Semester VI: Translation Theory and Practice

Course code- UAENG603B **04 Credits** **Total Lectures: 45**

Unit I: Terms & Concepts **15 Lectures**

1. Formal and Dynamic Equivalence
2. Interlingual and Intralingual Translation
3. Qualities and Strategies of Translator
4. Lexicography bilingual dictionaries
5. Commercial and collaborative Translation.
6. Audiovisual, Subtitling and Dubbing

Unit 2: Types of Translation-process and problems **15 Lectures**

1. Translation of Prose and fiction
2. Translation of Poetry
3. Translation of Drama

Unit 3: Translated Literary Texts **15 Lectures**

1. Premchand's short story "Gulli Danda" translated from Hindi into English (Premchand's Selected Stories 1, Translated and adapted by Anupa Lal, Ratna Sagar, P. Ltd. New Delhi 1995)

2. Nissim Ezekiel's poem "Night of the Scorpion" translated from English into Marathi (Adhunik- Stotre by Pradeep Deshpande)

Evaluation Pattern:1) Semester End Examination: 80 Marks – 2 ½ Hours
2) Project: 20 Marks

Semester End Examination for both Semesters:

Q.1. 2 Short Notes based on Unit-I (2 out of 4)

Q.2. Essay type question based on Unit-II (One out of two)

Q.3. Essay type question based on Unit-III (One out of two)

Q.4. Translation of Unseen Non-literary passage from English into Hindi/Marathi

Project Work for both semesters (20 marks):

A Literary text of about 500 words from Hindi or Marathi to be translated into English by the students. It should also include the introduction of the SL text, list of the problems faced and the loss and gain in the process of translation.

Recommended Reading:

1. Bassnett, Susan, Political Discourse, Media and Translation, Cambridge Scholars, 2010.
2. Bassnett Susan and Trivedi Harish, "Post-Colonial Writing and Literary Translation" in Post-Colonial Translation: Theory and Practice. Ed. London: Routledge, 1999.
3. Didier, Coste, The Poetics and Politics of Literary Translation, New Delhi, 2011. 71
4. Ghurye, G.S Caste, Class and Occupation: Popular Book Depot, 1961.
5. Guha, Ranjit and Spivak Gayatri Selected Subaltern Studies: Eds., Oxford University Press, New York and Oxford, 1988.
6. Lawrence, Venuti, (Edited by) Translation Studies Reader, 2012.
7. Mukherjee, Meenakshi. The Twice Born Fiction: Themes and Techniques of theIndian Novel in English New Delhi: Heinemann Educational, 1971.
8. Naikar Basavaraj, Glimpses of Indian Literature in English Translation,Authorspress, 2008.
9. Pandey, A. P. A Revolutionary Fervor in Kabir's Poetry, by Bhaskar Publications,Kanpur, 2008.

10. Rahman, Anisur. Indian Literature(s) in English Translation - The discourse of Resistance and representation in Journal Of Postcolonial Writing Vol. 43, 2007.

Websites & You Tube Videos

1. https://complit.artsci.wustl.edu/graduate/translation_studies
2. http://cw.routledge.com/textbooks/translationstudies/data/samples/9780415584890.pdf
3. https://www.youtube.com/watch?v=HZXhzP3mBsA
4. https://www.youtube.com/watch?v=gP3bheM6fmg

Syllabus Prepared by:

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective
Course Title: Popular Culture

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG503C & UAENG603C
	iii)	Course Title :	Popular Culture
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	
2.		Scheme of Examination :	4 Questions of 20 marks each and a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA
Course: Popular Culture
Course Codes: UAENG503C& UAENG603C

Objectives of the Course:

1. To understand the nature and politics of Popular Culture.
2. To explore the interplay between Culture and Popular Culture and their influence over each other.
3. To expand existing critical thinking to enable textual analysis
4. To understand different perspectives on politics and control.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1. To articulate in writing responses to thinking critically about Popular Culture
2. To be able to assert agency over events involving their lives

Semester V: Popular Culture
Course code- UAENG503C **4 Credits** **Total Lectures: 45**

Unit 1: Understanding the Concept of Popular Culture **15 Lectures**

- Culture, Ideology and the Concept of the Popular
- Culture and Civilisation Tradition
- Culturalism
- High Culture vs Culture Debate

Unit 2 Control over Meaning through perpetuation of Myths (15 Lectures)

- Semiotics-Understanding the construction of the Sign- Saussure
- Barthes –Structuralism and post structuralism-
- Will Wright- Myth and the Western Film
- Critical terms: myth, genre, theme, language, structure, character
- To be applied to any texts/images of popular culture

Unit 3: The Politics of Culture-Hegemony and Post Marxist Perspectives (15 Lectures)

- Encoding/Decoding of Meaning
- Negotiation and Agency
- Caste/Gender Discrimination-Perpetuating Rape Culture
- Recommended study from the perspective of contemporary case studies/films

Project: Deconstructing Texts of Popular Culture 20 Marks

- Folk Tales/Fairytales/Animal fables
- Detective Fiction/Crime Fiction/Thriller/Suspense
- Comics- Tarzan, Wonderwoman, Peanuts (Marvel/Shultz)
- Identify and analyse the historical, socio-political and literary dynamics as well as themes and concerns which define genre, reflect culture, extend across cultures or appeal to a particular culture

Semester VI: Popular Culture - II
Course code- UAENG603C 4 Credits Total Lectures: 45

Unit 1 Gender and Popular Culture 15 Lectures

- Feminist Approaches to Popular Culture
- Subversions of Femininity/Masculinity in Popular Culture
- Visual Pleasure/Narrative Cinema: Scopophilia and the Male Gaze/Ignoring the Female Spectator/Bechdel Test
- Mainstream Cinema and Female Spectatorship
- Recommended Films- Films of Alfred Hitchcock from the perspective of his treatment of women/Films of MadhurBhandarkar 2011 female-centric films/any other films with strong female protagonists (Hindi and Regional Films may be studied.

Unit 2: Postmodernism and Culture: 15 Lectures

- The Global Postmodern
- Reality/Mediated Reality/Pluralism of Value
- John Storey/Francois Lyotard/Frederic Jameson/Jean Baudrillard
- Case studies from the perspective of how both Western and Indian cultural paradigms have evolved

Unit 3 Taste/Identity and Popular Culture 15 Lectures

- Culture Industry Revisited
- Frankfurt School/Consumerism
- The Politics of Popular Taste
- Privilege and Taste
- Case studies from the perspective of advertising/consumerism

Semester End Examination Pattern: 80 Marks 2 ½ Hours

The Semester End Examination for 80 marks will have 4 questions (with internal choice) of 20 marks each:
Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (02 out of 04) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)-02 each on Unit 2 & 3

Project: One project of 20 marks

- Project: Deconstructing Texts of Popular Culture (20 Marks)

Music/Music Videos/Pop Art/Dance/Reality Shows on Television; Identify and analyse the historical, socio-political and literary dynamics as well as themes and concerns which define genre, reflect culture, extend across cultures or appeal to a particular culture

Recommended Reading:

Appadurai, Arjun, and Carol A. Breckenridge."Public Modernity in India." *Consuming Modernity*.Ed. Carol A. Breckenridge. Delhi: Oxford UP, 1995. 1-17. Print.

_____. *Modernity at Large: Cultural Dimensions of Globalization*. Minneapolis, MN: U of Minnesota, 1996. Print.

Arnold, Matthew. *Culture and Anarchy*. N.p.: n.p., 1869. Print.

Barrett, Michèle. "Feminism and the Definition of Cultural Politics." *Feminism, Culture,and Politics*. Ed. Rosalind Brunt and Caroline Rowan. London: Lawrence and Wishart, 1982. 37-58. Print.

Barthes, Roland. *Mythologies*.Trans. Annette Lavers. Hertfordshire: Paladin, 1973. Print. (Essays Novels and Children: page 50, The Face of Garbo: page 56, Striptease: page 84, Accessed on the internet: 16th May, 2016)

Bartky, S. "Foucault, Femininity, and the Modernization of Patriarchal Power." *Feminismand Foucault: Reflections on Resistance*. Ed. I. Diamond and L. Quinby. Boston: Northeastern UP, 1988. 61-86. Print.

Berger, John. *Ways of Seeing*. London: British Broadcasting Corporation and Penguin, 2008. Print. (Chapter 7, Accessed on the internet: 5th May, 2016)

Butler, Judith. Gender trouble: feminism and the subversion of identity. New York:Routledge, 1990. Print.

Chatterji, Shoma A., Subject: Cinema Object: Woman: A Study of the Portrayal of Women in Indian Cinema. Calcutta: Parumita Publications, 1998.

Cook, Pam. "Masculinity in Crisis?" *Screen* 23.3-4 (1982): 39-46. Web.

Durham, Meenakshi Gigi., and Douglas Kellner. *Media and Cultural Studies: Keyworks*. Malden, MA: Blackwell, 2001. Print.

Dwyer, Rachel. *All You Want Is Money, All You Need Is Love: Sexuality and Romance in Modern India*. London: Cassell, 2000. Print.

Dwyer, R. "Bombay Ishtyle." *Fashion Cultures: Theories, Explorations, and Analysis*. Ed. S. Bruzzi and G. P. Church. New York: Routledge, 2000. 178-90. Print.

Ellis, John. *Visible Fictions: Cinema, Television, Video*. London: Routledge, 1992. Print.

Fiske, J. "Active Audiences," and "Pleasure and Play." *Television Culture*. London and NY: Methuen, 1987. N. pag. Print.

Fiske, John. *Understanding Popular Culture*. Boston: Unwin Hyman, 1989. Print.

Foucault, Michel as cited in Barrett, Michèle. *The Politics of Truth: From Marx to Foucault*. Stanford, CA: Stanford UP, 1991. Print.

Gamman, Lorraine, and Margaret Marshment. *The Female Gaze: Women as Viewers of Popular Culture*. London: Women's, 1988. Print.

Ganham, Nicholas, and Raymond Williams. "Pierre Bourdieu and the Sociology of Culture: An Introduction." *Media, Culture and Society* 2.3 (n.d.): 215. Print.

Gehlawat, Ajay. *Reframing Bollywood: Theories of Popular Hindi Cinema*.N.p.: Sage Publications, 2010. Print.

Gledhill, Christine., "Pleasurable Negotiations." *Female Spectators: Looking at Film and Television*. Ed. D. E. Pribram. London: Verso, 1988. 64-89. Print.

Gledhill, Christine., Recent Developments in Feminist Criticism in Film Theory and Criticism, Introductory Readings. Eds: Leo Braudy and Marshall Cohen, New York and Oxford: Oxford University Press, 1999

Gledhill, Christine. *Stardom: Industry of Desire*. London: Routledge, 1991. Print.

Hall, Stuart. "Encoding/Decoding." *The Cultural Studies Reader*.Ed. S. During. London and NY: Routledge, 1993. N. pag. Print.

Kaarsholm, Preben, ed. *City Flicks City Flicks: Indian Cinema and the Urban Experience*. Calcutta, New Delhi: Seagull, 2004. Print.

Kaplan, E. Ann. *Looking for the Other: Feminism, Film, and the Imperial Gaze*. New York: Routledge, 1997.Web.

Kasbekar, A. "Hidden Pleasures: Negotiating the Myth of the Female Ideal in Popular Hindi Cinema." *Pleasure and the Nation: The History, Politics, and Consumption of Public Culture in India*. Ed. C. Penney and R. Dwyer. New Delhi: Oxford UP, 2001. 286-308. Print.

Kavoori, Anandam P., and AswinPunathambekar.*Global Bollywood*. New Delhi: Oxford UP, 2009. Print.

Kuhn, A. "Women's Genres." *Screen* 25.1 (1984): 18-29. Web.

Mathur, Vrinda. "Women in Indian Cinema: Fictional Constructs." *Films and Feminism: Essays in Indian Cinema*. Ed. Jasbir Jain and SudhaRai. Jaipur and New Delhi: Rawat Publications, 2002. N. pag. Print.

McGuigan, Jim. *Cultural Populism*. London: Routledge, 1992. Print.

Modleski, Tania. *Loving with a Vengeance: Mass-produced Fantasies for Women*. Hamden, CT: Archon, 1982. N. pag. Print.

Mulvey, Laura. "Visual Pleasure and Narrative Cinema." 1975. *Visual Culture: The Reader*. Ed. Jessica Evans and Stuart Hall. London: SAGE Publications inAssociation with the Open U, 1999. 381-89. Print.

Nandy, Ashis. *The Secret Politics of Our Desires: Innocence, Culpability, and Indian Popular Cinema*. London: Zed, 1998. Print.

Nayar, Pramod K. *An Introduction to Cultural Studies*. New Delhi: Viva, 2008. Print.

Philip, Michelle. *Reel VS Real: The Portrayal of Women in Mainstream Bollywood Cinema.* Mumbai. 2014. Print.

Philip, Michelle.*Re-possessing the Female Gaze: The Woman as Active Spectator of Mainstream Bollywood Cinema.*Mumbai. 2014. Print.

Philip, Michelle.*The Indian Woman's Search for Identity Vis a Vis Mainstream Bollywood Cinema*. 2014. Print.

Philip, Michelle. *The Treatment of Women in Reel VS Real Life as Influenced by Mainstream Bollywood Cinema*. 2014. Print.

Philip, Michelle. *Peddling Fantasies: The Role of Bollywood Cinema in Coping with Reality with Reference to MadhurBhandarkar's Film, Fashion*. 2015. Print.
Pinto, Jerry. *The Greatest Show on Earth: Writings on Bollywood*. New Delhi: Penguin, 2011. Print.
Prasad, M. Madhava. *Ideology of the Hindi Film: A Historical Construction*. Delhi: Oxford UP, 1998. Print.
Radway, Janice. *Reading the Romance: Women, Patriarchy, and Popular Literature*. London: Verso, 1987. N. pag. Print.
Saltzman, Joe. "Sob Sisters: The Image of the Female Journalist in Popular Culture." *Image of the Journalist in Pop Culture* (2003): n. pag. Web. 5 Mar. 2017.
Smelik, Anneke. *And the mirror cracked: feminist cinema and film theory*. New York: St. Martin's Press, 1998. Print.
Stacey, Jackie. *Star Gazing: Hollywood Cinema and Female Spectatorship*. London: Routledge, 1994. Print.
Storey, John. *Cultural Theory and Popular Culture: An Introduction*. Sixth ed. N.p.: Dorling Kindersley, 2014. Print. Indian Reprint
Vasudevan, Ravi. *Making Meaning in Indian Cinema*. New Delhi: Oxford UP, 2000. Print.
Vasudevan, R. "Cinema in Urban Space." Seminar, No. 525.N.p., n.d. Web. 23 Feb. 2004.
Virdi, Jyotika. *The Cinematic ImagiNation: Indian Popular Films as Social History*. New Brunswick, NJ: Rutgers UP, 2003. Print.
White, Patricia. *Film Studies: Critical Approaches*. Ed. John Hill and Pamela Church. Gibson. Oxford: Oxford UP, 2000. Print.
Willis, Paul. *Common Culture*. Buckingham: Open UP, 1990. 3. Print.
Wolf, Naomi. *The Beauty Myth: How Images of Beauty Are Used against Women*. London: Vintage, 1991. Print.

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Syllabus for T.Y.B.A. in English

Semester: V&VI

Course: Core Paper

Course Title: 19th Century English Literature

(Choice Based Credit System with effect from the Academic Year 2018-2019)

1. Syllabus as per **Choice Based Credit System**

i) Name of the Programme	:	T.Y.B.A. English
ii) Course Code	:	UAENG504 &UAENG604
iii) Course Title	:	19th Century English Literature
iv) Semester wise Course Contents	:	Copy of the syllabus Enclosed
v) References and additional references	:	Enclosed in the Syllabus
vi) Credit structure	:	
No. of Credits per Semester	:	04
vii) No. of lectures per Unit	:	20
viii) No. of lectures per week	:	04
ix) No. of Tutorial per week	:	---
2 Scheme of Examination	:	5 Questions of 20 marks each
3 Special notes, if any	:	No
4 Eligibility, if any	:	No
5 Fee Structure	:	As per University Structure
6 Special Ordinances / Resolutions, if any	:	No

Syllabus for TYBA

Course: 19th Century English Literature

Course Codes: UAENG504 &UAENG604

Objectives of the Course:

1. To introduce to students the major trends and ideas in the literature and culture of the Romantic and Victorian Eras
2. To help students understand the texts in the context of prevailing socio-cultural conditions & their historical, political location
3. To impress upon students the characteristically rebellious/ radical nature of British Romanticism and the stupendous range of changes in the socio-political conditions of Early (1837-1851), Middle (1851-1870) and Late (1870-1901) Victorian Era
4. To familiarize and highlight major representative texts, genres, thematic concerns and select key concepts/terms pertaining to the respective periods
5. To help students apply a variety of critical, historical, and theoretical approaches to prescribed literary texts
6. To sensitize students to diverse sensibilities and humanitarian concerns through literature of the nineteenth century

Course Outcomes:

After completion of the course, students are expected to be able to:

1. To view literary works in their dynamic interface with the background
2. To understand the literature of the 19th century as a complex outcome of artistic, intellectual and socio-political cross-currents
3. To appreciate poetry as mirroring private personality, protest and subsequently, public concerns
4. To view the development of the Victorian Novel as informed by Victorian morality as well as by larger democratic processes
5. To contextualize the impulses behind the significant emergence of women writing in the 19th century

Semester V:Paper VII: 19th Century English Literature I

Course Codes: UAENG504 04 Credits Total Lectures: 60

The Romantic Revival (1798-1832)

Unit I: A. Background: 20 Lectures

- Romanticism as a reaction to Neo-classicism
- Influence of Rousseau and French Revolution
- Survey of Literature: Novel, Poetry and Prose (Types, Trends and Characteristics)
- Rise of women writers in the period

B. Concepts:

- Romanticism : Features
- Romantic Imagination
- German Transcendentalism
- The Gothic Revival
- Medievalism
- Pantheism

Unit II: Poetry: Selected Verse from the Romantic Period: 20 Lectures

William Blake : 'The Divine Image' from *Songs of Innocence*

'The Human Abstract' from *Songs of Experience*

William Wordsworth : 'Lines Written in Early Spring'

'Lucy Gray'

Samuel Taylor Coleridge : 'Kubla Khan'

Lord Byron : 'Darkness'

P.B. Shelley : 'Ozymandias'

John Keats: : 'On First Looking into Chapman's Homer'

'Ode to Psyche

Unit III: 20 Lectures

A. **Novel**: Jane Austen: *Emma*

OR

B. **Essays:** Charles Lamb: From *Essays of Elia*

'Christs' Hospital Five and Thirty Years Ago'

'The Dream Children: A Reverie'

'Detached Thoughts on Books and Reading'

William Hazlitt: From *Table-Talk: Essays on Men and Manners*

'On the Pleasure of Painting' – Essay 1

'Why Distant Objects Please'

'On Going on a Journey'

Semester VI:Paper VII: 19th Century English Literature - II
Course Codes: UAENG504Total Lectures: 604 Credits

The Victorian Age (1837 -1901)

Unit I: A. Background20 Lectures

- Effects of Industrial Revolution
- Middle class complacency and the rise of the working class
- Age of Science, Age of Faith and Doubt (the Victorian Dilemma)
- Survey of Literature of the period: Types, features and development (Novel, Poetry and Prose)

B. Concepts

- Utilitarianism
- Darwinism
- Victorian Concept of Morality
- Aestheticism
- Pre-Raphaelitism
- The Oxford Movement
- Bildungsroman and the Victorian Novel

Unit II: Poetry:Selected Verse from the Victorian Period: 20 Lectures

Alfred Tennyson : From *In Memoriam*

Lyric 7: 'Dark house, by which once more I stand'

Lyric 54: 'Oh, yet we trust that somehow good'

Robert Browning :'Porphyria's Lover'

'Fra Lippo Lippi'

Elizabeth Barrett Browning: *Sonnets from the Portuguese*:

'Sonnet 21': 'Say over again, and yet once over again'

Matthew Arnold :'The Forsaken Merman'

Dante Gabrielle Rosetti :'The Cloud Confines'

Thomas Hardy :'Channel Firing'

'Dead Man Walking'

Unit III: **20 Lectures**

A. **Novel**: Charles Dickens: *David Copperfield*

OR

B. **Essays:** John Newman: From *The Idea of a University*

Discourse V 'Knowledge its Own End'

John Ruskin: From *Sesame and Lilies*

'Of Kings' Treasuries'

'From the Queens' Gardens'

Evaluation: Semester End Examination Pattern 100 Marks: 3 Hours

Question 1: A. Essay*or

Question 1: B. Essay or

Question 1.C. Short Notes (two out of four) from Unit I

Question 2: Essay on Unit II (1out of 2)

Question 3: Essay on Unit III (1 out of 2)

Question 4: Short Notes on Unit II (2 out of 4)

Question 5: Short Notes on Unit III (2 out of 4)

*In question 1 the essay questions will be based on Unit I A and Short Notes will be based on Unit I:B

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Core paper
Course Title: 20th Century British Literature

(Choice Based Credit System with effect from the Academic Year 2018-19)

	Syllabus as per Choice Based Credit System	
i)	Name of the Program :	T.Y.B.A. English
ii)	Course Code :	UAENG505&UAENG605
iii)	Course Title :	20th Century British Literature
iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
v)	References and Additional References :	Enclosed in the Syllabus
vi)	Credit Structure : No. of Credits per Semester	04
vii)	No. of lectures per Unit :	20
viii)	No. of lectures per week :	04
ix)	No. of Tutorials per week :	--
2.	Scheme of Examination :	5 Questions of 20 marks each
3.	Special notes , if any :	No
4.	Eligibility , if any :	No
5.	Fee Structure :	As per University Structure
6.	Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: 20th Century British Literature

Course Codes: UAENG505 &UAENG605

Objectives of the Course:

1) To expose students to literary genres, trends, and literary movements of Britain in the 20th Century.

2) To enable students to create linkages between social and historical contexts and literary texts .
3) To train students to develop skills for a critical and analytical understanding of the text.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Students will be equipped with comprehensive understanding of literary genres, trends and movements in 20th Century British Literature; thereby ,enabling them to understand the valuable co –relation between the socio-cultural ,economical and historical contexts; behind the literary production.

2) Students will acquire the discipline to become reflective and imaginative thinkers through a close, critical and analytical reading of the prescribed texts.

Semester V: 20th Century British Literature – I

Course code- UAENG505 **4 Credits** **Total Lectures: 60**

Unit 1: Background Topics **20 Lectures**

1. Modernism
2. Imagism
3. Symbolism
4. War Poetry
5. Movement Poets
6. Poetic Drama
7. Social Realism and its impact on English Drama
8. The Theatre of the Absurd

Unit 2: Drama **20 Lectures**

A. JOHN OSBORNE*: Look Back in Anger* (1956)

OR

B. BERNARD SHAW: *Saint Joan* (1923)

Unit 3: Poetry **20 Lectures**

1. T.S. ELIOT: i)'The Hippopotamus' ii) 'Portrait of a Lady'
2. W. B. YEATS: i) 'The Second Coming' ii) 'A Prayer for My Daughter'
3. W.H. AUDEN : i) 'The Shield of Achilles' ii) 'In Memory of W.B. Yeats'
4. WILFRED OWEN : i) 'Insensibility' ii) 'Strange Meeting'

Semester VI: 20th Century British Literature – II

Course code-UAENG605 **4 Credits** **Total Lectures: 60**

Unit 1: Background Topics: **20 Lectures**

1. Feminism in Modern Literature
2. Psychological Novel
3. The rise of Science Fiction
4. Post World War II Novel
5. Political Satire/Allegory as rising literary trends
6. Imperialism and Post colonialism in Modern British Fiction
7. Existentialism and Modern British Literature

Unit 2: Novel: **20 Lectures**

A. GEORGE ORWELL: *1984* (1949)

OR

B. IRIS MURDOCH: *The Black Prince* (1973)

Unit 3: Short stories **:** **20 Lectures**

1) JAMES JOYCE: *Eveline*
2) ROALD DAHL: *Lamb to the Slaughter*
3) GRAHAM GREENE: *The Invisible Japanese Gentleman*
4) ANGELA CARTER: *The Courtship of Mr. Lyon*

Semester End Examination Pattern: 100 Marks 03 Hours

The Semester End Examination for 100marks will have 5 questions (with internal choice) of 20 marks each

Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (two out of four) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)- Unit 2
Q.5 Short Notes (2 out of 4)- Unit 3

Recommended Reading:

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- https://www.askwillonline.com/2013/06/the-courtship-of-mr-lyon-by-angela.html
- https://the-artifice.com/angela-carter-beauty-and-the-beast-feminist-romance/
- http://sittingbee.com/the-invisible-japanese-gentlemen-graham-greene/
- http://britishliteratureoverview.blogspot.in/2008/09/invisible-japanese-gentlemen.html
- https://www.youtube.com/watch?v=K1sBQZfDh0I

- https://www.litcharts.com/lit/lamb-to-the-slaughter/summary-and-analysis
- https://www.cliffsnotes.com/literature/d/dubliners/summary-and-analysis/eveline
- https://interestingliterature.com/2017/07/18/a-summary-and-analysis-of-james-joyces-eveline/
- http://www.newworldencyclopedia.org/entry/Iris_Murdoch

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Paper

Course Title: Literature and Gender

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per **Choice Based Credit System**	
	i)	Name of the Program	T.Y.B.A. English
	ii)	Course Code	UAENG506A& UAENG606A
	iii)	Course Title	Literature and Gender
	iv)	Semester wise Course Contents	Enclosed the copy of syllabus
	v)	References and Additional References	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	 04
	vii)	No. of lectures per Unit	15
	viii)	No. of lectures per week	03
	ix)	No. of Tutorials per week	--
2.		Scheme of Examination	4 Questions of 20 marks each and a project of 20 marks
3.		Special notes , if any	No
4.		Eligibility , if any	No
5.		Fee Structure	As per University Structure
6.		Special Ordinances / Resolutions if any	No

Syllabus for TYBA

Course: Literature and Gender

Course Codes: UAENG506A& UAENG606A

Objectives of the Course:

1) To introduce students to the politics of gender identity
2) To enable students to analyze gender
3) To empower students to scrutinize gendering in literature
4) To appreciate popular culture and diverse gender and sexual identities
5) To discern masculinities and femininities

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Understand politics of gender identities
2) Undertake gender analysis
3) Understand the gendering in literature
4) Appreciate popular culture and gender identities
5) Interpret masculinities and femininities

Semester V: Gender and Literature
Course code- UAENG506A 04 Credits Total Lectures: 45

Unit I: 15 Lectures

Schools of Feminism: Liberal and Marxist Feminism

Concepts: Patriarchy, Masculinity Studies, Sex and Gender, The Politics of Feminism(s), Gynocriticism, Indian Feminism

Unit II: Short-Stories 15 Lectures

Anne Petry: *Like a Winding Sheet*
Katherine Mansfield: *The Fly*
Dorothy Parker: *The Waltz*
Anita Desai: *The Domestic Maid*
Nathaniel Hawthorne: *The Birthmark*
Vishwapriya Iyengar : *The Library Girl*

Unit III: Novel 15 Lectures

Khaled Hosseini: *A Thousand Splendid Suns*

OR

Jeanette Winterson: *Oranges are not the only Fruit*

Semester End Examination Pattern: 80 Marks 2 1/2 Hours

Semester End Assessment: **80 marks**

Q 1. (a) Essay type question on School of Feminism 20 marks

OR

(b) Essay type question on School of Feminism

OR

(c) Short notes on Unit I: Concepts (Two out of Four)

Q 2. Essay type question on Unit II (One out of two) 20 marks

Q 3. Essay type question on Unit III (One out of two) 20 marks

Q 4 (a) Short notes from Unit II (One out of Two) 10 marks

(b) Short notes from Unit III (One out of Two) 10 marks

Internal Assessment (Project): **20 marks**

A project of 20 marks/semester to be undertaken by the students with particular focus on the schools of feminism studied in that particular semester. Students to analyse a novel of their choice (not prescribed in the syllabus) through the lens of Liberal/Marxist Feminism in Semester V and Socialist/Radical Feminism in Semester VI

Semester VI: Gender and Literature
Course Code- UAENG606A 04 Credits Total Lectures: 45

Unit I: **15 Lectures**

Schools of Feminism: Socialist and Radical Feminism

Concepts: Ecofeminism, Queer Theory, Postcolonial Feminism, Psychoanalytic Feminism, Postmodern Feminism

Unit II: Poetry **15 Lectures**

Carol Ann Duffy: *Little Red Cap*

Imtiaz Dharker : *Purdah I*

Walt Whitman: *We Two, How Long We were Fool'd*

Amrita Pritam : *I will Meet You Again*

Audre Lorde: *Coal*

Langston Hughes : *Young Sailor*

Café: 3 am

Unit III: Drama **15 Lectures**

Mahesh Dattani: *Tara*

OR

Lorraine Hansberry: *A Raisin in the Sun*

Evaluation Pattern:1) Semester End Examination: 80 Marks – 3Hours
2) Project: 20 Marks

The Semester End Examination for 80 marks will have 4 questions of 20 marks each.

Q 1. (a) Essay type question on School of Feminism 20 marks

OR

(b) Essay type question on School of Feminism

OR

(c) Short notes on Unit I: Concepts (Two out of Four)

Q 2. Essay type question on Unit II (One out of two) 20 marks

Q 3. Essay type question on Unit III (One out of two) 20 marks

Q 4 (a) Short notes from Unit II (One out of Two) 10 marks

(b) Short notes from Unit III (One out of Two) 10 marks

Internal Assessment (Projest): 20 marks

A project of 20 marks/semester to be undertaken by the students with particular focus on the schools of feminism studied in that particular semester. Students to analyze a novel of their choice (not prescribed in the syllabus) through the lens of Socialist/Radical Feminism in Semester VI.

References:

1. Singh Navsharan and Maitrayee Mukhopadhyay. 2007. Gender Justice, CitizenshipDevelopment. Zubaan.
2. Rai Shirin. 2008. The Gender Politics of Development. New Delhi: Zubaan.
3. Kapadia Karin. 2003. The Violence of Development. New Delhi : Zubaan.
4. Tsikata Dzodzi and Pamela Golah. 2010. Land Tenure, Gender, and Globalisation. New
5. Maithreyi Krishna Raj Women Studies in India – Some Perspectives (Bombay: Popular Prakasham, 1986).

a. Barbare Sinclaire Deckard: The Women's Movement, (New York: Harper & Row,1983)

6. Ella Rule (Ed): Marxism and the Emancipation of Women (Great Britain Harpal Brar, 2000).
7. Reina Lewis, Sara Mills (Ed.), Feminist Postcolonial Theory – A Reader Edinburgh University Press, Edinburgh, 2003.
8. Hasan Zoya (ed) 1994) Forging Identities: Gender Communities and State, New Delhi, Kali for Women. KapurRatna (ed) (1996) Feminist Terrains in Legal Domains, New Delhi, Kali for Women.
9. Hasan Zoya (ed) 1994) Forging Identities: Gender Communities and State, New Delhi, Kali for Women.
10. Kapur Ratna (ed) (1996) Feminist Terrains in Legal Domains, New Delhi, Kali for Women.
11. Menon, Nivedita (2004), Recovering Subversion: Feminist Politics Beyond the Law, New Delhi, Permanent Black.
12. Sangari K. Politics of Diversity: Religious Communities and Multiple Patriarchies, EPW 23 Dec, 1995
13. Bassnett, Susan. Translation Studies. London: Methuen, 1980.
14. Venuti, Lawrence, ed. The Translation Studies Reader. London: Routledge, 2000.
15. Baker, Mona, ed. The Routledge Encyclopedia of Translation Studies. London: Routledge, 1998.
16. Trivedi, Harish Susan Bassnet. Postcolonial Translation: Theory and Practice. London: Routledge, 1999.
17. Gentzler, Edwin. Contemporary Translation Theories. London: Routledge, 1993.

Syllabus Prepared by:

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Course

Course Title: Drama and Theatre

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG506B & UAENG606B
	iii)	Course Title :	Drama and Theatre
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Drama and Theatre

Course Codes: UAENG506B & UAENG606B

Objectives of the Course:

1) To acquaint the learners of literature with various types of drama.
2) To sensitize them to the techniques and types of theatre.
3) To identify and discuss the theoretical and practical elements of drama.
4) To introduce them to drama as a performing art.
5) To enhance their understanding of the elements of theatre.
6) To enable the learners to critically watch a play, write a review and to put up a play.

Outcome of the Course:

After completion of the course, students are expected to be able to:

1) Analyse the social and artistic movements that have shaped theatre and drama.
2) Apply discipline-specific skills to the creation of drama.
3) Analyze the difference between the concepts of drama and theatre.
4) Demonstrate knowledge of the history of drama and theatre as a literature and performing art.

Semester V: Drama and Theatre
Course code- UAENG506B **4 Credits** **Total Lectures: 45**

Unit 1: Literary Terms **(15 Lectures)**

i) Sanskrit Theatre
ii) Greek Tragedy
iii) Senecan Tragedy
iv) Indian English Drama in Translation
v) Structure of Elizabethan Theatre
vi) Poetic Drama

Unit 2: A) Tendulkar Vijay: *The Vultures* **(15 Lectures)**

OR

B) AdyaRangacharya: *Sanjivani*

Unit 3: A) Aeschylus: *Prometheus Bound* **(15 Lectures)**

OR

B) Eliot T.S.: *The Cocktail Party*

Semester VI: Drama and Theatre
Course code- UAENG606B **4 Credits** **Total Lectures: 45**

Unit 1: Literary Terms (15 Lectures)

i) Problem Play
ii) Expressionism
iii) Theatre of the Absurd
iv) Angry Young Men Theatre
v) Make-up and Costume
vi) One Act Play

Unit 2: A) O'Neill Eugene: *Desire under the* Elms **(15 Lectures)**
OR
B) Ibsen Henrik: *An Enemy of the People*

Unit 3: A) Albee Edward: *The Zoo* Story **(15 Lectures)**
OR
B) Chekhov Anton: *The Proposal*

Semester End Examination Pattern: 80 Marks 2 ½ Hours

Semester End Examination Pattern:

Q.1 A. Essay type Or B. Essay type Or C. Short Notes (2 out of 4) - Unit 1 (20 Marks)
Q.2 Essay Type Question (1 out of 2) - Unit 2 (20 Marks)
Q.3 Essay Type Question (1 out of 2) - Unit 3 (20 Marks)
Q.4 Short Notes (2 out of 4) – 02 each on Unit 2 and 3 (15 Marks)

Project 20 Marks:

Writing new/original one act play. Transcreation: A short story to be adopted as a one act play. Translation of any one act play in Indian Language into English. Group performance of any one act play.

Recommended Reading:

AllardyceNicoll. *A History of English Drama* 3 Vol. Set. Cambridge: 1946.

Bentley, Eric. *The Theory of the Modern Stage: An Introduction to Theatre and Drama.* London: Penguin Books, 1968.

Beth Osnes. Santa Barbara(ed.) *Acting: an International Encyclopedia*. California; Denver Colorado : ABC-CLIO, c2001. Main Stack PN 2035 .O84 2001

Bratton, J. S. *New Readings in Theatre History: Theatre and Performance Theory*. Cambridge: Cambridge University Press, 2003.

Brockett, Oscar. *The Essential Theatre*: New York: Wadsworth Publishing, 2007.

Brustein, Robert. *The Theatre of Revolt: An Approach to Modern Drama.* New York: Atlantic Monthly Press, 1965.

Clark, Darect H. *A Study of Modern Drama.*Philadelphia: Century Books-Bindery, 1982.

Frank, Marcie. *Gender, Theatre, and the Origins of Criticism*: *From Dryden to Manley*. Cambridge: Cambridge University Press, 2003.

Fuchs, Elinor, and Una Chaudhuri. *Land/Scape/Theater: Theater-Theory/Text/Performance*: Ann Arbor: University of Michigan Press, 2002.

Gascoigne, Bamber*. Twentieth Century Drama:* London: Hutchinson, 1967.

Gassner, John*. Masters of Drama.* New York: Dover Publications, 1954.

Jonathan Law, etc. Rev. and enlarged (ed.). *The new Penguin Dictionary of the theatre*. London: Penguin Books, 2001. Doe Reference PN 2035 .N474 2001

Kobialka, Michal. *Of Borders and Thresholds: Theatre History, Practice, and Theory*. Minneapolis: University of Minnesota Press, 1999.

Lumley, Fredrick*. New Trends in the Twentieth Century Drama: A Survey since Ibsen and Shaw*. Oxford: O.U.P, 1972.

Malekin, Peter, and Ralph Yarrow. Consciousness, *Literature, and Theatre: Theory and Beyond*. New York: St. Martin's, 1997.

Martin Harrison.*The Language of Theatre*. New York: Routledge, 1998. Main Stack PN 2035 .H297 1998

McAuley, Gay. Space *in Performance: Making Meaning in the Theatre. Theater-Theory/Text/Performance:* Ann Arbor: University of Michigan Press, 1999.

Michael Patterson.*The Oxford Dictionary of Plays*. Oxford; New York: Oxford University Press, c2005.

Nicoll, Allardyce. *The Theatre and Dramatic Theory*: London: Harrap, 1962.

Oscar Lee Brownstein and Darlene M. Daubert. *Analytical sourcebook of concepts in dramatic theory*. Westport, Conn.: Greenwood Press, 1981. Doe Reference PN 1631 .B7

Rai, Rama Nand. *Theory of Drama*: *A Comparative Study of Aristotle and Bharata*: New Delhi: Classical Pub. Co. 1992.

Rangacharya, Adya. *Introduction to Bharata's Natyasastra*. Delhi: Munshirm Manoharlal Pub, Reprint 2005.

Styan, J. L. *Modern Drama in Theory and Practice*. New York: Cambridge University Press, 1980.

Taylor, Russell John: *Anger and After: Guide to the New British Drama.* London: Eyre Methune, 1977.

Williams, Raymond .*Drama from Ibsen to Brecht* .London: Penguin Books, 1973.

Syllabus Prepared by:

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University of Mumbai

Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Elective Paper

Course Title: Film and Literature

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG506C & UAENG606C
	iii)	Course Title :	Film and Literature
	iv)	Semester wise Course Contents :	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure No. of Credits per Semester :	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each and a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Film and Literature

Course Codes: UAENG506C & UAENG606C

Objectives of the Course:

- To introduce the nature of film as an 'art' form.
- To explore how film as art and literature influence each other.
- To expand analytical skill towards film adaptation.
- To appreciate and evaluate different perspectives on film adaptations.
- To create responses in thinking critically about films.

Outcome of the Course:

After completion of the course, students are expected to be able to:

- To understand the nature of film as an 'art' form.
- To explore ways in which film as art and literature influence each other.
- To expand existing textual analytical skill towards an understanding of film adaptation.
- To understand different perspectives on film adaptations.
- To aid students to think critically and articulate in writing responses about films.

Semester V: Film and Literature – I
Course code- UAENG506C **4 Credits** **Total Lectures: 45**

Unit 1 Image and Art **15 Lectures**

- Early Theories of Film.
- Cinema's evolution as a distinct art form.

Unit 2 Evolving technological innovations in cinema and directorial interventions **15 Lectures**

- Movement -Lumiere Brothers
- Cinematic effects - **Georges Méliès**
- Editing -Edwin Porter and Sergei Eisenstein
- Cinematography and narrative – D.W. Griffith and Orson

Unit 3 Film and ideology **15 Lectures**

- Defining ideology in film
- Disrupting hegemony of western models of performance and cultural dominance in Shakespearean adaptations.
  Recommended Films: *Omkara* (2006), *Haider* (2014) Director: Vishal Bharadwaj adapted from William Shakespeare's *Othello* and *Hamlet*

Topics for Project:

- Application of Film Terms as Point of View, Mise-en-Scene
- Editing, Narrative in Film
- Researching on movies
- Writing a screening report
- Writing a movie review
- Comparing the earlier and later versions of the same movie

Semester VI: Film and Literature-II

Course code- UAENG606C **4 Credits** **Total Lectures: 45**

Unit 1 Critical Approaches toward Films Analysis 15 Lectures

- Gender-based Approach
- Marxist Approach
- Psychoanalytical Approach
- Post-Colonial Approach

Recommended Films: *Mirch Masala* (1987) Director: Ketan Mehta,

Metropolis (1927) Director: Fritz Lang

Vertigo (1958) Director: Alfred Hitchcock

Satya (1998) Director: Ram Gopal Varma

Chungking Express (1994) Director: Wong Kar Wai

In the Mood for Love (2000) Director: Wong Kar Wai

Unit 2 Adaptations: Definitions and Approaches 15 Lectures

Defining the concept of adaptations and understanding literal, traditional, and radical translations of the source text

Recommended Film: *Adaptation* (2002). Director Spike Jonze

Unit 3 Novel to Film 15 Lectures

- *Passage to India*. E.M. Forster (1924)

  Film: *Passage to India* (1984) dir. David Lean

  OR

- *The Hours*. Michael Cunningham (1998)

  Film: The Hours (2002) dir. Stephen Daldry

Topics for Project:

Writing a report on inter-genre adaptations

Observations on Cinema and digital culture

Transitions in adaptations of literary sources as narratives

Reviews on adaptations of identity and history

Recommended Novel and Film: *Watchmen* (1987) Alan Moore and Dave Gibbons

Watchmen (2009) Director: Zack Snyder

Evaluation Pattern:1) Semester End Examination: 80 Marks – 2 ½ Hours

2) Project: 20 Marks

The Semester End Examination for 80 marks will have 4 questions (with internal choice) of 20 marks each:

Question 1: A. Essay or Question 1: B. Essay or Question 1.C. Short Notes (two out of four) - Unit I
Q.2 Essay Type Question (1 out of 2) - Unit 2
Q.3 Essay Type Question (1 out of 2) - Unit 3
Q.4 Short Notes (2 out of 4)- Unit 2 & Unit 3

Recommended Reading:

- Austerlitz, Saul. *Black and White*. Reverse Shot Online. n.d. Web. 22 Sept 2009.
- Bharucha, Rustom. "Foriegn Asia/ Foriegn Shakespeare. Dissenting notes on New Asian Interculturality, Postcoloniality and Recolonization".*Theatre Journal*, vol 56, issue 1, 2004, pp1-28.
- Burke, Liam.*The Comic Book Film Adaptation:* Exploring Modern Hollywood's Leading Genre, Univ. Press of Mississippi, 2015

- Cahir, L. *Literature into film: Theory and practical approaches*. Jefferson, N.C.: McFarland& Company, 2006.
- Corrigan, Timothy. *A Short Guide to writing About Film*, Pearson Education Inc. 2007
- Elliot, Kamila. "Literary Cinema and the Form/Content Debate" *Rethinking the Novel / Film Debate*Cambridge University Press, 2003, pp.133-183.
- Giannetti, Louis. *Understanding Movies* (11th edition), Prentice Hall, 2008.
- Grant, Barry Keith. *Auteurs and authorship: a film reader*, Blackwell Publications 2008
- Hess, John. "*Film and Ideology"*. *Jump Cut,* no. 17, April 1978, pp. 14-16.
- Hutcheon, Linda. "In Defence of Literary Adaptation as Cultural Production." M/C Journal, vol.10, issue 2, 2007. Web article
- Jeong,Seung-hoon. *Cinematic Interfaces: Film Theory After New Media*, Routledge, 2013.
- Keane,Stephen.*CineTech: Film, Convergence and New Media*, Macmillan Education,2006.
- Khan, Maryam Wasif (2016-06-22). "Enlightenment Orientalism to Modernist Orientalism: The Archive of Forster's A Passage to India". *MFS Modern Fiction Studies*. 62 (2): 217–235.
- McDonald, Kevin. *Film Theory: The Basics*, Routledge, 2016.
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- Leitch, Thomas. "Adaptation studies at a crossroads". *Adaptation* vol. 1, issue 1, pp 63-77.
- "Twelve Fallacies in Contemporary Adaptation Theory". *Criticism* vol. 45, issue 2, (2003): 149-171

- Said, Edward *Culture and Imperialism* (1st Vintage books ed.). New York: Vintage Books, 1994
- Stam, Robert "The Theory and Practice of Adaptation." *Literature and Film: A Guide to the Theory and practice of Film Adaptation.* Oxford Blackwell, 2005, pp 1-30.
- Suleri., Goodyear, Sara (1992). *The Rhetoric of English India*. Chicago: University of Chicago Press. pp. 132–135.
- Žižek, Slavoj. *The Fright of Real Tears: Krzysztof Kieślowski Between Theory and Post-Theory*. 2001

Syllabus Prepared by:

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Syllabus for T.Y.B.A. English

Semester: V & VI

Course: Optional Paper

Course Title: Literature of Protest

(Choice Based Credit System with effect from the Academic Year 2018-19)

1.		Syllabus as per Choice Based Credit System	
	i)	Name of the Program :	T.Y.B.A. English
	ii)	Course Code :	UAENG506D& UAENG606D
	iii)	Course Title :	Literature of Protest
	iv)	Semester wise Course Contents:	Enclosed the copy of syllabus
	v)	References and Additional References :	Enclosed in the Syllabus
	vi)	Credit Structure : No. of Credits per Semester	04
	vii)	No. of lectures per Unit :	15
	viii)	No. of lectures per week :	03
	ix)	No. of Tutorials per week :	--
2.		Scheme of Examination :	4 Questions of 20 marks each, and a Project of 20 marks
3.		Special notes , if any :	No
4.		Eligibility , if any :	No
5.		Fee Structure :	As per University Structure
6.		Special Ordinances / Resolutions if any :	No

Syllabus for TYBA

Course: Literature of Protest

Course Codes: UAENG506D& UAENG606D

Objectives of the Course:

1. To explore voices of discord, rhetoric and cultural contexts.
2. To compare and contrast the artistic manoeuvres.
3. To examine the protest spectrum in literature.
4. To bring in panoramic understanding of global protest literature and ideologies.
5. To learn the historical links between forms of protest and meanings of literature

Outcome of the Course: After completion of the course, students are expected to be able to:

1. Read and interpret cross cultural texts.
2. Understand protest literature.
3. Get sensitized towards global issues.
4. Learn to look into past, correlate it to present and future.
5. Understand the historicity of protest literature.

Semester V: Literature of Protest– I		
Course code- UAENG506D	**04 Credits**	**Total Lectures: 45**

Unit 1: Background Topics: **15 Lectures**

1. Literature and Protest
2. Politics and Language of Protest
3. Translation and Literature of Protest
4. Concept of Caste, Varna Theory and Division of Labor
5. Concept of Race and Discrimination
6. Protest in African American, Dalit and Tribal Literature

Unit 2: Autobiography: 15 Lectures

I Want to Destroy Myself: A Memoir- Mallika Amar Shaikh Translated by Jerry Pinto

Or

Dreams from My Father- Barack Obama

Unit 3: Short Story 15 Lectures

1. Death of a Rich Man
2. When the Sun God Refused to Set
3. Loneliness of An Ex-soldier
4. Confessions of a Graveyard Keeper

(The stories are from *Desperate Men and Women: Ten Dalits Short Stories from India*, edited by Rangrao, B., Kalpaz Publications, 2013)

Semester End Examination Pattern: 80 Marks 3 Hours

Q 1. (a) Short notes on Unit I: Concepts (Two out of Four)	20
Q 2. (a) Essay type question on Unit II(One out of Two)	20
Q 3. (a) Essay type question on Unit III (One out of Two)	20
Q 4. (a) Short notes on Unit II (One out of Two)	10
(b) Short notes on Unit III (One out of Two)	10

Internal Assessment: 20 marks

A project of 20 marks/semester (1500-2000 words) to be undertaken by the students with particular focus on the protest literature in the writings such as Aboriginal literature, Dalit literature, Tribal Literature, African American literature. Students to analyse an autobiography or 5 short stories of their choice (not prescribed in the syllabus) through the lens of protest in Semester V)

Semester VI: Literature of Protest – II
Course code- UAENG606D **03 Credits** **Total Lectures: 45**

Unit I: Protest in Contemporary Regional Writings: **15 Lectures**

1. Marathi Literature
2. Tamil Literature
3. Gujrati Literature
4. Kannada Literature
5. Hindi Literature
6. Bengali Literature

Unit 2: Novel: **15 Lectures**

Uncle Tom's Cabin- Harriet Beecher Stowe

Or

My Father Baliah- Y.B.Satyanarayana

Unit 3: Poetry **15 Lectures**

Kamala Das: 1. *The Looking Glass 2. Forest Fire*

Meena Kandasamy: 1. Advaita: The Ultimate Question, 2. The Gods Wake Up

Jyoti Lanjewar: 1. The Nameless Ones (anamikas), 2. Caves,

Semester End Examination Pattern: 80 Marks 3 Hours

Q 1. (a) Short notes on Unit I: Concepts (Two out of Four)	20
Q 2. (a) Essay type question on Unit II (One out of Two)	20
Q 3. (a) Essay type question on Unit III (One out of Two)	20
Q 4. (a) Short notes on Unit II (One out of Two)	10
(b) Short notes on Unit III (One out of Two)	10

Internal Assessment: 20 marks

A project of 20 marks/semester (1500-2000 words) to be undertaken by the students with particular focus on the protest literature in the writings such as Aboriginal literature, Dalit literature, Tribal Literature, African American literature. Students to analyse a novel or 5 poems of their choice (not prescribed in the syllabus) through the lens of protest in Semester VI)

Recommended Reading:

Ambedkar B. R., 1978, *Dr. Babasaheb Ambedkar's Writings and Speeches*, vol 1, Education Department, Government of Maharashtra, Bombay

Lohia, Rammanohar, 1964, *The Caste System*, Rammanohar Lohia Samta Vidyalaya Nyas, Hyderabad.

Dangle, Arjun. *Poisoned Bread: Translations from Modern Marathi Dalit Literature*. Orient Longman, 1992 –

Faye, Harrison. The Persistent Power of "Race" in the Cultural and Political Economy of Racism. *Annual Review of Anthropology* 24:47-74.

Nath, J.P., 2002, *Socialist Leadership in India*, Kanishka Publishers, New Delhi

Sharan Kumar Limbale and Jaydeep Sarangi, 2018. *Dalit Voice: Literature and Revolt*. Authors Press, New Delhi

Zoe, Trodd. *American Protest Literature*.2008. Belknap Press of Harvard University Press.

Drake, Kimberly. Literature of Protest.2013.Salem Press.

Patricia D. Netzley 1999, *Social Protest Literature: An Encyclopedia of Works, Characters, Authors, and Themes*. ABC-CLIO Literary Companion

Faye, Harrison.2008. *Outsider Within: Reworking Anthropology in the Global Age*. Urbana: University of Illinois Press.

Guru, Gopal, 2008. *Humiliation: Claims and Context*. Oxford University Press Delhi.

Hilliard, Nunn, 1998. Representing African Women in Movies in J. D. Hamlet (Ed.), *Afrocentric Visions: Studies in Culture and Communication*. Sage Publications. USA.

Bhowmik, Davinder & Steve Rabson. 2016. *Islands of Protest: Japanese Literature from Okinawa*

University of Hawai Press.

Reed, T.V. “Introduction” and “Reflections on the Cultural Study of Social Movements.” in *The Art of Protest: Culture and Activism from the Civil Rights Movement to the Streets of Seattle*. Minneapolis: University of Minnesota Press, 2005

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AC – 17/05/2022
Item No. – 5.1(R)

UNIVERSITY OF MUMBAI

Revised Syllabus for S.Y.B.A. (English) (Ancillary) and

(Applied Component)

Semester - Sem V and VI

(Choice Based Credit System)

(With effect from the academic year 2022-23)

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**S.Y.B.A. (English) (Ancillary) and (Applied Component)**
2	Eligibility for Admission	F.Y.B.A.
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	02 years & 04 semesters
6	Level	~~P.G.~~ / U.G./ ~~Diploma / Certificate~~ (Strike out which is not applicable)
7	Pattern	~~Yearly~~ / Semester (Strike out which is not applicable)
8	Status	~~New~~ / Revised (Strike out which is not applicable)
9	To be implemented from Academic Year	From Academic Year **2022-2023**

Date: 25/10/2021

Signature :

Name of BOS Chairperson / Dean : **Dr. Sudhir Nikam**

University of Mumbai

Revised Syllabus for S.Y.B.A. (English)

(Ancillary) & (Applied Component)

Semester- III / IV

(Choice Based Credit System)

With effect from the academic year 2022-23

Board of Studies in English

Dr. Sudhir Nikam (Chairperson)

Dr. Rajesh Karankal (Member)

Dr. Santosh Rathod (Member)

Dr. Bhagyashree Varma (Member)

Dr. Deepa Mishra (Member)

Dr. B. N. Gaikwad (Member)

Dr. Dattaguru Joshi (Member)

Dr. Satyawan Hanegave (Member)

Dr. Deepa Murdeshwar-Katre (Member)

University of Mumbai

Syllabus for S.Y.B.A. (English) (Ancillary)

Program: B.A.

Course: Optional English: Introduction to Drama

Paper II

(Choice Based Credit System with effect from the Academic Year 2022- 2023)

1. Syllabus as per Choice Based Credit System (CBCS):

i)	**Name of the Program**	**:** S.Y.B.A. English (Ancillary)
ii)	**Course Code**	**:** Semester III UAENG301 & Semester IV UAENG401
iii)	**Course Title**	**: Optional English: Introduction to Drama Paper II**
iv)	**Semester wise Course Contents**	**:** Enclosed the copy of the syllabus
v)	**References and Additional References:**	Enclosed in the Syllabus
vi)	**Credit Structure**	03
vii)	**No. of lectures per Unit**	15
viii)	**No. of lectures per week**	03
2.	**Scheme of Examination**	**:** 5 Questions of 20 marks each
3.	**Special notes, if any**	**:** No
4.	**Eligibility, if any**	**:** No
5.	**Fee Structure**	**:** As per University Structure

6. Special Ordinances / Resolutions if any: No.

SYBA English (Ancillary) Course Title

Optional English: Introduction to Drama

Paper II

(100 Marks Examination Pattern)

Objectives of the Course:

- To create interest and develop passion amongst learners towards drama (and theatre)
- To familiarize learners with the salient elements and characteristics of drama
- To introduce learners to different forms and types of drama
- To introduce learners to the trends and characteristics of significant dramatic movements through representative dramas
- To equip the learners with the tools and techniques to critically appreciate drama
- To inculcate and propagate human values reflected in the plays among learners
- To demonstrate that drama is reflection / representation of life
- To Develop analytical skills and critical thinking through close reading of drama

Course Outcomes:
By the end of the course, a learner will:

- develop interest and passion for drama (and theatre).
- be familiarized with the salient elements and characteristics of drama.
- be able to identify the different forms and types of drama.
- be capable to identify the various trends and characteristics of significant dramatic movements through the representative dramas.
- be equipped with the tools and techniques to critically appreciate drama.
- imbibe human values reflected in the selected plays.
- justify that drama is reflection / representation of life.
- develop analytical skills and critical thinking through close reading of the represnttative dramas.

Semester III:	**Paper II**	**Total Credits: 03**
Course Title: Optional English: Introduction to Drama		

Total Lectures: 45

Course Content

Unit 1: **No. of lectures: 15**

Definition, Concept and Significance of Drama

Origin and Development of Drama

Terms and Concepts associated with Drama:

Plot (Main Plot, Sub-plot, Simple, Complex, Peripeteia and Anagnorisis, Exposition, Complication, Resolution, Denouement, Climax, Anti-climax)

Character (Hero, Villain, Confidante, Foil)

Act and Scene,

Soliloquy and Aside,

Music, Chorus Lights, Masks, Proscenium Arch, Play within Play, Subtext, Catharsis, Hamartia, Comic relief, Unity of action, time and place, Narrator and Sutradhar, etc.

Unit 2: **No. of lectures: 15**

Sophocles : *Oedipus Rex / Oedipus, The King*

OR

John Galsworthy : *Strife*

Unit 3: **No. of lectures: 15**

Girish Karnad : *Flowers*

OR

Mohan Rakesh : *Half-way House (Adhe Adhure)*

Evaluation: First Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

Semester IV:	**Paper II**	**Total Credits: 03**
Course Title: Optional English: Introduction to Drama		

Total Lectures: 45

Course Content

Unit 1: **No. of lectures: 15**

Types of Drama (based on form, content, function, theme, style, etc.):

Interlude, Chronicle Plays, Mystery Plays, Miracle Plays, Morality Plays, Romantic Comedy, Comedy of Humours, Restoration Comedy of Manners, Sentimental Comedy, Senecan Plays or Revenge Plays, History Plays, Heroic Drama, Blank Verse Drama, Poetic Drama / Verse Drama, Drama of Ideas / Problem Play, Expressionist Plays, Epic Theatre, Absurd Plays, Plays by Angry Young Men, Kitchen Sink Drama, Theatre of Cruelty, Comedy of Menace, etc.

Unit 2: **No. of lectures: 15**

Eugene O'Neil : *The Hairy Ape*

OR

Lorraine Hansberry : *A Raisin in the Sun*

Unit 3: **No. of lectures: 15**

Wole Soyinka : *The Lion and the Jewel*

OR

David Williamson : *The Removalists*

Evaluation: Second Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

References:

Abrams, M. H. and Harpham, Geoffrey Galt. *A Glossary of Literary Terms.* Cengage Learning, 2015.

Ackerman, Alan Louis, editor. *Reading Modern Drama*. University of Toronto Press, 2012.

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Andermahr, Sonya. et al. *A Glossary of Feminist Theory.* Arnold, 2000.

Athenian Society. *Drama, Its History.* Nabu Press, 2012.

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Birch, Dinah, editor. *The Oxford Companion to English Literature*. Oxford UP, 2009.
Boulton, Marjorie. *The Anatomy of Drama*. Routledge, 2015.
Brandon, James R. *Theatre in Southeast Asia.* Harvard UP, 2009.
Brooks, Cleanth and Heilman, Robert B. - *Understanding Drama.* Creative Media Partners, 2018.
Cavanagh, Dermot Alan Gillis et.al., editors. *The Edinburgh Introduction to Studying Literature.* Edinburgh UP, 2010.
Chakrabarti, Piyas. *Anthem Dictionary of Literary Terms and Theory.* Anthem Press, 2006.
Chakraborty, Kaustav. *Indian Drama in English*. PHI Learning Pvt. Ltd., 2014.
Chatterji, Suniti Kumar. *Indian* Drama. The Publications Division, Ministry of Information and Broadcasting, Government of India, National Printing Works, 1956.
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Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries.* Orient BlackSwan, 2014.
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Dawson, S. W. *Drama & the Dramatic*. Routledge, 2018.
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Fleming, Mike. *Starting Drama Teaching*. Routledge, 2017.
Ford, Boris. *The Pelican Guide to English Literature.* Volume I to X. Penguin Books,1991.
Galsworthy, John. *Strife.* Books Way, 2021.
Gibson, Arthur. *What is Literature.* Peter Lang Pub Inc, 2007.
Hansberry, Lorraine. *A Raisin in the Sun.* Vintage, 2004.
Hudson, W. H. *An Introduction to the Study of English Literature.* G. K. Publishers Pvt. Ltd., 2011.
Hudson, W. H. *An Outline History of English Literature.* G. K. Publishers Pvt. Ltd., 2011.
Karnad, Girish. *Collected Plays Vol. II.* edited by Aparna Bhargava Dharwadker, Oxford UP, 2011.
Keith, A. Berriedale, *The Sanskrit Drama: In its Origin, Development Theory & Practice*. Oxford UP, 1998.
Kennedy X. J. and Dana *Gioia. An Introduction to Fiction, Poetry, and Drama.* HarperCollins College Publishers Inc., 1995.
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Krasner, David. *A History of Modern Drama*. Volume I, Wiley-Blackwell, 2012.
Krasner, David. *A History of Modern Drama*. Volume II 1960-2000, Wiley-Blackwell, 2016.
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Michael. *A History of English Literature*. Palgrave Macmillan, 2000.
Naik, M. K. *A History of Indian English Literature*. Sahitya Akademi, 2009.
Nicoll, Allardyce. *The Theory of Drama*. Doaba Publications, 1998.
O'Neil, Eugene. *The Hairy Ape.* Good Press, 2019.
Prasad, Birjadish. *Background of the Study of English Literature*. Macmillan, 1999.
Pritner, Cal, and Scott E. Walters. *Introduction to Play Analysis*. Waveland Press, 2017.
Quinn, Edward. *A Dictionary of Literary and Thematic Terms.* Facts on File Inc., 2006.
Rakesh, Mohan. *Halfway House.* Translated by Bindu Batra. Worldview Publications, 1999.
Rees, R. J. *English Literature: An Introduction to Foreign Readers*. Macmillan, 1982.
Rush, David. *A Student Guide to Play Analysis*. Carbondale, IL: Southern Illinois UP, 2005.
Salgado, Gamini. *English Drama: A Critical Introduction.* St. Martin's Press, 1980.

Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford UP, 2004.
Shepherd-Barr, Kirsten. *Modern Drama: A Very Short Introduction*. Oxford UP, 2016.
Sophocles. *Oedipus Rex*. edited by R. D. Dawe, Cambridge UP, 2006.
Soyinka, Wole. *The Lion and the Jewel*. Oxford UP, 1974.
Styan, J. L. *Elements of Drama.* Cambridge UP, 2001.
Styan, J. L. *Modern Drama in Theory and Practice.* Cambridge UP, 1980.
Turco, Lewis. *The Book of Literary Terms.* UP of New England, 1999.
Walsh William, *Commonwealth Literature.* Oxford UP, 1973.
Widdowson, Peter. *The Palgrave Guide to English Literature and its Contexts 1500-2000.* Palgrave Macmillan, 2004.
Williamson, David. *The Removalists*. Currency Press, 1980.

Activity: Students should be encouraged to perform any scene or act from any play.

MOOCs:

Merin Simi Raj. Twentieth Century American Drama. IIT Madras.
https://nptel.ac.in/noc/courses/noc21/SEM2/noc21-hs75/

Prof. Aysha Iqbal. American Literature and Culture. IIT Madras.
https://nptel.ac.in/noc/courses/noc21/SEM2/noc21-hs63/

Chattopadhyay, Sayan. 'Introduction to Literary Theory.' IIT Kanpur.
https://onlinecourses.nptel.ac.in/noc20_hs82/preview

Perui, Avishek . 'Gender and Literature'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs59/preview

Raj, Merin Simi. 'History of English Language and Literature'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs52/preview

Perui. Avishek. 'Feminists Writings'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs58/preview

Web Resources:

1. https://youtu.be/2CVO9Vd067U (Greek Theatre Explained)
2. https://youtu.be/4_XPcAwmuLg (Ancient Greek Theatre and Machinery)
3. https://ingilizedebiyati.net/wp-content/uploads/ABSURD_DRAMA.pdf
   The Theatre Of The Absurd: The Basics
4. https://asianethnology.org/downloads/ae/pdf/a430.pdf
   Indian Folk Traditions and the Modern Theatre
5. https://www.mansworldindia.com/currentedition/from-the-magazine/drama-mahesh-dattanis-life/
6. https://en.wikipedia.org/wiki/Indian_classical_drama#:~:text=The%20term%20Indian%20classical%20drama,highest%20achievement%20of%20Sanskrit%20literature. (Indian Classical Drama)
7. http://www.unishivaji.ac.in/uploads/distedu/Home/SIM%202015/B.%20A.%20III%20Understanding%20Drama%20Paper-9.PDF
   Understanding Drama

8. http://notedesk.blogspot.com/2017/05/allied-i-background-to-study-of-english.html
Elements of Drama

9. http://notedesk.blogspot.com/2017/05/allied-paper-ii-background-to-study-of.html
Drama

10. https://web.archive.org/web/20051107010423/http://www.hccy.cg.catholic.edu.au/home/pamela_cohen/removalists/removalistindex.htm
The Removalists: A Study Guide

Syllabus Drafting Committee

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University of Mumbai

Syllabus for S.Y.B.A. (English) (Ancillary)

Course: Optional English: Introduction to Poetry

Paper III

(Choice Based Credit System with effect from the Academic Year 2022-2023)

1. Syllabus as per Choice Based Credit System (CBCS):

i) Name of the Program **:** S.Y.B.A. English (Ancillary)

ii)	**Course Code**	**:** Semester III UAENG302 & Semester IV UAENG402
iii)	**Course Title**	**: Optional English: Introduction to Poetry Paper III**
iv)	**Semesterwise Course Contents**	**:** Enclosed the copy of the syllabus
v)	**References and Additional References:** Enclosed in the Syllabus	
vi)	**Credit Structure**	03
vii)	**No. of lectures per Unit**	15
viii)	**No. of lectures per week**	03
2.	**Scheme of Examination**	**:** 5 Questions of 20 marks each
3.	**Special notes , if any**	**:** No
4.	**Eligibility, if any**	**:** No
5.	**Fee Structure**	**:** As per University Structure

6. Special Ordinances / Resolutions if any: No.

SYBA English (Ancillary) Course Title:

Optional English: Introduction to Poetry

Paper III

(100 Marks Examination Pattern)

Objectives of the Course:

- To introduce students to different genres and forms of poetry
- To sensitize them to the rhythmical and formal properties of poetry by introducing key elements of poetry
- To provide them with basic poetic devices for analyzing poems
- To introduce them to the trends and characteristics of significant poetic movements through representative poems
- To develop their skills in reading, writing and to critically appreciate poetry
- To introduce students to poetry produced in various social and cultural context

Course Outcome: By the end of the course, a student should develop the ability to:

- Identify different genres and forms of poetry
- Identify poetic technique, style and rhetorical devices used in poetry
- Critically appreciate poems by separating various component parts and investigating the relationship of the parts to the whole
- Demonstrate understanding of wide range of poems from different historical periods, written in a wide range of forms, styles and subject matter
- Identify the major poets of world literature and define the importance of their works
- Enhance their cultural sensitivity through reading of representative poems from diverse cultural context

Semester III: Paper III Total Credits: 03

Course Title: Optional English: Introduction to Poetry

Total Lectures: 45

Unit I **15 Lectures**

A) Elements of Poetry: Turns of Speech: Voice and persona, tone, mood, attitude; Diction: Denotation and connotation; Imagery; Symbol; Allegory; Figurative Language; Music: Rhyme and Rhythm, Scansion (scansion to be taught and practiced; not for evaluation)

B) Types of Verse: Nature, characteristics and functions: Epic, lyric, sonnet, elegy, ode, ballad, dramatic monologue and free verse

Unit II **15 Lectures**

John Milton :'Invocation' (from *Paradise Lost*), Book 1, Lines 1-26

Robert Frost :'The Road Not Taken'

Edmund Spenser : 'Men Call you Fayre…'(*Amoretti* LXXIX)

William Shakespeare : Sonnet 19, 'Devouring Time, blunt thou the Lion's paws'

Walt Whitman :'O Captain! My Captain!'

Ralph Waldo Emerson: 'Ode to Beauty'

W. B. Yeats : 'The Song of Wandering Aengus'

Unit III **15 Lectures**

John Keats : 'La Belle Dame sans Merci'

Alfred Lord Tennyson: 'Ulysses'

Rabindranath Tagore : 'Freedom'

Sarojini Naidu : 'Indian Weavers'

Wole Soyinka : 'To My First White Hairs'

Pablo Neruda : 'You Start Dying Slowly'

Nissim Ezekiel : 'Enterprise'

Evaluation Pattern:

Third Semester End Examination Pattern	**Duration: 3 Hours**	**Marks: 100**
Question 1(A): Short notes on Unit I (A)	(2 out of 4)	:10 Marks
and		
Question 1 (B): Short notes on Unit I (B)	(2 out of 4)	:10 Marks
Question 2: Essay on Unit II	(1out of 3)	:20 Marks
Question 3: Essay on Unit III	(1 out of 3)	:20 Marks
Question 4: Short Notes on Unit II	(2 out of 4)	:20 Marks
Question 5: Short Notes on Unit III	(2 out of 4)	:20 marks

Semester IV:	**Paper III**	**Total Credits:03**
	Course Title: Introduction to Poetry	
		Total Lectures: 45

Unit I: Trends and Movements in Poetry: Modernism and after **15 Lectures**

Modernism, War Poetry, Harlem Renaissance, Imagism, Symbolism, Surrealism, Confessional Poetry, Beat poetry, Modernism in Indian English Poetry

Unit II **15 Lectures**

T.S. Eliot :'The Love Song of J. Alfred Prufrock'

Wilfred Owen :'Anthem for Doomed Youth'

Claude McKay :'If We Must Die'

William Carlos Williams :'The Red Wheelbarrow'

Wallace Stevens :'Sunday Morning'

Kamala Das :'An Introduction'

Arun Kolatkar :'The Bus'

Unit III **15 Lectures**

Phillip Larkin :'Church Going'

Robert Creeley : 'I Know a Man'

Meena Kandasamy :'Touch'

Gabriel Okara: : 'The Mystic Drum'

Chinua Achebe : 'Refugee Mother and Child'

Margaret Atwood : 'This is a Photograph of Me'

Derek Walcott : 'A Far Cry from Africa'

Evaluation Pattern:

Fourth Semester End Examination Pattern	**Duration: 3 Hours**	**Marks: 100**

Question 1: Short notes on Unit I	(4 out of 6)	:20Marks
Question 2: Essay on Unit II	(1out of 3)	:20 Marks
Question 3: Essay on Unit III	(1 out of 3)	:20 Marks
Question 4: Short Notes on Unit II	(2 out of 4)	:20 Marks
Question 5: Short Notes on Unit III	(2 out of 4)	:20 marks

References:

Abrams, M.H. *Glossary of Literary Terms*. Macmillan Publishers, 2000.

Adams, Stephen J. *poetic designs: an introduction to meters, verse forms and figures of speech.* Broadview Press Ltd., 2003.

Albert, E. *History of English Literature*, Oxford University Press, 2009.

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Altieri, Charles. *The Art of Twentieth-Century American Poetry: Modernism and After,* Blackwell Publishing Professional, 2006.

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Das, Kamala, *The Old Playhouse and Other Poems.* Orient Longman, 1973.

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Edmond Gore and Alexander Holmes. *What is Poetry*? Nabu Press, 2010.

Ezekiel, Nissim. *Latter- day Psalms*. Oxford University Press,1982

Ferry, Anne. *Milton's Epic Voice: The Narrator in Paradise Lost,* University of Chicago Press, 1963.

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Fowler, Roger. ed., *A Dictionary of Modern Critical Terms*. Routledge & Kegan Paul, 1987.

Friedlander, Benjamin. (ed.) *Robert Creeley: Selected Poems 1945-2005.*University of California Press,2008.

Gibson, Arthur. *What is Literature*, Peter Lang Pub Inc., 2007.

Gross, Harvey and Robert McDowell. *Sound and Form in Modern Poetry*. U of Michigan Press1996.

Helbling, Mark, *The Harlem Renaissance: The One and the Many*, Greenwood Press,1999.

Hobsbawm, Phillip. *Metre, Rhythm and Verse Form*.Routledge,1996.

Hudson, W.H. *An Outline History of English Literature*, G K Publishers Pvt. Ltd. 2011.

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-----. *An Anthology of New Indian English Poetry*. Rupa Publications, 1994.
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Roberts, Neil (ed.), *A Companion to Twentieth Century Poetry*. Blackwell, 2003.
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Smith A. J. M., (ed.), *The Oxford Book of Canadian Verse.* Oxford University Press 1965.
Smith A. J. M. (ed.), *Masks of Poetry: Canadian Critics on Canadian Verse*. McClelland and Stewart, 1968.
Soyinka Wole (ed.), *Poems of Black Africa, African Writers Series.* Heinemann Educational Books, 1975.
Spenser, Edmund. Amoretti: *A Sonnet Cycle.* Portable Poetry, 2017,
Thiong'o, Ngugi wa. *Homecoming: Essays on African and Caribbean Literature, Culture and Politics.* Educational Books, 1972.
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Walsh William, *Commonwealth Literature*, Oxford University Press, 1973.
Widdowson, Peter. *The Palgrave Guide to English Literature and its Contexts 1500-2000.* Palgrave Macmillan, 2004

MOOCs:

Dhanwal, S. P. 'Poetry'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs64/preview
Chattopadhyay, Sayan. 'Introduction to Literary Theory.' IIT Kanpur.
https://onlinecourses.nptel.ac.in/noc20_hs82/preview
Perui, Avishek . 'Gender and Literature'.IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs59/preview
Raj, Merin Simi. 'History of English Language and Literature'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs52/preview
Perui. Avishek. 'Feminists Writings'. IIT Madras.
https://onlinecourses.nptel.ac.in/noc20_hs58/preview

****

Syllabus Sub-Committee:

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Dr. H. L. Narayana Rao, Member, Department of English, Bhavan's College, Andheri.

Mr. Shailesh Bagdane, Member, Department of English, Gokhale Education Society's Arts, Commerce and Science College, Jawhar, Palghar.

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University of Mumbai

Syllabus for S.Y.B.A. (Applied Component)

Course: Business Communication

Paper I & II

(Choice Based Credit System with effect from the Academic Year 2022-2023)

1. Syllabus as per Choice Based Credit System (CBCS):

i.	**Name of the Program**	**:** S.Y.B.A. (Applied Component)
ii.	**Course Code**	**:** Semester III (UABC301) Semester IV (UABC401)
iii.	**Course Title**	**: Business Communication Papers I and II**
iv.	**Semester wise Course Contents**	**:** Enclosed in the Copy of the Syllabus
v.	**References & Additional References**	**:** Enclosed in the Syllabus
vi.	**Credit Structure**	**:** Number of credits per Semester – 02
vii.	**No. of lectures per Unit**	**:** As mentioned in the syllabus
viii.	**No. of lectures per week**	04

2.	**Scheme of Examination**	**: 05 Questions** of 20 Marks each
3.	**Special notes, if any**	**:** No
4.	**Eligibility, if any**	**:** No
5.	**Fee Structure**	**:** As per University Fee Structure
6.	**Special Ordinances / Resolutions if any**	**:** No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Business Communication

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course: This course aims to introduce students with

- To build up comprehensive understanding of business correspondence and conditions.
- To create influential oral, written and practical skills among students.
- To develop the powerful utilization of communication technologies.
- To equip students with the career skills such as collaborative working at workplace, interviews, etc.

Course Outcome: At end of the course learners will develop

- Theoretical understanding of both business and communication
- The business correspondence techniques.
- Competency in effective use of media and electronic devices in business.
- Interpersonal skills, presentation skills, oral, written and listening skills.

Semester III: Applied Component: Paper-I Total Credits: 02 **Course Title: Business Communication**

Total Lectures: 60

Unit I : Theory of Communication (05)

- Concept of Communication
- Meaning
- Definition
- Process
- Need
- Feedback
- Emergence of Communication as a key concept in the Corporate and Global world

Unit II : Communication at the Workplace

i. Channels of Communication (03)

Formal and Informal – Vertical, Horizontal, Diagonal and Grapevine

ii. Methods of Communication (05)

Verbal, Non-Verbal and Visual (including Kinesics, Para-Language, Proxemics, Silence, Sign, Signal and Symbol)

iii. Business Etiquette **(04)**

Office Etiquette, Internet Etiquette / Netiquette, Business Card Etiquette, Handshake Etiquette, Mobile Phone Etiquette

iv. Barriers to Communication and Ways to Overcome Them **(06)**

Physical or Environmental, Semantic or Language, Psychological and Cross-Cultural Barriers

Ways to Overcome these Barriers

v. Listening **(04)**

What is Listening?
The Listening Process
Importance of Good Listening
How to Develop Effective Listening Skills
Obstacles to Listening

vi. Business Ethics **(07)**

What is Ethics? Business Ethics?
Importance of Business Ethics at Workplace
Digital Ethics
Environmental Ethics
Ethics in International Business
Corporate Social Responsibility

Unit III: New Media in Communication **(07)**

- Impact of Technology Enabled Communication
- Video Conference: Skype, Google Meet, Go-To-Meeting and Jio-Meet
- Social Media: WhatsApp, Twitter, Facebook, Instagram, Telegram and Blogs

Unit IV: Business Correspondence

i. Theory of Business Letter Writing **(05)**

- Principles of Effective Letter Writing
- Parts of a Business Letter
- Layout of a Business Letter (Full Block)

ii. Personnel Correspondence **(09)**

Job Application Letter and Resume
Letter of Recommendation
Letter of Appointment
Letter of Acceptance of Job Offer
Letter of Appreciation
Letter of Resignation

Unit V : Paragraph Writing and Book Review

i. Paragraph Writing **(02)**

Developing an idea, using appropriate linking devices, etc.
Cohesion and Coherence, etc.

ii. Book Review **(03)**

Steps in writing a book review: Introduction, Summary, Opinion and Conclusion
Recommended Books are: *The Wings of Fire* by Dr. APJ Abdul Kalam,
Bhujia Barons: *The Untold Story of How Haldiram Built a 5000 Crore Empire* by Pavitra Kumar and
The 7 Habits of Highly Effective People by Stephen Covey

Evaluation Pattern:

Third Semester	**End Examination Pattern**	**Duration: 3 Hours**	**Marks: 100**

Question 1. **:20 Marks (10+05+05)**

A. Explain the terms in 2 to 3 sentences (five out of eight) (from all Units)

B. Objective type questions (From all Units)

C. True or False (From all Units)

Question 2. Short Notes (four out of six) (From Unit – I and III) **:20 Marks**

Question 3. Essay Type Questions (two out of three (From Unit – II) **:20 Marks**

Question 4. Personnel Letters (four out of five) **:20 Marks**

Letter of Recommendation

Letter of Appointment

Letter of Acceptance of Job Offer

Letter of Appreciation

Letter of Resignation

Question 5. **20 Marks (10+05+05)**

A. Job Application Letter with Resume (05+05)

B. Book Review

C. Paragraph Writing

Semester IV:	Title of the paper:	Paper- II	Total Credits:03
	Course Title: Business Communication		

Total Lectures: 60

Unit I : Group Communication

i. Group Discussion and Interview **(08)**

- Group Discussion

What is GD? Effective Participation in GD, Role of Participants in GD and Role of Evaluators

- Interview, Definition

Preparing for an interview: the Interviewer and the Interviewee

Types of interview: Selection Interview, Appraisal Interview, Stress Interview, Exit Interview and Online Interview

- Soft Skills - Emotional Quotient (EQ), Conflict Management

ii. Meetings **(10)**

- Need and Importance of Meetings
- Types of Meetings: Formal and Informal Meetings
- Preparation and Conduct of Formal Meetings and Group Dynamics
- Role of the Chairperson
- Role of the Participants
- Drafting of Notice, Agenda and Resolutions
- Secretary: Types of Secretaries- Company Secretary/Private Secretary, Functions of Secretaries.

iii. Committees and Conferences **(08)**

- Committee

Definition of Committee

Types of Committees

Advantages and Disadvantages of Committee

- Conference

Definition of Conference

Organizing a Conference

Advantages and Disadvantages of organizing a conference

Unit II: Public Relations **(10)**

- Meaning
- Functions of the PR Department of an Organization
- Qualification of a PRO
- External and Internal Measures of Promoting PR
- Crisis Management
- Definition
- Causes of Crisis
- Types of Crisis
- Stages for Crisis Management

- Role of Crisis Manager

Unit III: Business Correspondence **(10)**

- Letters of Inquiry
- Letters of Reply to Inquiry
- Letters of Complaint, Claim and Adjustments
- Sales Letters
- Consumer Grievance Redressal Letters

Unit III : Report Writing **(06)**

- Parts of a Business Report
- Drafting Feasibility Reports
- Drafting Investigative Reports

Unit V : Language and Writing Skills **(08)**

i. Presentation Skills

- Principles of Effective Presentation
- Use of PPT
- How to make effective Power-Point Presentation

ii. Interactive Sessions (Not to be assessed in exam)

- Group Discussion
- Mock Interview

Evaluation Pattern:

Fourth Semester End Examination Pattern	**Duration: 3 Hours**	**Marks: 100**

Question 1. Short Notes (four out of six) **:20 Marks**
(From Unit – I Group Discussion, Interviews, Meetings)

Question 2. Essay Type Questions (two out of three) **:20 Marks**
(Based on Committees, Conferences and Public Relations)

Question 3. Trade Letters (four out of five) **:20 Marks**
Letters of Inquiry
Letters of Reply to Inquiry
Letters of Complaint, Claim and Adjustments
Sales Letters
Consumer Grievance Redressal Letters

Question 4. Answer the following questions **:20 Marks (10+10)**

A. Drafting Notice, Agenda and Two Resolutions (03+03+04)

B. Report Writing (One out of two) (10)

Question 5. Answer the following questions. **:20 Marks (10+05+05)**

A. Explain the terms in 2 to 3 sentences (five out of eight) (from all Units)

B. Multiple Choice Questions (From all Units)

C. Short Notes (From Unit-V (i) Presentation Skills)

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Books for Book Review:

1. Kalam, APJ. *Wings of Fire*. University Press, 1999.
2. Covey, Stephen. *The 7 Habits of Highly Effective People*. Electronic Ed. RosettaBooks LLC, 2012.
3. Kumar, Pavitra. *Bhujia Barons: The Untold Story of How Haldiram Built a 5000 Crore Empire*. Potfolio/Penguin, 2016.

Web Resources:

1. http://lifehacker.com/top-10-ways-to-improve-your-communication-skills- 1590488550
2. https://www.thebalance.com/verbal-communication-skills-list-2059698
3. https://bemycareercoach.com/soft-skills/list-soft-skills.html
4. https://www.thebalance.com/verbal-communication-skills-list-2059698
5. https://bemycareercoach.com/soft-skills/list-soft-skills.html
6. https://www.sitepoint.com/social-networking-sites-for-business

Suggested List of YouTube Videos:

1. https://www.youtube.com/watch?v=K15ca0n0ois
2. https://www.youtube.com/watch?v=ixSUB11WNxk
3. https://www.youtube.com/watch?v=K15ca0n0ois

MOOCs:

1. https://www.mooc-list.com/tags/communication-skills
2. https://www.mooc-list.com/tags/effective-communication
3. http://www.about.com/Communication+Skills+List

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UNIVERSITY OF MUMBAI

Syllabus for

S.Y.B.A. (Applied Component)

Course Title: Mass Communication

Paper I & II

(Choice Based Credit System with effect from the Academic Year 2022-2023)

7. Syllabus as per Choice Based Credit System (CBCS):

ix.	**Name of the Program**	**:** S.Y.B.A. (Applied Component)
x.	**Course Code**	**:** Semester III (UAMASSCOM301) Semester IV (UAMASSCOM401)
xi.	**Course Title**	**: Mass Communication** **Papers I and II**
xii.	**Semester wise Course Contents**	**:** Enclosed in the Copy of the Syllabus
xiii.	**References & Additional References**	**:** Enclosed in the Syllabus
xiv.	**Credit Structure**	**:** Number of credits per Semester – 02
xv.	**No. of lectures per Unit**	**:** As mentioned in the syllabus
xvi.	**No. of lectures per week**	04

8. **Scheme of Examination** **: 05 Questions** of 20 Marks each

9. **Special notes, if any** **:** No

10. **Eligibility, if any** **:** No

11. **Fee Structure** **:** As per University Fee Structure

12. **Special Ordinances / Resolutions if any** **:** No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Mass Communication

Paper I & II

(100 Marks Examination Pattern)

Learning Objectives:

1. To introduce some major aspects of communication, mass communication processes, crucial mass media theories and mass communication industries
2. To develop a broad perspective of the past and the present status of mass media in India
3. To comprehend different types of Mass Media and gain a critical understanding of the impact of mass media on Indian history, society and culture
4. To develop critical awareness of the ethics and ideologies in mass media products
5. To understand the mass media laws in India, and how these laws shape the media practices
6. To introduce students to the application of social media
7. To identify various careers opportunities in media industry.

Course Outcome:

By the end of the course the students should be able to

1. understand the importance, scope, and function of communication and media
2. understand the strengths and limitations of basic theories of mass communication
3. demonstrate knowledge of growth and development of various mass media
4. throw light on the present status of various mass media
5. gain knowledge about various media laws and ethics
6. critically understand and analyse various mass media products and explore various career opportunities in media industry.

Semester III – Paper I

Credits: 02

Lectures per week: 04 **Total lectures: 60 per semester**

Unit 1- Nature of Mass Communication (20 lectures)

A) Scope, need, and elements of communication

B) Meaning, definition, and features of Mass Communication

C) Mass media theories like Cultivation theory, Gatekeeping theory, Magic bullet/hypodermic needle theory

D) Functions of Mass Communication: entertainment, surveillance, education, interpretation, persuasion, socialization, opinion building

E) Mass audience & opinion leaders: concept, sociology and psychology

Unit II- Traditional media, Print Media and Radio (15 lectures)

A) Folk media

B) The making of a newspaper: major formats of newspaper items

C) Partisan Journalism/Yellow Journalism/Objective Reporting

D) Major types of magazines

E) Radio as a patron of music

F) Radio News, Radio Drama, Community Radio and Campus Radio

Unit III- Films/ Cinema (15 lectures)

A) History of Indian cinema and major milestones

B) Major types of films/cinema: Documentaries, Art films, Animations, Short films, and Biopics

C) Some aspects of film making (scripting, directing, sounds)

D) The impact of films/cinema on society

E) Ethics of cinema

Unit IV- Trends in New media or Digital media (10 lectures)

A) Online news websites

B) Social media and social networking sites

C) Special issues regarding social media: mass campaigns; fake news; fact-checkers

D) Film streaming services (Netflix, Amazon Prime)

E) Web series

Evaluation Pattern:

Third Semester End Examination

Duration: 3 Hours **100 Marks**

Q.1. Objective Type:

a) Explain the following in 2/3 sentences (5 terms from all the 4 units): 10 marks

b) Multiple choice questions (5 questions on all the 4 units): 05 marks

c) State whether the statements are true or false (5 statements on all the 4 units): 05 marks

Question No. 2 to 5 on Unit No. 1 to 4 respectively:

Q.2 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.3 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Q.4 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.5 a) 1 Full length essay type question: 20 marks

OR

b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Semester IV – Paper II

Credits: 2

Lectures per week: 04 **Total lectures: 60 per semester**

Course Title: Mass Communication

Unit I- Evolution of Different Media and the Contemporary Context (10 Lectures)

A) Beginnings of mass media in India

B) Technological milestones and changing trends from conventional to digital media

C) Role of media in national development

D) Reach of media (regional and demographic coverage)

Unit II - Television (15 lectures)

A) Major formats of TV programmes

B) Television and its impact on Indian families

C) Television and consumerism

D) Television and surveillance

E) Reality Television

Unit III- Media-related Issues and Laws in India (20 lectures)

A) Freedom of expression and Censorship

B) Relationship between media and government

C) Media objectivity, media bias, and political leanings

D) Trial by media and media ethics (Television and Print)

E) Objectionable advertising

F) Information technology (IT) Acts related to media

G) Major laws in India related to media

Unit IV- Functions of Media Personnel and Careers in Media (15 lectures)

A) Cyber Journalism

B) Editors

C) Translators

D) Copywriters

E) Role of Radio Jockey/Video Jockey

F) Blogging

G) Writing jingles

H) Voice-over Artists

I) Public Relations specialists

J) Advertising/marketing specialists

K) Script-writers

L) Newsreaders

M) Researchers/Writers

N) Music specialists

O) Social media specialist

Evaluation Pattern:

Fourth Semester End Examination

Duration: 3 Hours **100 Marks**

Q.1 Objective Type:

a) Explain the following in 2/3 sentences (5 terms from all the 4 units) :10 marks
b) Multiple choice questions (5 questions on all the 4 units) :05 marks
c) State whether the statements are true or false (5 statements on all the 4 units):05 marks.

Question No. 2 to 5 on Unit No. 1 to 4 respectively:

Q.2 a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.3 a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.4 a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

Q.5 a) 1 Full length essay type question : 20 marks
OR
b) 2 Short essay type questions (a and b): (10+10) = 20 marks

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UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.A. (English)
(Applied Component)
Program: B.A.

Course: Introduction to Journalism

(Choice Based Credit System with effect from the academic year 2022-2023)

1. Syllabus as per Choice Based Credit System with effect from the academic year 2021-2022

i)	**Name of the Program**	**: B.A.**
ii)	**Course Code**	**: Semester III UAJOUR301**
		Semester IV UAJOUR401
iii)	**Course Title**	**: S.Y.B.A. Introduction to Journalism**
		(Applied Component)
		SEM III: Fundamentals of Journalism and Reporting
		SEM IV: Editing, Feature Writing and Layout
iv)	**Semester wise Course Contents**	**: Enclosed the copy of syllabus**
v)	**References and Additional References:**	**Enclosed in the Syllabus**
vi)	**Credit Structure**	**: No. of Credits per Semester – 02**
vii)	**No. of lectures per week**	**04**
2.	**Scheme of Examination**	**: 5 Questions of 20 marks each**
3.	**Special notes , if any**	**: No**
4.	**Eligibility, if any**	**: No**
5.	**Fee Structure**	**: As per University Structure**
6.	**Special Ordinances / Resolutions if any**	**: No**

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Introduction to Journalism

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course

1) To acquaint the learners with the basic concepts of journalism and to familiarize them with the content of a newspaper and departments of the newspaper publishing house.
2) To sensitize them to the styles of journalistic prose
3) To inculcate in them the skills of reporting, editing and feature writing in print medium
4) To enable the students to have a career perspective in journalism

Course Outcomes: By the end of the course, a student should develop the ability:

- To write in various journalistic formats effectively
- To write and edit reports and features
- To develop a career perspective in journalism

Semester III: Fundamentals of Journalism and Reporting (Applied Component) Paper I
Course code-UAJOUR301 **Credits 2**

Total: 60 Lectures

Unit 1: Introduction: **12 lectures**

(i) What is news (ii) Origin and development of the Indian Press (iii) Major Press Laws in India: Adam's Regulations, Vernacular Press Act (iv) Press and Socio-Political issues in pre- and post-Independence India (v) Journalism during Freedom Movement (vi) Press during the Emergency (vii) Photo-journalism

Unit 2: Agencies, Electronic Journalism, Ethics: **12 lectures**

(i) News Agencies, (ii) Press Syndicate (iii) Electronic Journalism (iv) Ethics in Journalism

Unit 3: Organization and Structure of a Newspaper House: **12 lectures**

Circulation, Advertising, Editorial and Mechanical Departments

Unit 4: Basics of Reporting: **12 lectures**

News Value, News Gathering, Readers' interest, Qualities and aptitude necessary for a reporter, Types of reports

Unit 5: **Writing of Reports:** **12 lectures**

Basic principles: objectivity, accuracy, speed, clarity and integrity; Parts of a news report; 5Ws; Headline writing; Types of Leads; and Report writing

Evaluation:	**Third Semester End Examination Pattern**	**100 Marks**	**3 Hours**

Question 1: Essay (1/2) or Short Notes (2/4) on Unit 1 :20 Marks

Question 2: Essay (1/2) or Short Notes (2/4) on Unit 2 : 20 Marks

Question 3: Essay (1/2) or Short Notes (2/4) on Unit 3 : 20 Marks

Question 4: Essay (1/2) or Short Notes (2/4) on Unit 4 : 20 Marks

Question 5: Students to write a news report with clear headlines and lead on a given topic or essay (1/2) on the basics of reporting on Unit :20 Marks

Semester IV: Editing, Feature Writing and Layout (Applied Component) Paper 2

Course code-UAJOUR401 Credits 2

Total: 60 Lectures

Unit 1: Basics of Editing: **8 lectures**

Principles of editing, Editorial policy, Role of the Editor, Role of the News Editor, Role of Chief Sub-editor, Role of Sub-editors

Unit 2: Process of Editing: **16 lectures**

Compiling of data, Editing for language and style, Editing for space, Editing for correctness, Editing for clarity

Unit 3: Editing an Article: **12 lectures**

Students are expected to learn how to edit an article for newsworthiness, length and suitable expression.

Unit 4: Basics of Feature Writing: **12 lectures**

Types of features: Obits, Reviews, Columns, Trend Stories.

Students are expected to learn how to write a feature on a contemporary topic.

Unit 5: Design and Make up: **12 lectures**

Make up and its functions, Types of Layout: Horizontal, Vertical Make up, Circus Make up, Modular layout, Broadsheet layout, Tabloid layout, Fonts and Typography

Evaluation: Fourth Semester End Examination Pattern 100 Marks 3 Hours

Question 1: Essay (1/2) or Short Notes (2/4) on Unit 1 :20 Marks
Question 2: Essay (1/2) or Short Notes (2/4) on Unit 2 :20 Marks
Question 3: Edit an article or report. : 20 Marks
Question 4: Write a feature on a contemporary topic (1/2) :20 Marks
Question 5: Essay (1/2) or Short Notes (2/4) Unit 5 : 20 Marks

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Kamath. M V. *Professional Journalism*. New Delhi: Vikas Publishing House, 1980.

Mencher, Melvin. *Basic News Writing*. New Delhi: Universal Book Stall, 1992.

Menon, P. K. *Practical Journalism*. Jaipur: Avishkar Publishers, 2005.

Natrajan. J. *History of Indian Journalism*. New Delhi: Ministry of Information and Broadcasting, 1995.
Parthasarathy, Rangaswami. *Basic Journalism*. New Delhi: MacMillan India Ltd. 1989.

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Syllabus for S.Y.B.A. (Public Relations)

(Applied Component)

Program: B.A.

Course: Public Relations

(Choice Based Credit System with effect from the academic year 2022-2023)

1. Syllabus as per Choice Based Credit System:

i) Name of the Program : S.Y.B.A. (Applied Component)

Semester III and IV

ii) Course Code : UAPR3A1 & UAPR4A1

iii) Course Title : Public Relations Papers I & II

iv) Semester wise Course Contents : Enclosed the copy of syllabus

v) References and Additional References : Enclosed in the Syllabus

vi) Credit Structure : No. of Credits per Semester – 02

vii) No. of lectures per week 04

viii) No. of lectures per unit 15

2. Scheme of Examination : 5 Questions of 20 marks each

3. Special notes, if any : No

4. Eligibility, if any : No

5. Fee Structure : As per University Structure

6.Special Ordinances / Resolutions if any : No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Public Relations

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course:

- To introduce learners to the origin, basic concepts and activities of Public Relations.
- To motivate learners to practice various basic skills required for successful career in the field of Public Relations
- To give learners an insight about the significance, uses and functions of Public Relations.
- To explain the learners importance of ethics and professional code for PR practitioners.
- To explicate the learners the role and function of Public Relations for Corporate field, education institutions, local self-government, government and NGOs
- To create awareness among students about various career opportunities available in the field of public relations and also to motivate them to pursue the same

Course Outcomes: By the end of the course,

- Students will be able to understand and explain the basic components and aspects of the Public Relations
- Students will comprehend and recognise the importance of Public Relations for achieving success in the various fields like business, education, works carried out by various government, local government bodies as well as non-government organisations
- Students will be able to practice various communication skills required in the field of Public Relations as well as in other fields
- Students will opt for various careers like PR officer as well as attempt to pursue other career opportunities in the field of Public Relations

Semester Three: Public Relations: Paper 1 - 2 Credits

Lectures: 60

Unit 1: Introduction to Public Relations

- The concept of Public Relations: Origin, definitions, activities, and role of PR
- Objectives of Public Relations
- Evolution and the development of modern Public Relations
- Development of Public Relations in India, Pre and post-independence period.

Unit 2: Principles, Components and importance of Public Relations for various sectors

- Principles of Public Relations
- Components of PR-Employees Relations, Industrial Relations, Community Relations, Customer Relations, Financial Relations, Press Relations, Government Relations and Liaison, Special Events, Counseling Research, Publicity, Fundraising/Launches
- Importance of Public Relations in business, industry, and for governmental, Public, nonprofit, nongovernmental organizations such as cultural, sports, educational organizations like trusts, clubs, schools, colleges etc.
- Misconceptions about PR –Propaganda, Fine Appearance, Free Gifts, Annual Parties, Protocol, Goodwill

.

Unit 3 : Process of Public Relations

- Defining the model, planning, execution and evaluation of the Action Plan of PR process
- Importance of communication in the process of PR, including theory, objectives, types, barriers, art of listening and communication skills required for successful process of PR
- Process and activities of Internal PR
- Process and activities of External PR

Unit 4 : Functions and tools of PR

- Functions and uses of Public Relations
- Media tools for PR- Press Release, Press Conference, Special Issue, News Clippings, Photo Gallery, Meetings
- Specific tools for PR- Family get together and outing, cultural programme for employees, Celebration of foundation day, week for specific purpose, camp, competition, lecture series, exhibition, open day, sponsorship, newsletter, in- house Journal etc.
- Crisis Management as PR function-types, guiding principles, preparation and role of PR in the Crisis management, services provided by PR during the crisis, the review of Crisis Management, Crisis communication in the times of Industrial disaster, consumer pressures, image problems, quality issues

Evaluation Pattern:
Third Semester End Examination
Duration:3 Hours 100 Marks

Question1. Objective type questions: (based on all units)

a) Explain the following concepts in three to five sentences each. (**Any five**) :**10 Marks**

(**7 Short answer Questions should be framed**)

b) Match the following pairs. :**05 marks**

c) State whether the following statements are true or false. **:05 marks**

Question 2. Based on Unit 1

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 3. Based on Unit 2

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 4. Based on Unit 3

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Question 5. Based on Unit 4

a) 1 Full length essay type question :20 marks

OR

b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Semester Four: Public Relations :Paper 2 - 2 Credits

Lectures: 60

Unit 1: Public Relations in Corporate Business

- Image Building of the brand, company and constituents of Image Building
- Corporate Social Responsibility and Public Relations
- New trends in corporate Public Relations-Benchmarking, Consultancy, Team Building, Branding and Image Building, Public Opinion, ICT technology and Digital Social Media like Facebook, twitter, linkedin, blogs etc.
- Corporate Citizenship and Public Relations
- Professional nature of Public Relations, reasons and factors responsible for the development of professional nature of public relations in business world, Research and training in the Public Relations

Unit 2: Ethics and Code of Conduct in PR

- Principles of Public Relations Practice
- Code of Ethics prescribed by PR Society of India
- IPRA Code of Conduct
- Purpose of Professional Bodies
- Code of AIR and T.V. Channels
- Code of commercial advertising on T.V. Channels
- Advertising and PR ethics.
- Impact of PR on the society

Unit 3: Public Relations in Practice

- Qualities of a PR Practitioner
- Areas of Work (Functions) of Public Relations Practitioners—Writing, Editing, Media Relations, Special Events, Mass Media Production ,Corporate Counseling, Crisis Communication, Managing News and Features
- Effective Oral Communication skill
- Skills for PR -Effective Public Speaking, Writing Skills, Debating Skills, Group Interaction.
- Written Communication and Audio-Visual Aids for PR

Unit 4: Public Relations and other related areas

- PR and Marketing, PR and Journalism, PR and Business Communication, PR and Psychology
- PR and advertising, types, creativity, message through entertainment, correlation and differences between PR and advertising
- PR Campaign
- Relations with Shareholders, Relations with Dealer – Distributor, Relations with Financial Institutions, Relations with other Business Groups Community Relations, Consumer Relations.

Evaluation Pattern:

Fourth Semester End Examination

Duration:3 Hours 100 Marks

Question1. Objective type questions: (based on all units)
a) Explain the following concepts in three to five sentences each. (**Any five**) :**10 Marks**
(7 Short answer Questions should be framed)
b) Match the following pairs. :**05 marks**
c) State whether the following statements are true or false. **:05 marks**

Question 2. Based on Unit 1

a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 3. Based on Unit 2
a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) =20 marks

Question 4. Based on Unit 3
a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Question 5. Based on Unit 4
a) 1 Full length essay type question :20 marks
OR
b) 2 Short essay type questions (a and b) :(10+10) = 20 marks

Suggested Readings :-

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Alison, Theaker., (2008) *The Public Relations Handbook,:*Routledge.

Banks Stephen P., (2003) Multicultural Public Relations, New Delhi: Surjeet Publications.

Block, Caroline. ,(2003*) The PR Practitioner's : A Handbook* ,Vivabooks Pvt Ltd.

Butterick,Keith. ,(2010) *Introducing Public Relations: Theory and Practice,* New Delhi: Sage Publications.

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Raucher, Alan R., (1968) *Public Relations and Business (1900- 1921),* Baltimore:The Jehn Hopkins Press.
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Tomar,Dinesh., (2008) *Public Relations Management*, New Delhi: Vista International Publishing House.
Vachani, Jagdish., (2007) *Public Relations Management in Media and Journalism*, New Delhi: Kanishka Publications.
Wragg, David, W.,(1992) *An introduction to Public- Relations* :U.K, Oxford.
प्रा डॉ कप्तान, सं जय.,प्रा फु ले,ककशोर,. (2009) जनसं पक, पु णे :डायमं ड पब्लिके शन्स . प्रा पु री,सु रे श. (2013)जनसं पक : सं कल्पना एवं कसद्धां त,औरं गाबाद :साद प्रकाशन.

Web Resources

The Era of Corporate Social Responsibility is Ending | Rachel Hutchisson | TEDxWilmington, @ https://www.youtube.com/watch?v=N8dXNzCIVxg accessed on 10th July 2020

The social responsibility of business | Alex Edmans | TEDxLondonBusinessSchool, @ https://www.youtube.com/watch?v=Z5KZhm19EO0 accessed on 12th July 2020

Re-thinking corporate social responsibility: Andy Le Seelluer at TEDxStHelier,@ https://www.youtube.com/watch?v=jga4s0Ei7Zs accessed on 15th July 2020

Book Review on "Corporate Communication", @https://www.youtube.com/watch?v=iu1I_zkq444 accessed on 25th July 2020

Career in Public Relations, @ https://www.youtube.com/watch?v=zdiNCOixLBA accessed on 25th July 2020

About PR in general: https://apps.prsa.org/AboutPRSA/PublicRelationsDefined/ accessed on 26th July 2020
Readings on Global PR: http://www.instituteforpr.org/global-public-relations/ accessed on 5th August 2020
Anderson, F., & Hadley, L. (1999). Guidelines for setting measurable public relations objectives. Institute for Public Relations, retrieved February 6, 2010, from http://www.instituteforpr.org/ipr_info/measureable_public_objectives accessed on 7th August 2020.

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UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.A.
(Women's Studies) (Applied Component)
Program: B.A.

Course: Women's Studies

(Choice Based Credit System with effect from the academic year 2022-2023)

1. Syllabus as per Choice Based Credit System:

i)	**Name of the Program**	**: B.A.**
ii)	**Course Code**	**: Semester III (UAWS3A1) and Semester IV (UAWS4A1)**
iii)	**Course Title**	**: Women's Studies (Applied Component)**
iv)	**Semester wise Course Contents**	**: Enclosed the copy of syllabus**
v)	**References and Additional References: Enclosed in the Syllabus**	
vi)	**Credit Structure**	**: No. of Credits per Semester – 02**
vii)	**No. of lectures per week**	**04**

2.	**Scheme of Examination**	**: 5 Questions of 20 marks each**
3.	**Special notes , if any**	**: No**
4.	**Eligibility, if any**	**: No**
5.	**Fee Structure**	**: As per University Structure**

6. Special Ordinances / Resolutions if any : No

Syllabus for S.Y.B.A. (Applied Component)

Course Title: Women's Studies

Paper I & II

(100 Marks Examination Pattern)

Objectives of the Course:

i. To enable an understanding of concepts such as sex and gender, patriarchy
ii. To enable an understanding of the construction of gender
iii. To provide insight into the workings of patriarchy and its oppressive nature
iv. To familiarize students with an understanding of feminist theory and the schools of feminist thought
v. To empower students with a knowledge of women's rights and legal safeguards
vi. To provide an understanding of major historical developments and feminist movements in feminist history
vii. To engender a critical understanding of literary and media texts dealing with women's issues

Course Outcome: By the end of the course, a student should develop the ability:

i. To articulate concepts linked to gender and feminism
ii. To have an understanding of patriarchy
iii. To have an awareness of crimes against women, and the constitutional and legal safeguards protecting / empowering women
iv. To have knowledge and understanding of feminist theory
v. To have a knowledge of feminist history
vi. To analyze and critically evaluate literary and media texts dealing with women's issues
vii. To be gender-sensitive, have a feminist outlook, and combat stereotypes and gender biases prevalent in society

Semester Three: Women's Studies :
Paper 1 (Applied Component) 2 Credits

Lectures: 60

Unit 1: An Introduction to Concepts, and the Scope and Practice of Women's Studies

a) Women's Studies: Relevance, Prospects and the Indian Context
b) Sex, Gender and Biological Determinism
c) Patriarchy as an oppressive ideology
d) Three Waves: Feminine, Feminist and Female

Unit 2: Schools of Feminism and Feminist Theory

a) Liberal Feminism
b) Marxist Feminism
c) Psychoanalytical Feminism
d) Radical Feminism

Unit 3: Combatting Crimes and Discrimination - Constitutional and Legal Safeguards for Women

a) Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)
b) National Policy on Empowerment of Women
c) Laws and safeguards against Rape and Sexual Harassment: Indian Penal Code; the Indecent Representation of Women Prohibition Act, 1987; the Vishakha Guidelines; the 'Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013'; the Internal Complaints Committee in organizations; the Zero FIR
d) Laws related to Women and Pregnancy: Maternity Benefit Act, 1961; Medical Termination of Pregnancy Act, 1971; The Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act, 2003; the Surrogacy (Regulation) Bill, 2016

Unit 4: Feminist historiography and Feminist Movements in India

a) Locating Women in History: The need for Feminist historiography
b) The Brahmo Samaj in India
c) The White Revolution, Amul and Women's Empowerment
d) The Nirbhaya case and combatting 'rape culture'

Unit 5: **Literary Texts**

a) Charlotte Perkins Gilman: "The Yellow Wallpaper"
b) James Joyce: "Eveline"
c) Fay Weldon: "Weekend"
d) Mahasweta Devi: "The Breast Giver"

Evaluation:	**Third Semester End Examination Pattern**	**100 Marks : 3 Hours**
Question 1:	One Essay or Two Short Notes	:20 Marks
Question 2:	One Essay or Two Short Notes	:20 Marks
Question 3:	One Essay or Two Short Notes	:20 Marks
Question 4:	One Essay or Two Short Notes	:20 Marks
Question 5:	One Essay or Two Short Notes	:20 Marks

Each question corresponds to the respective unit in the syllabus. In each question, there will be 2 essay type questions in options A and B respectively, and option C will have four short notes, with two to be attempted. There will be a choice of 3 questions: A (essay) or B (essay) or C (short notes).

Semester Four: Women's Studies (Applied Component) 2 Credits

Lectures: 60

Unit 1: Feminist History and Global Movements

a) The Seneca Falls Convention and Women's Suffrage Movement
b) Women Scientists and women in science
c) Women, Self-help Groups and Entrepreneurship
d) The #MeToo Movement

Unit 2: Schools of Feminism and Feminist Theory

a) Gynocriticism
b) Postmodern Feminism
c) Postcolonial Feminism
d) Intersectional Feminism

Unit 3: Women and Work

a) The Public-Private Dichotomy, sexual division of work and perceptions of jobs as gender-specific
b) Concepts of visible and invisible work, paid and unpaid labour
c) The Glass Ceiling, Sticky Floor and Glass Escalator Effects
d) Issues of working mothers and single working women

Unit 4: Women and the Media: Sexuality, Body Politics and Media Representations

a) Women and the Beauty Industry: Ageism, beauty standards, racism, cosmetic surgery, the Male gaze, and the casting couch phenomenon
b) Pregnancy related issues: Family Planning, Contraception, Abortion, Sex-determination, mental health and post-partum depression
c) Women on social media platforms, body shaming, cyber-bullying, cat-phishing, online stalking and harassment
d) The Representation of Women in the Media: Ads, Films, Music Videos and in the news

Unit 5: Literary and Media Texts

a) Sylvia Plath: "The Mirror"
b) Maya Angelou: "Still I Rise"
c) Short Films: *Juice* (directed by Neeraj Ghaywan), *Going Dutch* (Tittar Lodge Productions); *Ahalya* (directed by Sujoy Ghosh) and *Devi* (directed by Priyanka Banerjee)
d) Dove ads focusing on the campaign of 'real beauty'

Evaluation: Fourth Semester End Examination Pattern 100 Marks: 3 Hours

Question 1:	One Essay or Two Short Notes	:20 Marks
Question 2:	One Essay or Two Short Notes	:20 Marks
Question 3:	One Essay or Two Short Notes	:20 Marks
Question 4:	One Essay or Two Short Notes	:20 Marks
Question 5:	One Essay or Two Short Notes	:20 Marks

Each question corresponds to the respective unit in the syllabus. In each question, there will be 2 essay type questions in options A and B respectively, and option C will have four short notes, with two to be attempted. There will be a choice of 3 questions: A (essay) or B (essay) or C (short notes).

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1. Juice:
   https://www.youtube.com/watch?v=R-Sk7fQGIjE
2. Going Dutch:
   https://www.youtube.com/watch?v=iFFYF-fykaU
3. Devi
   https://youtu.be/2KP0aDTVtFI
4. Ahalya
   https://youtu.be/Ff82XtV78xo

MOOC

Andrea Walsh, and Elizabeth Fox. *WGS.101 Introduction to Women's and Gender Studies.* Fall 2014. Massachusetts Institute of Technology: MIT OpenCourseWare, https://ocw.mit.edu. License: Creative Commons BY-NC-SA.

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University of Mumbai

Syllabus for S.Y.B.A. (Applied Component)

Program: B.A.

Course: Introduction to Advertising

(Choice Based Credit System with effect from the Academic Year 2022-23)

1. Syllabus as per Choice-Based Credit System:

a) Name of the Program : S. Y. B.A. (Applied Component) Semester III and IV

b) Course Code : Semester III (UAIA3A1) Semester IV (UAIA4A1)

c) Course Title : Introduction to Advertising Semester III: Paper I, (Basic Concepts of Advertising)

Semester IV: Paper II, (Creativity and Research in Advertising)

d) Semester wise Course Contents : Enclosed the copy of syllabus

e) References and Additional References: Enclosed in the Syllabus

f) Credit Structure : No. of Credits per Semester – 02

g) No. of lectures per Unit 12

h) No. of lectures per week 04

2. Scheme of Examination : 5 Questions of 20 marks each

3. Special notes, if any : No

4. Eligibility, if any : No

5. Fee Structure : As per University Structure

6. Special Ordinances /: No Resolutions if any: No

S.Y. B.A. (Applied Component)

Course Title: Introduction to Advertising

Paper I & II

(100 Marks Examination Pattern)

- **Objectives:**

i) To introduce learners to the main subfields and basic modern concepts/ideas, theoretical models, empirical instruments and data sources in advertising.
ii) To encourage learners for further interest in advertising studies
iii) To develop professional communicative competence
iv) To introduce learners to different tools of communication for corporate identity /brand building through various advertising techniques

- **Course Outcomes:**

By the end of the course, learners should develop the following abilities:

i) To demonstrate a working knowledge of the following areas associated with the advertising industry: Target marketing, Ad agency organizations and operations, media strategies, use of electronic media, outdoor media, print media, sales promotions, etc.
ii) To write clearly, coherently and effectively about various concepts in advertising
iii) To define the economic and social impact of advertising on society
iv) To understand the communication process of advertising, marketing research, campaign strategies, concepts, budgets, creative process, and ethics in advertising.

Semester-III	**Applied Component**	**Paper – I**	**Total Credits – 2**

Course Title: Introduction to Advertising - Basic Concepts of Advertising

Total Lectures: 60

Unit- I Introduction to Advertising **12 Lectures**

a) Advertising: Evolution of Advertising, Features of Advertising, Active participants, Role of Advertising in Marketing Mix, Role of Advertising in society.
b) Classification of Advertising: Social Advertising, Political Advertising, Advocacy Advertising, Retail Advertising, Financial Advertising, Corporate Image Advertising, Print Media Advertising, Electronic or Broadcast Media Advertising, National Advertising, International Advertising, Advertising on Social media

Unit- II Advertising and Media for Marketing and Communication **12 Lectures**

a) Introduction to Integrated Marketing Communication, Advertising and Publicity, Public Relation, Sales promotion, Different Forms of Displays - Window Display, Showcases, Showrooms , Exhibitions, Trade Fairs,

Traveling Displays, Car Cards, Sky Writing or Sky Balloons, Word of Mouth Influence (WOM), Packaging,

b) Advertising and Brand Management, A History of Branding and Advertising, Psychology of Advertising, Media Ecology, Consumer Behaviour, Environmental Marketing Communications

Unit- III The impact of Media in Advertising **12 Lectures**

a) Factors influencing Media selection and Media Planning Strategies, Importance of Advertising in Marketing , Role of Celebrity Endorsers in Advertising,
b) Media options for advertising – Television, Radio , Internet, Print, Film, Outdoor advertising and Social Media,
c) Concepts - Media Buying, Media Selling, Media Mix, Clutter, Zipping & Zapping, Branding & Brand Positioning

Unit- IV Economic & Social Aspects of Advertising **12 Lectures**

a) Economic aspects of Advertising: Impact on production, distribution and consumer cost, advertising and competition, Understanding the role of advertising agencies.
b) Social aspects of advertising, advertising and culture (values, festivals, customs), standard of living, ethics in advertising, Advertising and Women, Advertising and Children, Ethical issues of Packaging and Branding, Ethical issues in Online and Social Media Marketing,
c) Regulation and control on advertising in India – Advertising Standard Council of India (ASCI), Advertising Agencies Association of India (AAAI), and Information & Broadcasting Ministry, Advertising self-Regulation

Unit- V Advertising Agency and Advertising as a Career **12 Lectures**

a) Advertising Agency – definition, types of services offered, types of advertising agencies, structure of Ad agencies, agency selection criterion, ways of getting clients with special reference to creative pitch, Top advertising agencies and their campaigns.
b) Career options available in advertising field – Advertising agency, media, production houses, research and allied fields - printing, graphics and animation, modelling and dubbing, brand managers, copywriters, Art Directors, Web content Managers, Creative writers, Freelancing

Unit-VI Practical Segment

(This Unit is not to be considered for the Assessment/ Examination)

a) Poster / Technology based group presentations on various Advertisements on socially relevant topics with relevant case studies.
b) Creating a print Advertisement (Students can be asked to make a print advertisement and displaying it to the class)

Evaluation Pattern:

Third Semester End Examination	**Duration: 3 Hours**	**100 Marks**

Question 1	One Essay or Two Short notes on Unit I	20 Marks
Question 2	One Essay or Two Short notes on Unit II	20 Marks
Question 3	One Essay or Two Short notes on Unit III	20 Marks
Question 4	One Essay or Two Short notes on Unit IV	20 Marks
Question 5	One Essay or Two Short notes on Unit V	20 Marks

Semester IV Applied Component Paper II 2 Credits
Course Title: Introduction to Advertising - Creativity and Research in Advertising

Total Lectures: 60

Unit- I Creativity and Psychology in Advertising **12 Lectures**

a) Role of Creativity in Advertising, Positioning strategies, Role of Persuasion, Determining the message theme, USP, Decision on Advertising appeals and selling styles (soft selling / hard selling skills), Appropriateness and Novelty, Styles of Creative Advertising- Generic Creative Style, Pre-emptive Creative Style, Resonance Creative Style
b) Psychology in Advertising – Perception, attitudes and values, personality and motivations (including buying motives), Use of Metaphors in Advertising

Unit-II Copy Writing **12 Lectures**

a) Copy – types and essentials, Copy writing for print, Outdoor, Radio, Web and Television (concept of storyboards)
b) Elements of copy – headline (functions and types), over line, body copy, captions, taglines, slogans, call to action, logo, company name

Unit-III Creativity in Advertising **12 Lectures**

a) Illustrations – functions and types, Essentials of a good illustration
b) Visualization – Techniques of Visualization, Layouts- Stages and Types, Slogans, Logo, Headlines, Memes, GIFs as means of creative marketing strategy etc.
c) Digital Advertising: The societal and business impact of digital advertising, Types of digital advertising, The future of online advertising

Unit-IV Advertising Research **12 Lectures**

a) Evaluating advertising effectiveness, Importance of research in Advertising, Types of research: copy research and behavioural research, Psychographic Segmentation
b) The impact of Ideology on Advertisements- Various ideological issues and concerns
c) Pre-testing and Post-testing methods of evaluation, Pre-testing methods: methods for concept testing and copy testing , Post-testing methods: sales and response rates, recall tests, recognition tests and attitude and opinion tests.

Unit- V Advertising Budget **12 Lectures**

a) Meaning of Advertising Budget: Collection of Data and Preparation of Advertising Budget, Presentation and Approval of the Budget, Budget Execution, Control of Budget
b) Methods of Framing the Advertising Budget: Affordable Method, Percentage of Sales Method, Competitive Parity Method, Return on Investment Method, Objective and Task Method, Judgment Method
c) Approaches to Advertising Budget: Traditional Approach, Modern Approach, Marcom Budgeting

Unit-VI Practical Segment:

(This Unit is not to be considered for the Assessment/ Examination)

a) A visit to an Advertising agency or group presentation on Copy writing
b) Creating an electronic Advertisement and displaying it to the class via electronic communication medium

Evaluation Pattern:

Fourth Semester End Examination	**Duration: 3 Hours**	**100 Marks**

Question 1	One Essay or Two Short notes on Unit I	20 Marks
Question 2	One Essay or Two Short notes on Unit II	20 Marks
Question 3	One Essay or Two Short notes on Unit III	20 Marks
Question 4	One Essay or Two Short notes on Unit IV	20 Marks
Question 5	One Essay or Two Short notes on Unit V	20 Marks

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2. www.advertisinginindia.com
3. www.tamindia.com
4. www.tamadex.com

5. www.aidem.in
6. http://en.wikipedia.org/wiki/Chennai
7. http://en.wikipedia.org/wiki/Pondicherry_urban_area
8. http://www.census2011.co.in/census/district/482-puducherry.html
9. 9.www.digitalimpulse.in/insights/wp-content/upoads/2013/01/Digital-advertising-Industry-inIndia.jpg
10. http://findarticles.com/p/articles/mi_hb3192/is_200205/ai_n7866610/
11. http://www.revistalatinacs.org/_2008/23_34_Santiago/Francisco_Campos.html
12. http://www.anthropoetics.ucla.edu/a
13. http://ideasmarkit.blogspot.in/2009/02/indian-advertising-2009-2013-kpmg-ficci.html
14. http://info.shine.com/Industry-Information/Automobiles/783.aspx=Media advertising - By Shailja Shah Purohit
15. http://www.inderscience.com/search/index.php?action=record&rec_id=11489
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17. http://www.merinews.com/article/the-changing-scenario-of-advertising/126596.shtml
18. http://www.entrepreneur.com/encyclopedia/media-planning
19. http://www.chillibreeze.com/ articles various/advertising-firms.asp
20. www.afaqs.com
21. www.ascionline.org;
22. www.campaignindia.in
23. www.exchange4media.com
24. www.tamindia.com
25. www.cengage.com/global

MOOC Courses:

1) <<https://www.mooc-list.com/course/online-advertising-onlinead-open2study>>
2)\<<https://www.mooc-list.com/course/integrated-marketing-communications-advertisingpublic-relations-digital-marketing-and-more>>
3) <<https://www.mooc-list.com/course/content-advertising-social-imc-coursera>>
4) <<https://www.mooc-list.com/course/advertising-and-society-coursera>>

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Cover Page

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	FYBA : Communication Skills in English
2	Eligibility for Admission	10+2
3	Passing Marks	40
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	1 Year (semester I and II)
6	Level	~~P.G.~~ / U.G./ ~~Diploma~~ / ~~Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	~~New~~ / Revised **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year **2021 -2022**

Date: 21/12/2020 Signature :

Name of BOS Chairperson / ~~Dean~~ : **Dr. Sudhir Nikam**

University of Mumbai

Syllabus for F.Y.B.A

Program: B.A.

Course: Communication Skills in English (Core Paper)

(Choice Based Credit System with effect from the academic year 2021-2022)

Board of Studies in English

Dr. Sudhir Nikam (Chairperson)

Dr. Rajesh Karankal (Member)

Dr. Bhagyashree Varma (Member)

Dr. B. N. Gaikwad (Member)

Dr. Satyawan Hanegave (Member)

Dr. Santosh Rathod (Member)

Dr. Deepa Mishra (Member)

Dr. Dattaguru Joshi (Member)

Dr. Deepa Murdeshwar-Katre (Member)

Syllabus Sub-Committee

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Dr. Sachin Labade (Member)	**:**	Department of English, University of Mumbai
Mr. Vinodsinh Patil (Member)	**:**	Department of English, Arts & Commerce College, Phondaghat, Dist.Sindhudurg
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Dr. S. Vishnu Priya (Member)	**:**	Department of ELT, SDE, EFLU, Hyderabad.

Course: Communication Skills in English

(80:20 Marks Examination Pattern)

(Choice Based Credit System with effect from the academic year 2021-22)

1. Syllabus as per Credit Based Semester and Grading System:				
	i)	Name of the Programme	:	B.A.
	ii)	Course Code	:	UACS 101 & UACS 201
	iii)	Course Titles	:	Communication Skills in English
	iv)	Semester-wise Course Content	:	Enclosed the copy of syllabus
	v)	References and Additional References:		Enclosed in the Syllabus
	vi)	Credit Structure	:	No. of Credits per Semester – 02
	vii)	No. of lectures per Unit	:	15
	viii)	No. of lectures per week	:	03 lectures + 01 tutorial
2.	Scheme of Examination		:	Written Exam: 4 Questions of 20 Marks each Internal Assessment: 20 marks
3.	Special notes, if any		:	No
4.	Eligibility, if any		:	No
5.	Fee Structure		:	As per University Structure
6.	Special Ordinances / Resolutions if any		:	No

Revised Syllabus for FYBA Communication Skills in

English Paper I and Paper II

To be implemented from 2021-22 (80:20 Marks Examination Pattern)

Preamble:

The English language is the dominant medium through which one can connect to the global community. It is, therefore, vital that all learners acquire adequate skills in this language. Communication Skills in English is a core course wherein the first year learners are guided to acquire the four skills of communication viz., Listening, Speaking, Reading and Writing.

The focus of the syllabus is on building confidence in the learners in applying these skills while using the English language both academically and socially. Keeping this in mind, the units will have a multi-pronged approach. The course is graded from basic to higher levels of learning so as to help learners gradually acquire the skills. The 80:20 pattern will also help in accomplishing this goal. The tutorial activities are designed to focus on oral skill development, while the lectures are aimed at honing their cognitive, analytical, linguistic and creative skills.

It is hoped that by the end of the academic year, the learners will have developed confidence in using the English language both for oral and written communication as well as develop interest in enhancing these skills later on.

Objectives:

1. To enhance English language proficiency of students by familiarizing them with the skills of Listening, Speaking, Reading and Writing (LSRW)
2. To introduce learners to different perspectives of looking at a text or passage
3. To equip learners in the functional aspects of English so that they use the acquired language skills correctly and confidently
4. To guide learners in the effective use of the digital medium of communication.

Outcomes:

1. The learners will learn to understand and interpret any text they are reading from different perspectives
2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.
3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.
4. The learners will develop good oral and written skills of communication in the English language.

Periods: 45 lectures + 15 Tutorials (3 lectures + 1 tutorial per week per batch) per semester

All passages, stories, articles, poems selected should help the learners develop different communication skills. Learning through example and practice with a theoretical base is the intention.

Semester I

Communication Skills in English Paper I

Course Content

Unit 1: Introduction to Communication Skills **No. of lectures: 08**

1. English as an international language and varieties of English
2. Significance and ways of effective communication in English
3. Listening for academic and professional development
4. Formal and informal communication in spoken English
5. Reading for different purposes
6. Features of effective writing skills
7. Study skills in English

This unit shall work as theoretical base for the following units that are practical in nature.

Unit 2: Developing Comprehension Skills in English **No. of lectures: 12**

A. Reading Skills

1. Scanning a text for information
2. Skimming a passage to look for main ideas, understanding text type
3. Guessing meaning of an expression (word/phrase/clause)
4. Building inference skills
5. Understanding language structure (such as subject verb agreement, voice, direct and reported speech)
6. Note making
7. Summarizing

Passages from fables, folk stories, short stories, non-fiction, history, business or environment, of around 250- 300 words, could be chosen in this unit.

B. Listening Skills

1. Listening for main ideas/Gist
2. Listening for detail
3. Listening for text organization features
4. Listening for tone, accent, style and register
5. Predicting content and guessing meaning
6. Making inferences from the audio-visual text
7. Listening for opinion/argument/counter-arguments etc.
8. Taking notes

A variety of relevant audio/visual texts as samples may be drawn from various sources. Listening skills in English should be developed through various activities along with the practice done while teaching in the class.

Unit 3: Speaking Skills in English **No of lectures: 15**

A. Public Speaking in English

1. Introduction
2. Characteristics of an effective speech
3. Analysis of model speeches
4. Drafting and presenting a speech in formal and informal gatherings

B. Conversation in English

1. Opening a conversation
2. Introducing oneself in various contexts
3. Introducing others formally and informally
4. Building a conversation
5. Leaving and closing a conversation
6. Conversation in group in various situations

C. Speaking at an Event

1. Anchoring/compering an event
2. Introducing guests/ speakers/dignitaries
3. Proposing a vote of thanks

A variety of relevant texts as samples may be drawn from print and non-print sources such as books, videos, audio files etc. Speaking skills in English should be developed through various activities along with the practice done while teaching in the class.

Unit 4: Formal Writing Skills **No. of lectures: 10**

A. Letters:

1. Job applications with bio data (solicited and unsolicited)
2. RTI applications
3. Applications for duplicate documents (I-cards / mark sheet, etc.)

B. Emails:

1. Job acceptance and joining
2. Resignation
3. Complaints
4. Requests for references
5. Request for sponsorship

Tutorial Activities:

1. Use of YouTube videos for use of grammar study and practice that may be taken from the list recommended or similar relevant videos.
2. Listening to audio clips/ books to enhance listening skills
3. Reading aloud from newspapers, magazines, stories, non-fiction followed by classroom discussion on these to enhance reading and speaking skills
4. Making short presentations on given topics
5. Official letter writing/ email writing exercises

Semester II

Communication Skills in English Paper II

Course Content

Unit 1: English Usage in Communication **No. of lectures: 08**

1. Distinction between American English and British English
2. Indianism and Indian English
3. Appropriacy in the Use of English
4. Non-verbal Communication
5. Elevator Pitch
6. Information and Communication Technology and Use of English
7. Modes and Types of Interview
8. Principles of Creative Writing

This unit shall work as theoretical base for the following units that are practical in nature.

Unit 2: Enhancing Reading Competencies **No. of lectures: 12**

A variety of passages of 200-250 words may be taken such as extracts from novels, short stories, plays, magazine, newspapers, reports, documents, academic texts. The passages should have complex text type, function and lexis. The learners may be encouraged to gather meaning contextually or by referring to offline and online sources such as dictionary, thesaurus, and encyclopedia.

1. Augmenting active vocabulary
2. Understanding relations between parts of a text
3. Transferring information (Verbal to Non-Verbal)
4. Understanding concepts and arguments,
5. Developing skills in analysis and interpretation
6. Rewriting a passage from a defined perspective
7. Reading critically (presenting a reasoned argument that evaluates and analyses what you have read)

Weightage of questions on texts -

a. On vocabulary, synonyms and antonyms, prefixes and suffixes, collocations, making sentences of their own from the idioms or difficult words in the extract (50%)
b. On writing their opinions, perspectives on the passages in longer, more descriptive ways (50%)

Unit 3: Advanced Oral Communication Skills **No. of lectures: 15**

A. Presentation skills: (Formal presentations and skits)

1. Planning and structuring
2. Opening and closing a presentation
3. Use of body language
4. Use of technology in making a presentation
5. Drafting a skit (Not to be tested in theory exam)
6. Reading of a skit
7. Presenting a skit

Students are advised to prepare their own presentation scripts. Teachers should help them in drafting, reading and presenting those scripts in the class.

B. Group Discussion:

1. Formal and informal discussion
2. Elements of group discussion
3. Using appropriate language: Initiating, seeking and giving opinions, suggesting, responding to a suggestion, agreeing, disagreeing, interrupting, requesting, clarifying, summing up
4. Types of discussion:

   Giving and sharing opinions of a given topic, making decisions, problem solving (case study)

C. Interview Skills

1. Interviewing others
    - Researching the interviewee (writer, social worker, entrepreneur, actor etc.)
    - Preparing questions
    - Conducting interview
2. Attending an Interview (Job/Entrance)
    - Researching the organization
    - Reviewing job-profile and your bio-data/CV
    - Preparing for standard questions
    - Responding to questions
    - Preparing your questions to ask to the interviewer/s
3. Analyzing Interviews

Students can be tested on forming actual interview frameworks including questions. Teachers must form the groups and conduct actual interviews involving full strength of students.

Unit 4: Advanced Writing Skills **No. of lectures: 10**

A. Report Writing:

1. News report
2. Activity/Event report

B. Creative Writing:

1. Personal Essay
2. Memoir
3. Short Speech on the given occasion/ event
4. Story writing

Tutorial Activities:

1. Dialogue-writing exercises
2. Writing skits and presenting them
3. Giving speeches
4. Group discussions
5. Mock Interviews

6. Development of stories, passages from hints given, in about 200-250 words
7. Report writing tasks
8. Statement of Purpose

Evaluation Pattern:

A. Internal Evaluation (20 Marks)

		Marks	**Remarks**
1	Performance in Tutorial activities	10	**Sem I** -- Learners may be asked to make presentations, hold conversation in class, which will be assessed **Sem II** -- Learners may be asked to participate in group discussions or mock interviews in class, which will be assessed
2	Participation in classes (lectures and tutorials)	05	Learners' response to teaching, timely submission of tasks will be assessed
3.	Overall attendance (lectures and tutorials)	05	Percentage of learners' attendance in class to be considered

B. Written Examination: (80 marks)

Semester I: 4 questions carrying 20 marks each

Q. No.	Question details	Marks
1	Short Notes (4 out of 6) from Unit 1	20
2	Unseen Passage (200-250 words) (Unit 2) a. On content, the use of tenses, articles, prepositions, direct-indirect speech and concord, voice, word meanings - (50%) b. On reading sub-skills (pointing out main ideas and supporting details, making inferences) (50%)	10 10

3	Any four to be attempted from given options (based on Unit 3) a. Preparing a speech on a given topic b. Questions on introducing self and others c. Develop a conversation on a given situation d. Introducing speakers/guests in a given event e. Drafting vote of thanks at a given event	20
4	a. Job application with bio-data b. RTI letter c. Email writing (1 out of 2)	08 07 05

Semester II: 4 questions carrying 20 marks each

Q. No.	Question details	Marks
1	Short Notes (4 out of 6) on theory from Unit 1	20
2	Unseen Passage (200-250 words) (Unit 2) a. On content, synonyms and antonyms, prefixes and suffixes, collocations, making sentences of their own from the idioms or difficult words in the passage (50%) b. On other sub-skills (such as writing their opinions, perspectives on the passages in longer, more descriptive ways (50%)	10 10
3	Any Two out of Three to be attempted (based on Unit 3) a. Preparing a draft of presentation on a given topic b. Preparing a draft for a mock interview based on the given instructions c. Preparing a draft of a group discussion on a given topic & instructions	20

4.	a. Report writing (1 out of 2) b. Personal essay/Memoir c. Story Writing/Speech	08 07 05

Recommended Reading:

- Bellare, Nirmala. *Reading & Study Strategies*. Books. 1 and 2. Oxford University Press, 1997, 1998
- Bellare, Nirmala. *Easy Steps to Summary Writing and Note-Making*. Amazon Kindle Edition, 2020
- Comfort, Jeremy, et al. *Speaking Effectively: Developing Speaking Skills for Business English*. Cambridge University Press, 1994.
- Das, Bikram K., et. al. *An Introduction to Professional English and Soft Skills*. Cambridge University Press India Pvt. Ltd., 2010
- Das, Yadjnaseni & R. Saha (eds.) *English for Careers*. Pearson Education India, 2012.
- Devlin,Joseph. *How to Speak And Write Correctly*. New York, The Christian Herald, 1910
- Dimond-Bayir, Stephanie. *Unlock Level 2 Listening and Speaking Skills Student's Book and Online Workbook: Listening and Speaking Skills Student's Book+ Online Workbook*. Cambridge University Press, 2014.
- Doff, Adrian and Christopher Jones. *Language in Use (Intermediate and Upper Intermediate)*. CUP, 2004.
- Glendinning, Eric H. and Beverley Holmstrom. Second edition. *Study Reading: A Course in Reading Skills for Academic Purposes.* CUP, 2004
- Goodale, Malcolm. *Professional Presentations Video Pack: A Video Based Course*. Cambridge University Press, 1998.
- Grellet, F. *Developing Reading Skills*. Cambridge: Cambridge University Press, 1981

- Grussendorf, Marion. *English for Presentations*. Oxford University Press, 2007.Hamp-Lyons, Liz and Ben Heasiey. Second edition. *Study Writing: A Course in Writing Skills for Academic Purposes*. CUP, 2006
- Kumar, Sanjay and Pushp Lata. *Communication Skills.* Second Edition. New Delhi, 2011. Oxford University Press, 2015
- Lewis, N. *How to Read Better & Faster*. New Delhi, Goyal Publishers & Distributors Pvt. Ltd, 2006.
- McCarthy, Michael and Felicity O'Dell. *English Vocabulary in Use.* Cambridge: Cambridge University Press, 2001.
- Mohan, RC Sharma Krishna. *Business Correspondence and Report Writing*. Third edition. Tata McGraw-Hill Education, 2002.
- Murphy, Raymond, et al. *Grammar in use: Intermediate*. Cambridge University Press, 2000
- Richards, Jack C., and Chuck Sandy. *Passages Level 2* Student's Book. Cambridge University Press, 2014.
- Sadanand, Kamlesh & S. Punitha. Spoken English: A Foundation Course. (Part 1 & 2). Orient Blackswan. 2009.
- Sasikumar, V., et al. *A Course in Listening & Speaking I*. 2005. Cambridge University Press India Pvt. Ltd. (under the Foundation Books Imprint), 2010
- Savage, Alice, et al *Effective Academic Writing*. Oxford: OUP, 2005
- Sethi, J. *Standard English and Indian usage: Vocabulary and grammar*. PHI Learning Pvt. Ltd., 2011.
- Taylor, Grant. *English Conversation Practice*. 1967. Tata McGraw-Hill, 2013
- Turton, Nigel D. *A B C of Common Grammatical Errors*. 1995. Macmillan India Ltd., 1996
- Vas, Gratian. *English Grammar for Everyone*. Mumbai, Shree Book Centre, 2015
- Watson, T. *Reading Comprehension Skills and Strategies: Level 6*. Saddleback Educational
- Publishing, 2002
- Wright. Andrew, et al. *Games for Language Learning*: *Cambridge Handbooks for Language Teachers* (Third Edition). 2006. Cambridge (UK), Cambridge University Press, 2010

Web link Resources:

1. A rendezvous with Simi Garewal: Ratan Tata: https://www.youtube.com/watch?v=ozetTgOHu78&t=510sHere Ratan Tata discusses his personal life, his expectations, his experience as a CEO of Tata and sons.
2. A rendezvous with Simi Garewal: Kiran Bedi: https://youtu.be/vX2NyKvEAXQ
   In this video, Kiran Bedi shares her daring adventures, her field, her passion for career with Simi Garewal.
3. In Conversation: Rajiv Mehrotra with J.R.D.Tata: https://youtu.be/68otfg601HI
   J. R. D. Tata discloses his dream of India, his experiences with Pandit Nehru, Mahatma Gandhi, Sardar Patel and his contribution to modern India.
4. The Tharoor Guide To Indian English: https://youtu.be/NsyI9LIXbFM

   Shashi Tharoor talks of new words like “defenstrate”, “brinjol”; talks about Indian English, ethnicity and so on.
5. Dr.A.P.J Abdul Kalam on Discovery, invention and innovation:https://youtu.be/9CKCfiX3uO0
   Dr. Kalam addresses IIT Delhi students.
6. Malala Yousafzai’s speech on the occasion of her Nobel Peace Prize (2014) on education:https://youtu.be/c2DHzlkUI6s
7. Kailash Satyarthi’s speech on the occasion of Nobel Peace Prize (2014) on the innocence of children; he gives voice to voiceless in his speech:https://youtu.be/wt0LSCEuc_M
8. Speech by Mr. Ratan Tata: https://youtu.be/m7-tKX7aZXM
9. “I Have a Dream” speech by Martin Luther King Jr. HD (subtitled) https://www.youtube.com/watch?v=vP4iY1TtS3s
   “I Have a Dream" is a public speech that was delivered by American civil rights activist Martin Luther King Jr. during the March on Washington for Jobs and Freedom on August 28, 1963, in which he called for civil and economic rights and an end to racism in the United States.
10. Speech by Emma Watson on Gender Equality: https://youtu.be/nIwU-9ZTTJc
11. Imaginative science video: Could humans live in underwater cities? https://youtu.be/GUGtU7Ii1yk
12. A conversation about household appliances: https://youtu.be/rAPl0fSborU
13. Video on psychology: Why do we dream? https://youtu.be/2W85Dwxx218
14. Video on space: Solar system 101: https://youtu.be/libKVRa01L8
15. Video on evolution: How Apocalypses paved the way for Humans https://youtu.be/libKVRa01L8
16. Video on biology: Why Bats Aren't as Scary as You Think https://youtu.be/D6e_qh3YRPs
17. Video on social media: What is a social media influencer? https://youtu.be/39A3og7enz8
18. Tips on communication (TED Talk): The Secrets of Learning a New Languagehttps://youtu.be/o_XVt5rdpFY
19. Expressing opinions: If Cinderella Were a Guy:https://youtu.be/p4OyCNctKXg
20. Telling stories without words: Partly Cloudy https://youtu.be/ix13P9NqBjo
21. Telling stories without words: Tree of Unity https://youtu.be/sAo41Gyl6hY

22. Bonding over the Radio: A special storytelling series by the much loved author Ruskin Bond: akashvaniair
https://youtu.be/oxf60BlR2Q4
https://youtu.be/ISX7rUOJOms
https://youtu.be/rrC_s0XPXKI
https://youtu.be/FUML3q1ncF0
https://youtu.be/3by_ninqRzg
23. Video on the English language: Where did English come from?
https://youtu.be/YEaSxhcns7Y
24. Video on biology: The science of skin colour: https://youtu.be/_r4c2NT4naQ
25. Video on advertising: The Science of Persuasion https://youtu.be/cFdCzN7RYbw
26. "The Happy Prince" Oscar Wilde Michael Mills Classic Animated Short 1974
https://www.youtube.com/watch?v=q3RZh1yaqxM

Learners may be encouraged to watch animated stories such as this one and questions asked later on.

Cover Page

AC_____
Item No. _____

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	FYBA Optional English: 'Introduction to Prose and Fiction'
2	Eligibility for Admission	10+2
3	Passing Marks	40
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	1 Year (Semester I and II)
6	Level	~~P.G.~~ / U.G./ ~~Diploma~~ / ~~Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	~~New~~ / Revised **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year **2021-2022**

Date: 21/12/2020 Signature :

Name of BOS Chairperson / ~~Dean~~ : **Dr. Sudhir Nikam**

University of Mumbai

Syllabus for F.Y.B.A

Program: B.A.

Course: Introduction to Prose and Fiction

(Choice Based Credit System with effect from the academic year 2021-2022)

Board of Studies in English

Dr. Sudhir Nikam (Chairperson)

Dr. Rajesh Karankal (Member)

Dr. Bhagyashree Varma (Member)

Dr. B. N. Gaikwad (Member)

Dr. Satyawan Hanegave (Member)

Dr. Santosh Rathod (Member)

Dr. Deepa Mishra (Member)

Dr. Dattaguru Joshi (Member)

Dr. Deepa Murdeshwar-Katre (Member)

Syllabus Sub-Committee

Dr. Rajesh Karankal	**:**	Convenor, Head, Department of English, University of Mumbai
Dr. Rajesh Yeole	**:**	Member, Head, Department of English, Changu Kana Thakur A.C.S.College, New Panvel,
Ms. Sumali Bose	**:**	Member, Department of English, N.E.S Ratnam College, Mumbai
Dr. Shweta Salian	**:**	Member, Department of English, Mithibai College, Mumbai
Dr. Satyajit Kosambi	**:**	Member, Department of English, Sathaye College, Mumbai
Dr. Bharat Tupere	**:**	Member, Department of English, Sant Rawool Maharaj College, Kudal

Course: Introduction to Prose and Fiction

(100 Marks Examination Pattern)

(Choice Based Credit System with effect from the academic year 2021-22)

1. Syllabus as per Credit Based Semester and Grading System:				
	i)	Name of the Programme	:	B.A.
	ii)	Course Code	:	UAENG 101 & UAENG 201
	iii)	Course Titles	:	Introduction to Prose and Fiction Paper – I and II
	iv)	Semester-wise Course Content	:	Enclosed the copy of Syllabus
	v)	References and Additional References:		Enclosed in the Syllabus
	vi)	Credit Structure	:	No. of Credits per Semester – 03
	vii)	No. of lectures per Unit	:	15
	viii)	No. of lectures per week	:	04
2.	Scheme of Examination		:	Written Exam: 5 Questions of 20 Marks each
3.	Special notes, if any		:	No
4.	Eligibility, if any		:	No
5.	Fee Structure		:	As per University Structure
6.	Special Ordinances / Resolutions if any		:	No

Revised Syllabus for FYBA Optional English

Introduction to Prose and Fiction Paper I and II

To be implemented from 2021-22 (100 Marks Examination Pattern)

Objectives of the Course:

- To create interest and develop passion amongst learners towards English Literature
- To familiarize learners with salient characteristics of literary genres like short story, prose, fiction and non-fiction
- To introduce learners to various elements ofselected short stories written in English and translated into English
- To acquaint learners with different forms of prose and its importance through close reading of selected works
- To understand that literature is an expression of human values and universal truths

Course Outcomes:

- To develop passion for reading literary works amongst students
- To make learners at ease in the process of appreciation of literature
- To enable learners to understand and analyze selected stories, prose, fiction and non-fiction masterpieces
- To imbibe the underlying philosophy and values reflected in literature
- To develop sensitivity to nature and understand the relationship between human beings and environment

Semester I

Optional English: Introduction to Prose and Fiction Paper I

Course Content

Unit 1: **No. of lectures: 15**

Development of Short Story, Elements of Short Story: Plot, Character, Setting, Narrative, Development of Essay, Features of Prose writing, Types of Prose, Autobiography

Unit 2: **No. of lectures: 15**

- O' Henry : "The Cop and the Anthem"
- Ray Bradbury : "A Sound of Thunder"
- Rabindranath Tagore : "The Kabuliwala"
- Bernard Malamud : "The Jewbird"
- Baburao Bagul : "Mother"
- Ken Liu : "The Paper Menagerie"

Unit 3: **No. of lectures: 15**

- Sir Francis Bacon : "Of Marriage and Single Life" and "Of Revenge"
- Charles Lamb : "The Two Races Of Men "
- Ralph Waldo Emerson : "Self – Reliance"
- W.E.B. Du Bois : "Strivings of the Negro People"
- Shobha De : From "Speedpost": "Dear Arundhati"Aug'99 and "Dear Aditya" June'99
- Subroto Bagchi : From *Go kiss the world:* "Learning to Listen" (p. 145-150) and "Who Is a Good Leader?" (p. 150-155)

Evaluation: First Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

Semester II

Optional English: Introduction to Prose and Fiction Paper II

Course Content

Unit 1: **No. of lectures: 15**

Novella, Aspects of Novel, Children's Fiction, Adventure Novel, Mystery novel, Science Fiction, Social Novel, Philosophical Novel, Historical Novel

Unit 2: **No. of lectures: 15**

- John Steinbeck*: The Pearl*

  OR

- Ruskin Bond: *The Blue Umbrella*

Unit 3: **No. of lectures: 15**

- R.K. Narayan: *The Financial Expert*

  OR

- Isaac Asimov: *Fantastic Voyage*

Evaluation: Second Semester End Examination Pattern 100 Marks: 3 Hours

Question 1	:	Short Notes on Unit 1 (4 out of 6)	:	20 Marks
Question 2	:	Essay on Unit 2 (1 out of 2)	:	20 Marks
Question 3	:	Essay on Unit 3 (1 out of 2)	:	20 Marks
Question 4	:	Short Notes on Unit 2 (2 out of 4)	:	20 Marks
Question 5	:	Short Notes on Unit 3 (2 out of 4)	:	20 Marks

References:

Abrams, M.H. *Glossary of Literary Terms*. India, Macmillan Publishers, 2000.

Albert, E. *History of English Literature*, India, Oxford University Press, 2009.

Athenian Society. *Drama, Its History*, England, Nabu Press, 2012.

Auger , Peter. *The Anthem Glossary of Literary Terms and Theory* , India, Anthem Press, , 2011.

Baldick Chris, *Oxford Dictionary of Literary Terms*. Cambridge University Press, 2008.

Bennett, Andrew and Nicholas Royle. *Introduction to Literature Criticism and Theory*. Great Britain: Pearson Education Limited, 2004.

Brooks, Cleanth and Warren, Robert Penn. *Understanding Fiction*, Printice Hall.

Cavanagh, Dermot Alan Gillis, Michelle Keown, James Loxley and Randall Stevenson (Ed). *The Edinburgh Introduction to Studying Literature.* Edinburgh: Edinburgh University Press, 2010.

Chakrabarti, Piyas. *Anthem Dictionary of Literary Terms and Theory.* Delhi: Anthem Press, 2006.

Edmond Gore and Alexander Holmes. *What is Poetry*? England, Nabu Press, 2010.

Ford, Boris. The Pelican Guide to English Literature, Volume I to X

Forster, E M. *Aspects of the Novel*, (1954) London: Rosetta Books, 2002.

Fowler, Roger. (Ed.). *A Dictionary of Modern Critical Terms*. (Rev.Ed.) London: Routledge & Kegan Paul, 1987.

Gibson Arthur. *What is Literature*, Peter Lang Pub Inc, 2007.

Hudson, W.H., 2011, *An Outline History of English Literature*, India, G K Publishers Pvt. Ltd

McKeon, Michael. *Theory of the Novel: A Historical Approach*. Baltimore : John Hopkins University Press, 2000.

Prasad, B. . *Background of the Study of English Literature*, Chennai, Macmillan, 1999.

Rees, R.J. *English Literature : An Introduction to Foreign Readers*, New Delhi: Macmillan, 1982.

Turco , Lewis. *The Book of Literary Terms*, UK, University Press of New England, 1999.

Widdowson, Peter. The Palgrave Guide to English Literature and its Contexts 1500-2000, Hampshire: Palgrave, Macmillan, 2004

Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

All HODs/ coordinators are instructed to fill the following as per the academic year. Each subject's program outcome/ Course outcome has to be filled. The new syllabus of all subjects has it which can be used for reference. Please fill for the following academic years and mention it correctly, even if the same syllabus was followed for subsequent academic year you will have to fill it. Following is the example for your reference:

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Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

Academic year : 2022-2023

Name of Department: English

Class: S.Y.B.A. English (Ancillary)

Program Outcomes:

To create interest and develop passion amongst learners towards drama (and theatre)
To familiarize learners with the salient elements and characteristics of drama
To introduce learnersto different forms and types of drama
To introduce learners to the trends and characteristics of significant dramatic movements through representative dramas
To equip the learners with the tools and techniquesto critically appreciate drama
To inculcate and propagate human values reflected in the plays among learners
To demonstrate that drama is reflection / representation of life
To Develop analytical skills and critical thinking through close reading of drama

To introduce students to different genres and forms of poetry
To sensitize them to the rhythmical and formal properties of poetry by introducing key elements of poetry
To provide them with basic poetic devices for analyzing poems
To introduce them to the trends and characteristics of significant poetic movements through representative poems
To develop their skills in reading, writing and to critically appreciate poetry
To introduce students to poetry produced in various social and cultural context

- 1. To introduce the students to some major aspects of communication and mass communication. 2. To develop among the students a broad perspective of the past and the present status of Mass Media in India.
- 3. To develop among the students a critical understanding of the Mass Media with regard to their presentation formats, roles and audiences in Indian context.
- 4. To develop among the students a critical understanding of some special roles of different Mass Media in India.
- 5. To help the students to assess the contribution of Indian mass media to national development. 6. To acquaint the students with some issues and laws related to mass media in India.
- 7. To introduce the students to various job and career opportunities in media industry.

Program Specific Outcomes:

- By the end of the course the students should be able to receive and analyse various media products critically and become interested in jobs or career in Media Industry.
-

SEMESTER - III

Course Code: - UAENG301	**Course Title:** Introduction to Drama Paper II

Course Outcomes:

- develop interest and passion for drama (and theatre).
- be familiarized with the salient elements and characteristics of drama.
- be able to identify the different forms and types of drama.
- be capable to identify the varioustrends and characteristics of significant dramatic
- movements through the representative dramas.
- be equipped with the tools and techniquesto critically appreciate drama.
- imbibe human values reflected in the selected plays.
- justify that drama is reflection / representation of life.
- develop analytical skills and critical thinking through close reading of the represnttative
- dramas.

Course Code: UAENG302	**Course Title:** Introduction to Poetry Paper III

Course outcomes:
The students would be able :
Identify different genres and forms of poetry
Identify poetic technique, style and rhetorical devices used in poetry
Critically appreciate poems by separating various component parts and investigating the relationship of the parts to the whole
Demonstrate understanding of wide range of poems from different historical periods, written in a wide range of forms, styles and subject matter
Identify the major poets of world literature and define the importance of their works
Enhance their cultural sensitivity through reading of representative poems from diverse cultural context

Course Code: UAMASSCOM301	**Course Title:** Mass Communication 1

Course outcomes:
The students would be able :

- 1. To introduce the students to some major aspects of communication and mass communication. 2. To develop among the students a broad perspective of the past and the present status of Mass Media in India.
- 3. To develop among the students a critical understanding of the Mass Media with regard to their presentation formats, roles and audiences in Indian context.
- 4. To develop among the students a critical understanding of some special roles of different Mass Media in India.
- 5. To help the students to assess the contribution of Indian mass media to national development. 6. To acquaint the students with some issues and laws related to mass media in India.
- 7. To introduce the students to various job and career opportunities in media industry.

Course Code:	**Course Title:**

Course Outcomes:
The students would be able :

-

Course Code:	**Course Title:**

Course outcomes:

The students would be able : •	
Course Code:	**Course Title:**
Course outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
SEMESTER IV	
Course Code: UAENG401	**Course Title: :** Introduction to Drama Paper II Paper II
Course Outcomes: The students would be able : • develop interest and passion for drama (and theatre). • be familiarized with the salient elements and characteristics of drama. • be able to identify the different forms and types of drama. • be capable to identify the varioustrends and characteristics of significant dramatic • movements through the representative dramas. • be equipped with the tools and techniquesto critically appreciate drama. • imbibe human values reflected in the selected plays. • justify that drama is reflection / representation of life. • develop analytical skills and critical thinking through close reading of the represnttative • dramas.	
Course Code: UAENG402	**Course Title:** Introduction to Poetry - Paper III
Course Outcomes: The students would be able : **• Identify different genres and forms of poetry** **• Identify poetic technique, style and rhetorical devices used in poetry** **• Critically appreciate poems by separating various component parts and investigating the relationship of the parts to the whole** **• Demonstrate understanding of wide range of poems from different historical periods, written in a wide range of forms, styles and subject matter** **• Identify the major poets of world literature and define the importance of their works** **• Enhance their cultural sensitivity through reading of representative poems from diverse cultural context**	
Course Code: UAMASSCOM401	**Course Title:** Mass Communication

Course Outcomes:

The students would be able :

- 1. To introduce the students to some major aspects of communication and mass communication. 2. To develop among the students a broad perspective of the past and the present status of Mass Media in India.
- 3. To develop among the students a critical understanding of the Mass Media with regard to their presentation formats, roles and audiences in Indian context.
- 4. To develop among the students a critical understanding of some special roles of different Mass Media in India.
- 5. To help the students to assess the contribution of Indian mass media to national development. 6. To acquaint the students with some issues and laws related to mass media in India.
- 7. To introduce the students to various job and career opportunities in media industry.

Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

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Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

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Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

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Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

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Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

All HODs/ coordinators are instructed to fill the following as per the academic year. Each subject's program outcome/ Course outcome has to be filled. The new syllabus of all subjects has it which can be used for reference. Please fill for the following academic years and mention it correctly, even if the same syllabus was followed for subsequent academic year you will have to fill it. Following is the example for your reference:

Academic year : 2022- 2023

Name of Department: English

Class: TYBA

Program Outcomes:

- To introduce students to English Literature of the 16th, 17th and 18thcenturies.
- To show them how background influences shaped the writer's thinking.
- To present them to the literary masters who dominated the scene
- To familiarize students with different writing styles that each age adopted.
- To introduce the learners to important critical terms
- To make them aware of the nature and function of literature and criticism
- To impart the technique of close reading of literary texts
- To enable them to understand various literary theories and critical approaches
- To familiarize the learners with the tenets of practical criticism
- To develop amongst learners an insight into the process of word formation and transformation
- To develop amongst them an insight into the sounds, stress patterns and intonations in the English language to improve their speaking skills
- To develop among them an insight into the structure of the English language and to provide knowledge of the rules of grammar
- To help them learn grammatical analysis and description and the skills of sentence transformation
- To introduce the mechanics of writing for effective writing for various domains

Program Specific Outcomes:

- To understand the distinctive features of English literature of the 16th, 17th and 18th centuries
- To comprehend how background influences shaped the writer's thinking.
- To recognize and appreciate the literary masters who dominated the scene.
- To grasp the different writing styles that each age adopted.
- use some important critical terms
- become aware the nature and function of literature and criticism
- impart the technique of close reading of literary texts
- understand the various literary theories and critical approaches
- be familiar with the tenets of practical criticism
- Gain a basic understanding of phonetics, morphology and word transformation

- Have improved speaking skills
- Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation
- Write effectively in various domains.

SEMESTER - V

Course Code: - UAENG501	**Course Title:** Paper IV- 16th to 18 th Century English Literature –I

Course Outcomes:

- The students would be able :
- 1) To understand the distinctive features of English literature of the 16th, 17th and 18th centuries
- 2) To comprehend how background influences shaped the writer's thinking.
- 3) To recognize and appreciate the literary masters who dominated the scene.
  4) To grasp the different writing styles that each age adopted.
-

Course Code: UAENG502	**Course Title:** Paper V- Literary Criticism-I

Course outcomes:
The students would be able :

- 1) use some important critical terms
- 2) become aware the nature and function of literature and criticism
- 3) impart the technique of close reading of literary texts
- 4) understand the various literary theories and critical approaches
- 5) be familiar with the tenets of practical criticism

Course Code: UAENG503A	**Course Title:** Paper VI -- Grammar and the Art of Writing-I

Course outcomes:
The students would be able :

- 1. Gain a basic understanding of phonetics, morphology and word transformation
- 2. Have improved speaking skills
- 3. Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation
- 4. Write effectively in various domains.

Course Code:	**Course Title:**

Course Outcomes:
The students would be able :

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Course Code:	**Course Title:**

Course outcomes:
The students would be able :

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Course Code:	**Course Title:**
Course outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
SEMESTER VI	
Course Code: UAENG601	**Course Title:** Paper IV- 16th to 18th Century English Literature - II
Course Outcomes: The students would be able : • The students would be able : • 1) To understand the distinctive features of English literature of the 16th, 17th and 18th centuries • 2) To comprehend how background influences shaped the writer's thinking. • 3) To recognize and appreciate the literary masters who dominated the scene. • 4) To grasp the different writing styles that each age adopted.	
Course Code: UAENG602	**Course Title:** Paper V- Literary Criticism - II
Course Outcomes: The students would be able : • 1) use some important critical terms • 2) become aware the nature and function of literature and criticism • 3) impart the technique of close reading of literary texts • 4) understand the various literary theories and critical approaches • 5) be familiar with the tenets of practical criticism	
Course Code: UAENG603A	**Course Title:** Paper VI -- Grammar and Art of writing – II
Course Outcomes: The students would be able : • 1. Gain a basic understanding of phonetics, morphology and word transformation • 2. Have improved speaking skills • 3. Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation • 4. Write effectively in various domains.	
Course Code:	**Course Title:**
Course Outcomes:	

The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	

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All HODs/ coordinators are instructed to fill the following as per the academic year. Each subject's program outcome/ Course outcome has to be filled. The new syllabus of all subjects has it which can be used for reference. Please fill for the following academic years and mention it correctly, even if the same syllabus was followed for subsequent academic year you will have to fill it. Following is the example for your reference:

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Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

Academic year : 2022-2023

Name of Department: English

Class: FYBA

Program Outcomes:

1. To enhance English language proficiency of students by familiarizing them with the skills of Listening, Speaking, Reading and Writing (LSRW)
2. To introduce learners to different perspectives of looking at a text or passage
3. To equip learners in the functional aspects of English so that they use the acquired language skills correctly and confidently
4. To guide learners in the effective use of the digital medium of communication

• To create interest and develop passion amongst learners towards English Literature

• To familiarize learners with salient characteristics of literary genres like short story, prose, fiction and non-fiction

• To introduce learners to various elements of selected short stories written in English and translated into English

• To acquaint learners with different forms of prose and its importance through close reading of selected works

• To understand that literature is an expression of human values and universal truths

Program Specific Outcomes:

1. The learners will learn to understand and interpret any text they are reading from different perspectives
2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.
3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.
4. The learners will develop good oral and written skills of communication in the English language.

To develop passion for reading literary works amongst students

• To make learners at ease in the process of appreciation of literature

• To enable learners to understand and analyze selected stories, prose, fiction and non- fiction masterpieces

• To imbibe the underlying philosophy and values reflected in literature

• To develop sensitivity to nature and understand the relationship between human beings and environment

SEMESTER - I

Course Code: - :UACS101	**Course Title:** Communication Skills in English

Course Outcomes:
1. The learners will learn to understand and interpret any text they are reading from different perspectives
2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.
3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.
4. The learners will develop good oral and written skills of communication in the English language.

Course Code: : UAENG 101	**Course Title:** : Introduction to Prose and Fiction Paper – I and II

Course outcomes:
The students would be able :

To develop passion for reading literary works amongst students

• To make learners at ease in the process of appreciation of literature

• To enable learners to understand and analyze selected stories, prose, fiction and non- fiction masterpieces

• To imbibe the underlying philosophy and values reflected in literature

• To develop sensitivity to nature and understand the relationship between human beings and environment

-

Course Code:	**Course Title:**

Course outcomes:
The students would be able :

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Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
SEMESTER -II	
Course Code: UACS201	**Course Title:** Communication Skills in English
Course Outcomes: The students would be able : 1. The learners will learn to understand and interpret any text they are reading from different perspectives 2. The interest of learners in listening to and watching good quality audio and visual media will be aroused. 3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world. 4. The learners will develop good oral and written skills of communication in the English language.	
Course Code: UAENG 201	**Course Title:** Introduction to Prose and Fiction Paper – I and II
Course Outcomes: The students would be able : To develop passion for reading literary works amongst students	

• To make learners at ease in the process of appreciation of literature • To enable learners to understand and analyze selected stories, prose, fiction and non- fiction masterpieces • To imbibe the underlying philosophy and values reflected in literature • To develop sensitivity to nature and understand the relationship between human beings and environment ●

Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : ●	
Course Code:	**Course Title:**

Annexure I

AC–_____
Item No. _ _____

UNIVERSITY OF MUMBAI

Syllabus for F.Y.B.Sc.
Programme: B.Sc.
Subject : Information Technology

Semester – I and II

(CBCS)

(Choice Based Credit System with effect from the academic year 2022-2023)

(To introduce with effect from the academic year 2022-2023)

Annexure I

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Programme	**F.Y.B.Sc. Sem. I & II (Information Technology)**
2	Eligibility for Admission	Ordinance no. O.5051 Circular no. UG/284 of 2007 dated 16th June 2007
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	As applicable for all B.Sc. Courses
5	No. of Years / Semesters	Three years – Six Semesters
6	Level	~~P.G.~~ / U.G./ ~~Diploma~~ / ~~Certificate~~ **(Strike out which is not applicable)**
7	Pattern	~~Yearly~~ / Semester **(Strike out which is not applicable)**
8	Status	Revised / ~~New~~ /~~Amended~~ **(Strike out which is not applicable)**
9	To be implemented from Academic Year	From Academic Year **2022-2023**

Signature
Chairman Name Dr. R. Srivaramangai
BOS Chairman in Information Technology

Dr. Anuradha Majumdar
Dean, Science and Technology

Annexure I

PREAMBLE

The B.Sc. Information Technology programme was started in 2001 with an aim to make the students employable and impart industry oriented training. The main objectives of the course are:

- To think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex problems.
- To apply their knowledge and skills to be employed and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programmes.
- To be capable of managing complex IT projects with consideration of the human, financial and environmental factors.
- To work effectively as a part of a team to achieve a common stated goal.
- To adhere to the highest standards of ethics, including relevant industry and organizational codes of conduct.
- To communicate effectively with a range of audiences both technical and non-technical.
- To develop an aptitude to engage in continuing professional development.

The new syllabus is aimed to achieve the objectives. The syllabus spanning three years covers the industry relevant courses. The students will be ready for the jobs available in different fields like:

- Software Development (Programming)
- Website Development
- Mobile app development
- Internet of Things
- Software Testing
- Networking
- Database Administration
- System Administration
- Cyber Law Consultant
- GIS (Geographic Information Systems)
- IT Service Desk
- Security
- Technical communication skills
- Green IT

And many others

Annexure I

Name of Dean (Dean, Faculty of Science and Technology) : Dr. Anuradha Majumdar

Name of Associate Dean (Associate Dean, Faculty of Science and Technology) Prof. Shivram Garje

Name of Chairperson (BoS) : Dr. Mrs. R. Srivaramangai

Member(BoS) : Dr. Hiren Dand

Member(BoS) : Dr. Abhijeet Kale

Member(BoS) : Dr. Santosh Singh

Member(BoS) : Dr. Rajendra Patil

Member(BoS) : Dr. Mandar Bhave

Annexure I

Semester 1			
Course Code	**Course Type**	**Course Title**	**Credits**
USIT101	Core Subject	Programming Principles with C	2
USIT102	Core Subject	Digital Logic and Applications	2
USIT103	Core Subject	Fundamentals of Database Management Systems	2
USIT104	Core Subject	Computational Logic and Discrete Structure	2
USIT105	Ability Enhancement Skill Course	Technical Communication Skills	2
USIT1P1	Core Subject Practical	Programming Principles with C Practical	2
USIT1P2	Core Subject Practical	Digital Logic and applications Practical	2
USIT1P3	Core Subject Practical	Fundamentals of Database Management Systems Practical	2
USIT1P4	Core Subject Practical	Computational Logic and Discrete structure Practical	2
USIT1P5	Ability Enhancement Skill Course Practical	Technical Communication Skills Practical	2
		Total Credits	**20**

Semester 2			
Course Code	**Course Type**	**Course Title**	**Credits**
USIT201	Core Subject	Object Oriented Programming with C++	2
USIT202	Core Subject	Fundamentals of Micro Processor and Microcontrollers	2
USIT203	Core Subject	Web Applications Development	2
USIT204	Core Subject	Numerical Methods	2
USIT205	Ability Enhancement Skill Course	Green IT	2
USIT2P1	Core Subject Practical	Object Oriented Programming with C++ Practical	2
USIT2P2	Core Subject Practical	Fundamentals of Micro Processor and Microcontrollers Practical	2
USIT2P3	Core Subject Practical	Web Applications Development Practical	2
USIT2P4	Core Subject Practical	Numerical Methods Practical	2
USIT2P5	Ability Enhancement Skill Course Practical	PL/SQL Practical	2
		Total Credits	**20**

Annexure I

SEMESTER I

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Programming Principles with C		**Course Code: USIT101**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**75**
	Internal	**--**	**25**

Course Objectives: 1. To develop the logical ability of the student.
2. Basic concepts to be cleared using suitable examples.
3. Different approach towards the problem.
4. To handle the errors and find suitable solution.
5. Debugging the code.

Unit	Details	Lectures
I	Introduction: Algorithms, History of C, Structure of C Program. Program Characteristics, Compiler, Linker and preprocessor, pseudo code statements and flowchart symbols, Desirable program characteristics. Program structure. Compilation and Execution of a Program, C Character Set, identifiers and keywords, data types and sizes , constants and its types, variables, Character and character strings, typedef, typecasting	**12**
II	Type of operators: Arithmetic operators, relational and logical operators, Increment and Decrement operators, assignment operators, the conditional operator, Assignment operators and expression, Precedence and order of Evaluation Block Structure, Initialization, C Preprocessor Control Flow: Statements and Blocks, If-Else, Else-If, Switch, Loops- While and For Loops- Do-while, Break and Continue, Goto and Labels	**12**
III	Functions and Program Structure: Basics of functions. User defined and Library functions, Function parameters, Return values, Recursion External variables, Scope Rules, Standard Input and Output, Formatted Output-printf() and Formatted Input- scanf(), Line Input and Output, Error Handling- StdErr and Exit, Header Files	**12**
IV	Pointer and Arrays Pointer and Addresses, Pointer and Function Arguments, Pointer and Arrays, Address Arithmetic, Character Pointers and Functions, Pointer Arrays: Pointers and Functions, Multidimensional Array, Command-line Arguments, Pointers to Functions, Dynamic memory allocation	**12**
V	Structures: Basics of structures, Structures and Functions, Arrays of Structures, Pointers to Structures, Unions, Bit-fields, File management in C: Defining and Opening file, Closing a file, Input / Output operations on file, Error handling in C, Random access to files, Command line arguments.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Programming Language	Brian W. Kernighan and Denis M. Ritchie.	PHI	2nd	1988
2.	Mastering C	K R Venugopal	Tata McGraw-Hill	6th	2007
3.	Programming with C	Byron Gottfried	Tata McGRAW-Hill	2nd	1996
4.	Let us C	Yashwant P. Kanetkar	BPB publication		
5.	Programming in ANSI C	E.Balagurusamy	Tata McGraw-Hill	7th	1982

Annexure I

Course Outcomes:

Learners will be able to,

1. **Learn the basic principles of programming.**
2. **Develop of logic using algorithm and flowchart.**
3. **Acquire the information about data types.**
4. **Understanding of input and output functions.**
5. **Enhance advanced concepts using program.**

B. Sc (Information Technology)		**Semester – I**	
Course Name: Programming Principles with C Practical		**Course Code: USIT1P1**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

1. **To develop the logic of the student.**
2. **Describe loops and decision making using programs.**
3. **Practical use of operators.**
4. **Illustration of the difficult concepts using programming examples.**
5. **Discussion of the relevant concepts using program.**

List of Practical:	
1.	a. Write an algorithm and draw flowchart for Area of circle. b. Write an algorithm and draw flowchart to print the given no. is even or odd. c. Write an algorithm and draw flowchart to print 1 to 10 numbers. d. Write an algorithm and draw flowchart for sum of 1 to 5 numbers. e. Write an algorithm and draw flowchart to compute the addition of digits of a given number.
2.	a. Write a program using while loop to reverse the digits of a number. b. Write a program to calculate the factorial of a given number. c. Write a program to find the roots of quadratic equation. d. Write a program to print the Fibonacci series.
3.	a. Write a program in C to check entered character vowel or consonant b. Write a program to C program to print day name of week using switch-case. c. Write a program to read three values from keyboard and print out the largest of them without using if statement.
4.	a. Write a program to print the pattern of asterisks as shown below : * * * * * * * * * * b. Write a program to print the pattern of asterisks as shown below : * * * * * * * * * * * * * * * **c. Write a program to print Floyd's Triangle.**
5.	a. Write a program to print area of square using function.

Annexure I

	b. Write a program using recursive function. **c. Write a program to square root, abs() value using function.** **d. Write a program using goto statement.**
6.	a. Write a program to print rollno and names of 10 students using array. b. Write a program to read a matrix of size m*n. **c. Write a program to sort the elements of array** in ascending or descending order.
7.	a. Write a program to extract the portion of a character string and print the extracted part. b. Write a program to find the given string is palindrome or not. **c. Write a program to using strlen(), strcmp() function.**
8.	a. Write a program to display the values using different data types and its address using pointer. b. Write a program to perform addition and subtraction using pointer.
9.	a. Write a program to copy the contents of the file from one file into other. b. Write a program to print the structure using • Title • Author • Subject • Book ID Print the details of two students.
10.	a. Create a mini project on "Bank management system" . The program should be menu driven.

Course Outcomes:

Learners will be able to,

1. **Develop applications.**
2. **Work with textual information, characters and strings.**
3. **Understand of a functional hierarchical code organization**
4. **Debug the program**
5. **Understand the differences between syntax errors, runtime errors, and logic errors.**

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Digital Logic and Applications		Course Code: USIT102	
Periods per week (1 Period is 50 minutes)		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2	75
	Internal	--	25

Course Objectives:

1. **To introduce the basics of logic in digital electronics as an entry level course.**
2. **To interpret and assess number systems and the conversions of number systems**
3. **To analyze the boolean expressions and reduce the expression to the minimum.**
4. **To design simple logic circuits using tools such as Boolean Algebra and Karnaugh Mapping.**
5. **To understand the state of a memory cell and its types using flip-flops.**
6. **To create simple digital systems using counters, registers etc.**

Unit	Details	Lectures
I	**Digital Systems and Binary numbers** Introduction to Number systems, Positional Number systems, Conversions (converting between bases), Non positional number systems, Unsigned and Signed binary numbers, Binary Codes, Number representation and storage in computer system. **Logic gates and Logic Circuits** Basic and Universal Gates	**12**
II	**Boolean algebra and Gate level minimization** Introduction, Postulates of Boolean Algebra, Two Valued Boolean Algebra, Principle of Duality, Basic Theorems of Boolean Algebra, Boolean Functions and their Representation, Gate-Level Minimization (Simplification of Boolean Function), Quine-McCluskey Method, Review questions	**12**
III	**Combinational logic** Introduction, Analysis and Design Procedure for Combinational Logic Circuits, Types of Combinational Circuit, Review Questions	**12**
IV	**Sequential circuits** Introduction, Latch, Flip-Flops, Registers, Counters, Review Questions	**12**
V	**Applications** Bit Arithmetic and Logic unit, Carry lookahead generator, Binary Multiplication and Division algorithm, Booth's multiplication algorithm	**12**

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Digital Logic Design	Sonali Singh	BPB publications	1st	2015
2.	Fundamentals of Digital Electronics and Logic Design	Subir Kumar Sarkar, Asish Kumar De, Souvil Sarkar	Pan Stanford Publishing	1st	2014
3.	Digital Electronics Principles, Design and Applications	Anil K Maini	Wiley	1st	2007
4.	Fundamentals of Logic	Charles H Roth, Jr. , Larry L	Cengage	7th	2014

	Design	Kinney	Learning		
5.	Digital Principles and Applications	Donald P Leach Albert Malvino Goutam Saha	TMH	8th	2015

Course Outcomes:

Learners will be able to,

1. **Apply number conversion techniques in real digital systems**
2. **Solve boolean algebra expressions**
3. **Derive and design logic circuits by applying minimization in SOP and POS forms**
4. **Design and develop Combinational and Sequential circuits**
5. **Understand and develop digital applications**

B. Sc (Information Technology)		**Semester – I**	
Course Name: Digital Logic and Applications Practical		**Course Code: USIT1P2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

1. **To apply and test the gates learnt using various IC's .**
2. **To evaluate the Boolean expression to reduce and minimize the gates used**

1.	**Study of basic gates and Universal gates**
a.	To verify the truth tables of OR, AND, NOR, NAND, EX-OR, EX-NOR gates
b.	To study IC 7400, 7402, 7404, 7408, 7432, 7486, 74266
c.	To implement and verify NAND and NOR as Universal gates
2.	**Study of Boolean expressions**
a.	To verify De Morgan's laws
b.	Implement the given expression using a minimum number of gates.
c.	Implement the given expression using a minimum number of ICs.
3.	**Design of Combinational Circuits using K-maps**
a.	Design and implement combinational circuits for the given problem/problems using minimization techniques of K-maps.
4.	**Design and implement code converters**
a.	Design the circuit and implement Binary to gray code converter
b.	Design the circuit and implement Gray to Binary code converter
c.	Design the circuit and implement Binary to BCD code converter
d.	Design the circuit and implement Binary to XS-3 code converter
5.	**Implement Adder and Subtractor circuits**
a.	Design the circuit and implement Half Adder and Full Adder
b.	Design the circuit and implement BCD Adder, XS-3 Adder , Binary Subtractor

Annexure I

6.	**Design and implement Arithmetic circuits**
a.	Design and implement 2-by-2 bit multiplier
7.	**Implement Encoders and Decoders**
a.	Design and implement 8: 3 encoder
b.	Design and implement 3:8 decoder
8.	**Multiplexers and Demultiplexers**
a.	Design and Implement 4:1 multiplexer
b.	Design and Implement 1:4 demultiplexer
c.	Study IC 74151 8: 1 multiplexer and implement the expression
d.	Study IC 74138 3: 8 decoder and implement the expression
9.	**Study of Flipflops and Counters**
a.	Study of IC's 7473, 7474, and 7476
b.	Design a 3-bit ripple/ synchronous counter using IC 7473 and required gates
10.	**Design of Shift Registers**
a.	Design of Shift registers using IC 7474
b.	Implementation of digits using seven segment displays

Course Outcomes:

Learners will be able to,

1. **Construct basic and universal logic circuits.**
2. **Verify the functionalities of various IC's.**
3. **Design circuits using K-maps minimization technique**
4. **Design and test Encoders, Decoders, Multiplexers and Demultiplexers**
5. **Design and develop logic for Registers, Counters and its applications.**

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Fundamentals of Database Management Systems		Course Code: USIT103	
Periods per week (1 Period is 50 minutes)		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2	75
	Internal	--	25

Course Objectives:

The objective of the course is to present an introduction to fundamentals of database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Unit	Details	Lectures
I	Database system- concept and Architecture, Relational model and Relational database constraints. Relational Algebra.	12
II	Conceptual modelling and database design: Data modelling using the Entity Relationship model (ER).The enhanced entity relationship model. Relational database design by ER and EER model. Practical database design methodology and use of UML diagrams.	12
III	Database Design theory and normalization: Basics of functional dependencies and normalization for relational databases. Relational database design and further dependencies.	12
IV	Introduction to SQL , Complex queries, triggers, views, joining database tables and schema modification. Query Processing and optimization. File structure, hashing and indexing	12
V	Transaction management and concurrency control and recovery: Introduction to transaction processing concepts and theory. Concurrency control technique. Database recovery technique.	12

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	**Fundamentals of Database systems.**	**Ramez Elmasri, Shamkant B Navathe**	Pearson.	**6th Edition**	
2.	**Database Systems: Design implementation and management.**	**Carlos Coronel, Steven Morris, Peter Rob**	Cengage Learning	**9th Edition**	2010

Course Outcomes:

Learners will be able to

Annexure I

1. Define and describe the fundamental elements of relational database management system.
2. To relate the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
3. Design ER-models to represent simple database application scenarios.
4. Transform the ER-model to relational tables, populate relational database and formulate SQL queries on data.
5. Improve the database design by normalization.
6. Understand basic database storage structures and access techniques: file and page organizations, indexing methods and hashing.

B. Sc (Information Technology)		**Semester – I**	
Course Name: Fundamentals of Database Management Systems Practical		**Course Code: USIT1P3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- **To introduce ER data model, database design and normalization.**
- **To Learn SQL basics for data definition and data manipulation.**

1.	Draw E-R diagram and convert entities and relationships to relation table for a given scenario
a.	Bank
b.	College
2.	**Write relational algebra queries for a given set of relations**
3.	**Defining data**
a.	Using CREATE statement
b.	Using ALTER statement
c.	Using DROP statement
d.	Using TRUNCATE statement
e.	Using RENAME statement
4.	**Manipulating data**
a.	Using INSERT statement
b.	Using UPDATE statement
c.	Using DELETE statement
d.	Using SELECT statement
5.	**Creating and managing the tables**
a.	Creating table with contraints: NOTNULL, UNIQUE, PRIMARY KEY ,FOREIGN KEY
6.	**Restricting and sorting data**
a.	Using DISTINCT,IN, AS, SORT,LIKE,ISNULL, OR
b.	Using Group By, Having clause, Order By clause
7.	**Aggregate and Mathematical functions:**
a.	AVG,MIN,MAX,SUM,COUNT

Annexure I

b.	ABS,SQRT,ROUND,TRUNCATE,SIGN,POWER,MOD,FLOOR,CEIL
8.	**Views and Joins: For a given set of relation tables perform the following**
a.	Creating view
b.	Dropping view
c.	Selecting from a view
8.	**Database trigger**
a.	Using CREATE OR REPLACE TRIGGER
9.	**Index**
a.	Create index
b.	Drop index

Course Outcomes:

Learners will be able to:

1. **Design database schema for a given application and apply normalization.**
2. **Acquire skills in using SQL Commands for data Definition and data manipulation.**

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Computational Logic and Discrete Structures		**Course Code: USIT104**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**75**
	Internal	**--**	**25**

Course Objectives:

- **Course will provide students with an overview of discrete mathematics.**
- **Students will learn about topics such as logic and proofs, sets and functions, recursion, graph theory, tress and other important discrete math concepts.**

Unit	Details	Lectures
I	**Set Theory** Introduction, Sets and Elements, Subsets, Venn Diagrams, Set Operations, Algebra of Sets, Duality, Finite Sets, Counting Principle, Classes of Sets, Power Sets, Partitions, Mathematical Induction **Relations** Introduction, Product Sets, Relations, Pictorial Representatives of Relations, Composition of Relations, Types of Relations, Closure Properties, Equivalence Relations, Partial Ordering Relations	**12**
II	**Functions and Algorithms** Introduction, Functions, One-to-One, Onto, and Invertible Functions, Mathematical Functions, Exponential and Logarithmic Functions, Sequences, Indexed Classes of Sets, Recursively Defined Functions, Cardinality, Algorithms and Functions, Complexity of Algorithms **Probability** Introduction, Sample Space and Events, Finite Probability Spaces, Conditional Probability, Independent Events, Independent Repeated Trials, Binomial Distribution, Random Variables, Chebyshev's Inequality, Law of Large Numbers	**12**
III	**Techniques of Counting** Introduction, Basic Counting Principles, Mathematical Functions, Permutations, Combinations, the Pigeonhole Principle, The Inclusion–Exclusion Principle, Tree Diagrams **Advanced Counting Techniques, Recursion** Introduction, Combinations with Repetitions, Ordered and Unordered Partitions, Inclusion–Exclusion Principle Revisited, Pigeonhole Principle Revisited, Recurrence Relations, Linear Recurrence Relations with Constant Coefficients, Solving Second-Order Homogeneous Linear Recurrence, Relations, Solving General Homogeneous Linear Recurrence Relations	**12**
IV	**Graph Theory** Introduction, Data Structures,,Graphs and Multigraphs, Subgraphs, Isomorphic and Homeomorphic Graphs, Paths, Connectivity, Traversable and Eulerian Graphs, Bridges of Königsberg, Labeled andWeighted Graphs, Complete, Regular, and Bipartite	**12**

	Graphs, Tree Graphs, Planar Graphs, Graph Colorings, Representing Graphs in Computer Memory, Graph Algorithms, Traveling-Salesman Problem, Solved Problems **Directed Graphs** Introduction, Directed Graphs, Basic Definitions, Rooted Trees, Sequential Representation of Directed Graphs, Warshall's Algorithm, Shortest Paths, Linked Representation of Directed Graphs, Graph Algorithms: Depth-First and Breadth-First Searches, Directed Cycle-Free Graphs, Topological Sort, Pruning Algorithm for Shortest Path	
V	**Binary Trees** Introduction, Binary Trees,, Complete and Extended Binary Trees, Representing Binary Trees in Memory, Traversing Binary Trees, Binary Search Trees, Priority Queues, Heaps, Path Lengths, Huffman's Algorithm, General (Ordered Rooted) Trees Revisited **Ordered Sets and Lattices** Introduction, Ordered Sets, Hasse Diagrams of Partially Ordered Sets, Consistent Enumeration, Supremum and Infimum, Isomorphic (Similar) Ordered Sets, Well-Ordered Sets, Lattices 346 Bounded Lattices, Distributive Lattices, Complements, Complemented Lattices	**12**

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Discrete Mathematics, Schaum's Outlines Series	Seymour Lipschutz, Marc Lipson	Tata MCGraw Hill	3rd	2007
2.	Discrete Mathematics with Applications	Sussana S. Epp	Cengage Learning	5th	2018
3.	Discrete Mathematics and its Applications	Kenneth H. Rosen	Tata MCGraw Hill	8th	2019
4.	Discrete mathematical structures	B Kolman RC Busby, S Ross	PHI		
5.	Discrete structures	Liu	Tata MCGraw Hill		

Course Outcomes:

Learners will be able to:

1. **Use logical notation**
2. **Perform logical proofs**
3. **Apply recursive functions and solve recurrence relations**
4. **Use graphs and trees**
5. **Apply basic and advanced principles of counting**
6. **Define sets and Relations**
7. **Calculate discrete probabilities.**

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Computational Logic and Discrete Structures Practical		**Course Code: USIT1P4**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

Course will make students understand different commands and functions of SCILAB. It will enable student to use these tools to compute solutions of various discrete mathematical structures.

1.	**Set Theory**
a.	Inclusion Exclusion principle.
b.	Power Sets
c.	Mathematical Induction
2.	**Functions and Algorithms**
a.	Recursively defined functions
b.	Cardinality
c.	Polynomial evaluation
d.	Greatest Common Divisor
3.	**Probability Theory 1**
a.	Sample space and events
b.	Finite probability spaces
c.	Equiprobable spaces
d.	Addition Principle
4.	**Probability Theory 2**
a.	Conditional Probability
b.	Multiplication theorem for conditional probability
c.	Independent events
d.	Repeated trials with two outcomes
5.	**Counting 1**
a.	Sum rule principle
b.	Product rule principle
c.	Factorial
d.	Binomial coefficients
6.	**Counting 2**
a.	Permutations
b.	Permutations with repetitions

c.	Combinations
d.	Combinations with repetitions
7.	**Counting 3**
a.	Ordered partitions
b.	Unordered partitions
8.	**Graph Theory**
a.	Paths and connectivity
b.	Minimum spanning tree
c.	Isomorphism
9.	**Directed Graphs**
a.	Adjacency matrix
b.	Path matrix
10	**Recurrence relations**
a.	Linear homogeneous recurrence relations with constant coefficients
b.	Solving linear homogeneous recurrence relations with constant coefficients
c.	Solving general homogeneous linear recurrence relations

Course Outcomes:

Learners will be able to:

1. **To find computational solution to various discrete mathematical structures.**

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Technical Communication Skills		**Course Code: USIT105**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**75**
	Internal	**--**	**25**

Course Objectives:

- **To recognize the importance of various types of communication in technical set up.**
- **To understand the dynamics in different forms of formal communication.**
- **To learn about active listening and the art of giving presentations and interviews.**
- **To learn the art of business writing and ethics in business communication across functional areas.**
- **To evaluate, analyze and interpret technical data.**

Unit	Details	Lectures
I	**Fundamentals of Technical Communication** Introduction, The process of communication, Language as tool of communication, levels of communication, The flow of communication, Communication Networks, The importance of technical communication **Barriers to communication** Definition of Noise, classification of Barriers **Non-verbal Communication** Introduction, Definition, significance of nonverbal, forms of non -verbal communication, types of non-verbal communication	**12**
II	**The Seven Cs of Effective Communication**: Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness **Conversations** Introduction, Importance of Business conversion, Essential of Business conversion, Conversation Management **Meeting and conferences** Introduction, Purpose of Meeting, planning a meeting, Meeting Process, Leading effective meeting, Evaluating meeting, planning conference, teleconferencing **Group Discussion and team presentation** Introduction, Benefits of GD, Workplace GD guidelines, Functional and non functional roles in GD, Improving group performance, Assessment of group discussion ,Team presentation **Email communication** Introduction, Advantages of email, problems in email communication, Email etiquettes, Techniques of writing Effective Email	**12**
III	**Active Listening** Introduction, Type of listening, Traits of good listener, Active vs Passive listening, Implication of effective listening **Effective presentation Strategies** Introduction, Defining purpose, Analyzing audience and Locale, Organizing contents, preparing outline, Visual Aids, Understanding Nuances of delivery, Kinesics **Interview** Introduction, objectives, types of interview, job interviews	**12**
IV	**Business writing** Introduction, Importance of written Business, Five main strategies of writing business messages	**12**

	Business correspondence Business letter writing, common component of Business letter, Strategies for writing body of a letter, Types of Business letter, writing memos **Business reports and proposal** What is report? Steps in writing routine Business report, parts of report, corporate reports and Business proposals **Careers and Resume** Introduction to career building, resume format, traditional, electronic and video resumes, sending resume, follow up letters and online recruitment process	
V	**Communication across Functional areas** Financial communication, MIS **Ethics in Business Communication** Ethical communication, Values, ethics and communication, ethical dilemmas facing manager, strategic approaches to corporate ethics **Creating and Using Visual Aids** Object, Models, Handouts, Charts and Graphs, Text Visuals , Formatting Computer generated charts, graphs and visuals	**12**

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Technical communication : principles and practices	Meenakshi Raman & Sangeeta Sharma	Oxford Higher Education		
2.	Business Communication	Meenakshi Raman & Prakash Singh	Oxford- Higher Education	2nd edition	2006
3.	Effective Business Communication	Herta Murphy, Herbert Hildebrandt, Jane Thomas	Tata McGraw Hill	7th edition	2008
4.	Professional Communication	Aruna Koneru	McGraw Hill		2008
5.	Business and Professional Communication Plans, Processes and Performance	James R. DiSanza Nancy J..Legge	Pearson Education	4th Edition	
6.	Storytelling with data-a data visualization guide for business professionals	Cole Nussbaumer knaflic	Wiley		

Course Outcome:

Learners will be able to,

1. **Analyze, synthesize and utilize the process and strategies from delivery to solving communication problem.**
2. **Learn the communication methodologies at workplace and learning about importance of team collaboration.**
3. **Learn about different technical communication such as presentations and interviews.**
4. **Understand and apply the art of written communication in writing reports, proposals.**
5. **Ground rules of ethical communication and MIS.**
6. **Understand the functions of graphs, maps, charts.**

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Technical Communication Skills Practical		**Course Code: USIT1P5**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- **To express thoughts feelings and ideas of learners by using features of MS Word.**
- **To articulate formal and informal reports.**
- **To analyze and interpret data and learn visualization of data.**
- **To learn effective tools of presentation**.

1.	Use of word processing tools for communication.
a.	Use of various tools like spell checker, header, footer etc.
b.	Make formal and informal letters, creating resume.
c.	Designing brochures and flyers using templates in word.
2.	Writing reports, minutes of meeting, action plan.
3.	Use of spreadsheet for data interpretation and data analysis.
4.	Basic use of what if analysis using excel.
5.	Visual Representation of data using excel – pie chart ,line chart, bar chart etc.
6.	Summarization of data using of pivot tables and chart in excel.
7.	Use of presentation tools like PowerPoint for communication and presentation skills.
8.a.	Basic communication covering the following topics:- Meeting people, Asking Questions and Design of questionnaire.
8.b.	Using netiquettes in online mode of communication using Zoom / Google Meet / MS-Teams etc.
9.	Use of Mail etiquette for writing effective mails.
10.a.	Use of Mail merge and its features.
10.b.	Creating profile using Linkedln.

Course Outcome:

Learners will be able to:

1. **Use different forms of digital mediums for effective communication.**
2. **Create technical documents and format existing documents for effective communication.**
3. **Learn to use graphical tools for better visualization.**
4. **Create business presentation effectively.**
5. **Visualize the data from pictorial representations**.

Annexure I

SEMESTER II

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Object Oriented Programming with C++		**Course Code: USIT201**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**75**
	Internal	**--**	**25**

Course Objectives:

Understand object oriented programming and advanced C++ concepts

- **Be able to explain the difference between object oriented programming and procedural programming.**
- **Be able to program using more advanced C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.**
- **Be able to build C++ classes using appropriate encapsulation and design principles**
- **Be able to apply object oriented or non-object oriented techniques to solve**
- **bigger computing problems**

Unit	Details	Lectures
I	**INTRODUCTION OF OBJECT-ORIENTED DESIGN** : Introduction, Objects, Class and Instance, Polymorphism, Inheritance, Object-Oriented Analysis , Finding the Objects ,Conceptual Modeling Requirements Model , Analysis Model, The Design Model, The Implementation Model , Test Model, Object-Oriented Analysis and Design, The Evolution of Object Model, Object-Oriented Programming, Object-Oriented Design, Object-Oriented Analysis, Elements of Object Model ,The Role of OOAD in the Software Life Cycle, OOAD Methodologies, Grady Booch Approach, **STARTING WITH C++:** C++ Overview, C++ Character Set, C++ Tokens, Variables, Counting Tokens, Data Types, Qualifiers, Range of Data Types, Your First C++ Program, Structure of a C++ Program, Styles of, Writing C++ Programs, Programming Examples **FEATURES OF C++:** Introduction, Operators and Expressions, Declaring Constants, Type Conversion, Decision Making: An Introduction, Unconditional Branching Using Goto , Introduction to Looping **OPERATORS AND REFERENCES IN C++**: Introduction, Scope Resolution Operator, Reference Variables, The Bool Data Type, The Operator New and Delete, Malloc Vs. New ,Pointer Member Operators	**12**
II	**FUNCTION IN C++**: Introduction ,Function Declaration/Prototyping ,,The Main Function in C++,Recursion ,Call by Reference ,Call by Reference Vs Call by Address , Return by Reference ,,Inline Function ,Function Overloading ,Function with Default Arguments **CLASS AND OBJECTS IN C++** : Working with Class, Structure in C++ ,Accessing Private Data Passing and Returning Object ,Array of Object ,Friend Function ,Static Class Members ,Constant Member Function **WORKING WITH CONSTRUCTOR AND DESTRUCTOR:** Introduction, Constructor with Parameters, Implicit and Explicit Call to Constructor, Copy Constructor, Dynamic Initialization of Objects, Dynamic Constructor, Destructor **WORKING WITH OPERATOR OVERLOADING:** Introduction, Operator Overloading with Binary Operator Overloading Assignment (=) Operator, Overloading	**12**

	Unary Operators, Overloading Using Friend Function, Rules of Operator Overloading, Type Conversion	
III	**WORKING WITH INHERITANCE IN C++:** Introduction, Types of Inheritance, Public, Private and Protected Inheritance, Multiple Inheritance, Hierarchical Inheritance, Virtual Base Class, Constructor and Destructor in Inheritance, Containership **POINTERS TO OBJECTS AND VIRTUAL FUNCTIONS:** Pointer to Objects, The This Pointer, What is Binding in C++? , Virtual Functions ,Working of a Virtual Function ,Rules for Virtual Function ,Pure Virtual Function and Abstract Class ,Object Slicing ,Some Facts about Virtual Function ,Virtual Destructor **INPUT-OUTPUT AND MANIPULATORS IN C++:** Introduction, C++ Stream Classes, Unformatted Input/Output, Formatted Input /Output Operations, Manipulators	**12**
IV	**FILE HANDLING IN C++:** Introduction, File Streams, Opening and Closing a File, File Opening Modes Checking End of File, Random Access in File, Command Line Arguments, Working with Binary Mode Error Handling **TEMPLATE PROGRAMMING:** Introduction , Function Template , Class Template **EXCEPTION HANDLING IN C++ :** Introduction , Basics of Exception Handling , Exception Handling Mechanism , Programming Examples ,Exception Handling with Class Catching all Exceptions , Specifying Exception for a Function	**12**
V	**INTRODUCTION TO THE STANDARD TEMPLATE LIBRARY** : Introduction , Components of STL , Containers , Algorithms , Iterators ,Application of Container Classes Function Objects **MANIPULATING STRINGS** :Introduction , Creating (string) Objects , Manipulating String Objects , Relational Operations, String Characteristics , Accessing Characters in Strings , Comparing and Swapping **NEW FEATURES OF ANSI C++ STANDARD** : Introduction ,New Data Types , New Operators , Class Implementation , Namespace Scope , Operator Keywords , New Keywords , New Headers	**12**

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Object-oriented Programming C++ Simplified	Hari Mohan Pandey	University Science Press	1st Edition	2017
2.	Object Oriented Programming in C++	E Balagurusamy	Tata McGraw-Hill	5th Edition	2011
3.	Object-Oriented Programming in C++	Robert Lafore	Sams	4th Edition	2002
4.	Programming with ANSI C++	Bhushan Trivedi	Oxford University Press	2nd Edition	2012
5.	Demystified Object-Oriented Programming with C++	Dorothy R. Kirk	Packt Publishing Lt	1st Edition	2021
6.	C++ Programming: An Object-Oriented Approach	Behrouz A. Forouzan , Richard F. Gilberg	McGraw-Hill Education	1st edition	2020
7.	C++ How to Program	Paul Deitel, Harvey Deitel	Pearson Education	10th Edition	2017

Annexure I

Course Outcomes:

Learners will be able to,

1. **Understand the concept of OOPs, feature of C++ language.**
2. **Understand and apply various types of Datatypes, Operators, Conversions while designing the program.**
3. **Understand and apply the concepts of Classes &Objects, friend function, constructors & destructors in program design.**
4. **Design & implement various forms of inheritance, String class, calling base class constructors.**
5. **Apply & Analyze operator overloading, runtime polymorphism, Generic Programming.**
6. **Analyze and explore various Stream classes, I/O operations and exception handling.**

B. Sc (Information Technology)		**Semester – II**	
Course Name: Object Oriented Programming with C++ Practical		**Course Code: USIT2P1**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- **The student should be able to explain the important characteristics of the C++ programming language.**
- **The learner must be able to combine components of the C++ programming language to develop structured program.**
- **The student must demonstrate the skills essential to compile, debug, and test C++ programs correctly.**

1.	
a.	Write a C++ program to create a simple calculator.
b.	Write a C++ program to convert seconds into hours, minutes and seconds.
c.	Write a C++ program to find the volume of a square, cone, and rectangle.
2.	
a.	Write a C++ program to find the greatest of three numbers.
b.	Write a C++ program to find the sum of even and odd n natural numbers
c.	Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
3.	
a.	Write a C++ program using classes and object Student to print name of the student, roll_no. Display the same.
b.	Write a C++ program for Structure bank employee to print name of the employee, account_no. & balance. Display the same also display the balance after withdraw and deposit
c.	Write a C++ Program to design a class having static member function named showcount() which has the property of displaying the number of objects created of the class.

d.	Write a Program to find Maximum out of Two Numbers using friend function. Note: Here one number is a member of one class and the other number is member of some other class.
e.	Write a C++ Program using copy constructor to copy data of an object to another object.
f.	Write a C++ Program to allocate memory dynamically for an object of a given class using class's constructor.
4.	
a.	Write a C++ program to design a class representing complex numbers and having the functionality of performing addition & multiplication of two complex numbers using operator overloading.
b.	Write a C++ program to overload new/delete operators in a class.
c.	Write a C++ program to access members of a STUDENT class using pointer to object members
	Write a C++ Program to generate Fibonacci Series by using Constructor to initialize the Data Members.
d.	Write a C++ Program to generate Fibonacci Series by using Constructor to initialize the Data Members.
e.	Write a C++ Program that illustrate single inheritance.
f.	Write a C++ Program that illustrate multipe inheritance.
g.	Write a C++ Program that illustrate multi level inheritance.
h.	Write a C++ Program that illustrate Hierarchical inheritance.
i.	Write a C++ Program illustrating how the constructors are implemented and the order in which they are called when the classes are inherited. Use three classes named alpha, beta, gamma such that alpha,beta are base class and gamma is derived class inheriting alpha & beta
5.	
a.	Write a C++ Program to design a stuent class representing student roll no. and a test class (derived class of student) representing the scores of the student in various subjects and sports class representing the score in sports. The sports and test class should be inherited by a result class having the functionality to add the scores and display the final result for a student.
6.	
a.	Write a C++ program to maintain the records of person with details (Name and Age) and find the eldest among them. The program must use this pointer to return the result.
7.	
a.	Write a C++ program illustrating the use of virtual functions in class.
b.	Write a C++ program to design a class representing the information regarding digital library (books, tape: book & tape should be separate classes having the base class as media). The class should have the functionality for adding new item, issuing, deposit etc. the program should use the runtime polymorphism.
8.	
a.	Write a C++ program to show conversion from string to int and vice-versa.
b.	Write a C++ program implementing basic operation of class ios i.e. setf, unsetf, precision etc.
c.	Write a C++ program to implement I/O operations on characters. I/O operations includes inputting a string, Calculating length of the string, Storing the String in a file, fetching the stored characters from it, etc.
d.	Write a C++ program to copy the contents of one file to another.

e.	Write a C++ program to perform read/write binary I/O operation on a file (i.e. write the object of a structure/class to file).
9.	
a.	Write a C++ program to implement the exception handling with multiple catch statements.
b.	Write a C++ program to implement the exception handling with rethrowing in Exception.
10.	
a.	Write a C++ Program to create Simple calculator using Class template.
b.	Write a C++ Program to get maximum of two number using Class template.

Course Outcomes:

Leaners will able to,

- **Utilize C++ characteristics in software design and development.**
- **Explain object-oriented techniques and explain how C++ supports them.**
- **Employ C++ to demonstrate practical skill developing object-oriented solutions.**
- **Examine a problem statements and design and develop object-oriented software using good coding practices and procedures.**
- **In object-oriented design, use common software patterns and recognize their relevance in other software development contexts.**

Annexure I

B. Sc (Information Technology)		Semester – II	
Course Name: Fundamentals of Micro Processor and Microcontrollers		Course Code: USIT202	
Periods per week (1 Period is 50 minutes)		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2	75
	Internal	--	25

Course Objectives: 1) To understand the basic concept of Micro Computer Systems
2) To develop background knowledge in 8085 Microprocessor
3) To write Assembly language Programs of 8085
4) To understand the peripheral devices and interfacing to 8051 Micro Controller and design aspects of Micro Controller

Unit	Details	Lectures
I	**Microprocessor, microcomputers, and Assembly Language:** Microprocessor,Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Microcontrollers, Applications. **Microprocessor Architecture and Microcomputer System:** Microprocessor Architecture and its operation's, Memory, I/O Devices, Microcomputer System, Logic Devices and Interfacing, Microprocessor-Based System Application. **8085 Microprocessor Architecture and Memory Interface:** Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer, Memory Interfacing,Interfacing the8085 Memory Segment.	12
II	**Interfacing of I/O Devices** Basic Interfacing concepts, Interfacing Output Displays, Interfacing Input Devices, Memory Mapped I/O, Testing and Troubleshooting I/O Interfacing Circuits. **Introduction to 8085 Assembly Language Programming:** The 8085 Programming Model, Instruction Classification, Instruction, Data and Storage, Writing assembling and Execution of a simple program, Overview of 8085 Instruction Set, Writing and Assembling Program. **Introduction to 8085 Instructions:** Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs, Debugging a Program.	12
III	**Programming Techniques With Additional Instructions:** ProgrammingTechniques: Looping, Counting and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Instruction Related to Memory, Logic Operations: Rotate, Logics Operations: Compare, Dynamic Debugging. **Counters and Time Delays:** Counters and Time Delays, Illustrative Program: Hexadecimal Counter, Illustrative Program: zero-to-nine (Modulo Ten) Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs. **Stacks and Sub-Routines:** Stack, Subroutine, Restart, Conditional Call, Return Instructions, Advanced Subroutine concepts. **Interrupts:** The 8085 Interrupt, 8085 Vectored and Non vectored Interrupts, Restart as S/W Instructions.	12

IV	**Micro Controllers:** Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems. **Embedded Hardware:** Memory map, i/o map, interrupt map, processor family, external peripherals, memory – RAM , ROM, types of RAM and ROM, memory testing, CRC ,Flash memory. **Peripherals:** Control and Status Registers, Device Driver, Timer watch Timer **The 8051 Microcontrollers:** Microcontrollers and Embedded processors, Overview of 8051 family.8051 Microcontroller hardware, Input/output pins, Ports, and Circuits, External Memory. **8051 Programming in C:** Data Types and time delay in 8051 C, I/O Programming, Logic operations, Data conversion Programs.	**12**
V	**Designing Embedded System with 8051 Microcontroller:**Factors to be considered in selecting a controller, why 8051 Microcontroller, Designing with 8051. **Programming embedded systems:** structure of embedded program, infinite loop, compiling, linking and debugging. **Design and Development:** Embedded system, development Environment – IDE, types of file generated on cross compilation, Embedded Product Development cycle and Trends in embedded Industry	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Microprocessors Architecture, Programming and Applications with the 8085.	Ramesh Gaonkar	PENRAM	5th	2012
2.	8080A/8085 Assembly Language Programming	Lance A. Leventhel	Osborne		1978
3	Embedded Systems	Rajkamal	Tata Mcgraw-Hill		
4	Introduction to embedded systems	Shibu K V	Tata Mcgraw-Hill	1st	2012

Course Outcomes:

Learners will be able to,

1. **Understand the basic concepts of Micro Computer Systems**
2. **Understand the architecture and hardware aspects of 8085**
3. **Write assembly language programs in 8085**
4. **Design elementary aspects of Micro Controller based systems**
5. **Interfacing peripherals using Micro Controller**

Annexure I

B. Sc (Information Technology)		Semester – II	
Course Name: Fundamentals of Micro Processor and Microcontrollers Practical		**Course Code: USIT2P2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives: The course aims to learn

1. **Operations related to single & Multiple memory locations**
2. **Simple assembly language programs**
3. **How to perform register operations, packing and unpacking**
4. **Embedding computer using 8051 microcontrollers**
5. **Interfacing I/O Ports**
6. **Implement flashmagic in microcontrollers**

List of Practical	
1.	**Perform the following Operations related to memory locations.**
a.	Store the data byte 32H into memory location 4000H.
b.	Exchange the contents of memory locations 2000H and 4000H
2.	**Simple assembly language programs.**
a.	Subtract two 8-bit numbers.
b.	Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.
c.	Find the l's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H.
d.	Find the 2's complement of the number stored at memory location 4200H and store the complemented number at memory location 4300H.
3.	**Packing and unpacking operations.**
a.	Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store result in memory location 4300H. Assume the least significant digit is stored at 4200H.
b.	Two digit BCD number is stored in memory location 4200H. Unpack the BCD number and store the two digits in memory locations 4300H and 4301H such that memory location 4300H will have lower BCD digit.
4.	**Register Operations.**
a.	Write a program to shift an eight bit data four bits right. Assume that data is in register C.
b.	Program to shift a 16-bit data 1 bit left. Assume data is in the HL register pair

Annexure I

c.	Write a set of instructions to alter the contents of flag register in 8085.
d.	Write a program to count number of l's in the contents of D register and store the count in the B register.
5.	**Multiple memory locations.**
a.	Calculate the sum of series of numbers. The length of the series is in memory location 4200H and the series begins from memory location 4201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 4300H. b. Consider the sum to be 16 bit number. Store the sum at memory locations 4300H and 4301H
b.	Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H.
c.	Divide 16 bit number stored in memory locations 2200H and 2201H by the 8 bit number stored at memory location 2202H. Store the quotient in memory locations 2300H and 2301H and remainder in memory locations 2302H and 2303H.
6.	**Calculations with respect to memory locations.**
a.	Write a program to sort given 10 numbers from memory location 2200H in the ascending order.
b.	Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location 2Sample problem:
7.	**Assembly programs on memory locations**
a.	A list of 50 numbers is stored in memory, starting at 6000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 7000H, 7001H, and 7002H respectively
b.	Write an assembly language program to generate fibonacci number.
c.	Program to calculate the factorial of a number between 0 to 8.
8.	Design and develop a reprogrammable embedded computer using 8051 microcontrollers and to show the following aspects. a. Programming b. Execution c. Debugging
9 a	Configure timer control registers of 8051 and develop a program to generate given time delay.
b	Port I / O: Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's
c	To interface 8 LEDs at Input-output port and create different patterns.
d	To demonstrate timer working in timer mode and blink LED without using any

	loop delay routine.
10.	**Using FlashMagic**
a.	To demonstrate the procedure for flash programming for reprogrammable embedded system board using Flash Magic
b.	To demonstrate the procedure and connections for multiple controllers programming of same type of controller with same source code in one go, using flash magic.

Course Outcomes:

Learners will be able to,

1. **Apply concepts of 8085 to single & Multiple Memory Locations**
2. **Apply concepts of micro-processor register operations**
3. **Can implement assembly language programs**
4. **Use of Shift registers 8 & 16 bits**
5. **Apply the knowledge of Flash Magic in embedded Controllers**
6. **Learns to simulate and configure different timer controls**

Annexure I

B. Sc (Information Technology)		Semester – II	
Course Name: Web Applications Development		**Course Code: USIT203**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**75**
	Internal	**--**	**25**

Course Objectives:

- **Understand basic concepts of Internet and World Wide Web.**
- **Comprehend different HTML elements that can be used to develop static web pages.**
- **Become familiar with concept of stylesheets and various CSS effects.**
- **Peruse JavaScript as a tool to add dynamism to static HTML pages.**
- **Explore how server-side script works on the web.**
- **Learn how PHP can be connected to a database to store and retrieve data.**

Unit	Details	Lectures
I	**Internet and the World Wide Web**: What is Internet? Applications of Internet, E-mail, Telnet, FTP, E-commerce and E-business. Internet Service Providers, Domain Name Server, Internet Address, World Wide Web (WWW): World Wide Web and its Evolution, Uniform Resource Locator (URL), Browsers, Common Features of Browsers, Search Engine, Web Server, HTTP Protocol. **HTML5**: Introduction, Formatting Text by using Tags, Using Lists, Creating Hyperlinks and Bookmarks, Defining Metadata about an HTML Document, Redirecting to another URL. **CSS**: Implementing Styles using CSS – Stylesheets, Formatting Text and Links using CSS, CSS Selectors, Changing Background, Adding Border, Margin and Padding, Setting Dimensions, Using Inline Container to mark up a part of a text.	**12**
II	**HTML Page Layout**: Using Layout Elements, Semantic Elements, Creating, Positioning and Formatting Divisions, Floating Divisions next to each other, Responsive Web Design, Inline Frames. **HTML Media, Tables and Forms**: Embedding Images, Creating Client-side and Server-side Image Map, adding Favicon, Embedding audio and video on web page. Creating Simple Table, Table Dimension, Merging Table Cells, Formatting Tables: Applying Borders, Background and Foreground fills, Changing Cell Padding, Spacing and Alignment Collecting user input with HTML Forms, Additional Input Types in HTML5.	**12**
III	**JavaScript**: Introduction, Difference between Client-side and Server-side Scripting, JavaScript Variables and Constants, Data Types, Statements, Comments, Functions, Variable Scope, Hoisting, Strict Mode, JavaScript Objects, Dialog Boxes, void Keyword	**12**

	Operators: Arithmetic Operators, Assignment Operators, Comparison Operators, Logical Operators, Bitwise Operators **Statements**: Conditional Statements – if else, switch, Loops – while, do while, for, for in, for of, Loop Control – break, continue, labels **JavaScript Objects**: User-defined Objects, with Keyword, Native Objects – Array, String, Date, Math, Number, RegExp **DOM**: Introduction, DOM Properties and Methods. **Browser BOM**: Moving back and forward with History, Cookies **Events and Event Handlers**: HTML Events, DOM Events, DOM Event Listener, onAbort, onBlur, onChange, onClick, onDblClick, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onReset, onResize, onSelect, onSubmit, onUnload	
IV	**PHP**: Introduction, Server-side Scripting, PHP Syntax and Comments, Variables and Constants, Data Types, Control Structures, Looping, Loop Termination, Functions, PHP Form Handling, PHP Form Validation, Superglobals, PHP Arrays, PHP Strings, PHP RegEx, PHP Numbers, PHP Math, Basic PHP Errors	**12**
V	**Advanced PHP**: PHP Date and Time, PHP Include, PHP Cookies, PHP Sessions, Validating and Sanitizing Data with PHP Filters **PHP and MySQL** Why PHP and MySQL? Connect to MySQL, Creating Database and Tables, Inserting Single and Multiple Rows, Retrieving Last ID, MySQL Prepared, Selecting Data, Updating Data, Deleting Data, Limiting Data.	**12**

Course Outcomes:

- **Analyze working of Internet.**
- **Gain an insight into designing web pages.**
- **Use different ways of styling web pages using CSS.**
- **Implement basic and complex functionalities of JavaScript in a web page.**
- **Employ PHP Scripts to execute dynamic tasks in a web page.**
- **Perform various database tasks using PHP.**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
	The Complete Reference HTML & CSS	Thomas A. Powell	McGrawHill	5th	-
	Step by Step HTML5	Faithe Wempen	Microsoft Press		2011
	Learning PHP, MySQL, JavaScript, CSS & HTML5	Robin Nixon	O'Reilly	3rd	2018
	Learning Web Design A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics	Jennifer Niederst Robbins	O'Reilly	5th	2018

	The Complete Reference JavaScript	Thomas A. Powell & Fritz Schneider	McGrawHill	3rd	2012
	PHP & MySQL Novice to Ninja	Tom Butler	SPD	7th	2022

B. Sc (Information Technology)		**Semester – II**	
Course Name: Web Application Development Practical		**Course Code: USIT2P3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- **Understand how to effectively implement HTML.**
- **Write CSS effectively to create well organized, styled web pages.**
- **Add versatility to a web page with client-side scripting.**
- **Deploy a local web server and run a simple web application.**
- **Read and process data in MySQL using PHP.**

List of Practical:	
1.	**Use of Basic Tags**
a.	Design a web page using different text formatting tags.
b.	Design a web page with links to different pages and allow navigation between web pages.
c.	Design a web page that automatically redirects the user to another page.
2.	**Use of CSS**
a.	Design a web page demonstrating different stylesheet types.
b.	Design a web page demonstrating grouping selectors.
3.	**Layout and Media**
a.	Design a web page demonstrating different semantics.
b.	Design a web page embedding image, audio and video.
c.	Design a web page with Imagemaps.
4.	**Tables and Forms**
a.	Design a web page with different tables.
b.	Design a web page with a form that uses all types of controls.

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5.	**JavaScript**
a.	Using JavaScript, design a web page to accept a number from the user and print its Factorial.
b.	Using JavaScript, a web page that prints Fibonacci series/any given series.
c.	Write a JavaScript program to display all the prime numbers between 1 and 100.
d.	Write a JavaScript program to accept a number from the user and display the sum of its digits.
6.	**JavaScript Objects**
a.	Using JavaScript, design a web page demonstrating different native objects of JavaScript.
b.	Write a program in JavaScript to accept a sentence from the user and display the number of words in it. (Do not use split () function).
7.	**JavaScript Events**
a.	Write a JavaScript program to design simple calculator.
b.	Design a form and validate all the controls placed on the form using JavaScript.
8.	**Basic PHP**
a.	Write a PHP code to find the greater of 2 numbers. Accept the no. from the user.
b.	Write a PHP Program to accept a number from the user and print it factorial.
c.	Write a PHP program to accept a number from the user and print whether it is prime or not.
d.	Write a PHP program to display the following Binary Pyramid: 1 0 1 1 0 1 0 1 0 1 1 0 1 0 1
e.	Write a PHP program to demonstrate different string functions.
f.	Write a PHP program to demonstrate different array functions.
9.	**Advanced PHP**
a.	Write a PHP program to demonstrate use of sessions and cookies.
b.	Write a PHP program to demonstrate use of filters.
10.	**PHP and MySQL**
a.	Write a PHP program to create: Create a database College

Annexure I

	Create a table Department (Dname, Dno, Number_of_faculty)
b.	Write a PHP program to create a database named "College". Create a table named "Student" with following fields (sno, sname, percentage). Insert 3 records of your choice. Display the names of the students whose percentage is between 35 to 75 in a tabular format.
c.	Write a PHP program to Update rows in a table Delete rows from a table
d.	Design a PHP page for authenticating a user

Course Outcomes:

Learners will be able to,

1. **Design static web pages using Hyper Text Markup Language (HTML).**
2. **Enhance the look of web pages by implementing CSS.**
3. **Collect information from the user with HTML Forms.**
4. **Design interactive webpages using client-side script (JavaScript).**
5. **Implement Document Object Model and events in web pages using JavaScript.**
6. **Write and deploy basic PHP code to simplify web development.**
7. **Store and retrieve data from a server using PHP**.

Annexure I

B. Sc (Information Technology)		Semester – I	
Course Name: Numerical Methods		Course Code: USIT204	
Periods per week (1 Period is 50 minutes)		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2	75
	Internal	--	25

Course Objectives:
Course will enhance the problem solving skills of students using extremely powerful numerical methods.

Unit	Details	Lectures
I	**Mathematical Modeling and Engineering Problem Solving:** A Simple Mathematical Model, Conservation Laws and Engineering Problems **Approximations and Round-Off Errors:** Significant Figures, Accuracy and Precision, Error Definitions, Round-Off Errors **Truncation Errors and the Taylor Series:** The Taylor Series, Error Propagation, Total Numerical Errors, Formulation Errors and Data Uncertainty	12
II	**Solutions of Algebraic and Transcendental Equations:** The Bisection Method, The Newton-Raphson Method, The Regula-falsi method, The Secant Method. **Interpolation:** Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation	12
III	**Solution of simultaneous algebraic equations (linear) using iterative methods:** Gauss-Jordan Method, Gauss-Seidel Method. **Numerical differentiation and Integration:** Numberical differentiation, Numerical integration using Trapezoidal Rule, Simpson's 1/3rd and 3/8th rules.	12
IV	**Numerical solution of 1st and 2nd order differential equations:** Taylor series, Euler's Method, Modified Euler's Method, Runge-Kutta Method for 1st and 2nd Order Differential Equations. **Least-Squares Regression:** Linear Regression, Polynomial Regression, Multiple Linear Regression, General Linear Least Squares, Nonlinear Regression	12
V	**Linear Programming:** Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution. **Numerical Solutions of Partial Differential Equations:** Classification of Partial Differential Equations of the second order, Difference equation corresponding to Laplace Equation, Liebmann's Iteration Process, Bender-Schmidt's Difference Equation corresponding to the parabolic equation, Crank Nicolson's difference equations corresponding to the parabolic equation, Difference equation corresponding to the Hyperbolic equation..	12

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year

1.	Introductory Methods of Numerical Methods	S. S. Sastry	PHI	5th	2012
2.	Numerical Methods for Engineers	Steven C. Chapra, Raymond P. Canale	Tata Mc Graw Hill	6th	2010
3.	Numerical Analysis	Richard L. Burden, J. Douglas Faires	Cengage Learning	9th	2011
4.	Numerical Methods	T Veerarajan T Ramachandran	Tata Mc Graw Hill	7th	2011

Course Outcomes:

Learners will be able to,

1. **Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations.**
2. **Understand the difference operators and the use of interpolation.**
3. **Understand numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.**

B. Sc (Information Technology)		**Semester – I**	
Course Name: Numerical Methods Practical		**Course Code: USIT2P4**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

Course will provide different tools to find solutions to various numerical techniques

List of Practical: To be implemented using SCILAB	
1.	**Iterative Calculation**
a.	Program for iterative calculation
b.	Program to calculate the roots of a quadratic equation using the formula
c.	Program to evaluate e^x using infinite series
2.	**Solution of algebraic and transcendental equations:**

Annexure I

a.	Program to solve algebraic and transcendental equation by bisection method.
b.	Program to solve algebraic and transcendental equation by false position method.
c.	Program to solve algebraic and transcendental equation by Secant method.
d.	Program to solve algebraic and transcendental equation by Newton Raphson method.
3.	**Interpolation**
a.	Program for Newton's forward interpolation.
b.	Program for Newton's backward interpolation.
c.	Program for Lagrange's interpolation.
4.	**Solving linear system of equations by iterative methods**
a.	Program for solving linear system of equations using Gauss Jordan method.
b.	Program for solving linear system of equations using Gauss Seidel method.
5.	**Numerical Differentiation**
a.	Program to obtain derivatives numerically.
6.	**Numerical Integration**
a.	Program for numerical integration using Trapezoidal rule.
b.	Program for numerical integration using Simpson's 1/3rd rule.
c.	Program for numerical integration using Simpson's 3/8th rule.
7.	**Solution of differential equations**
a.	Program to solve differential equation using Euler's method.
b.	Program to solve differential equation using modified Euler's method.
c.	Program to solve differential equation using Runge-kutta 2nd order and 4th order methods.
8.	**Regression** 1
a.	Program for Linear regression.
b.	Program for Polynomial Regression.
9.	**Regression** 2

a.	Program for multiple linear regression.
b.	Program for non-linear regression.
10.	Numerical solution of partial differential equations
a.	Program to find solution of Laplace's equation.

Course Outcomes:

Learners will be able to,

1. **Find fast and accurate solution to simple and complex numerical problems using these programs.**

Annexure I

B. Sc (Information Technology)		Semester – II	
Course Name: Green IT		**Course Code: USIT205**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**75**
	Internal	**--**	**25**

Course Objectives:

- **To understand the concept of Green Technology.**
- **To learn Green IT regulating Green IT and different standards.**
- **To understand the concept of minimizing power utilization in technology.**
- **To know about Green PCs, Green notebooks and servers and Green data centers.**
- **To know how the way of work is changing and understand implementation of Paperless work.**
- **To know the concept of Recycling.**
- **To understand Metrics for Green IT.**

Unit	Details	Lectures
I	**Overview to Green IT:** Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power. **Regulating Green IT: Laws, Standards and Protocols** Introduction, The Regulatory Environment and IT Manufacturers RoHS, REACh, WEEE, Legislating for GHG Emissions and Energy Use of IT Equipment.Nonregulatory Government Initiatives, Industry Associations and Standards Bodies, Green Building Standards, Green Data Centres , Social Movements and Greenpeace.	**12**
II	**Minimizing Power Usage:** Power Problems, Monitoring Power Usage, Servers, Low-CostOptions, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, LowPower Computers, PCs, Linux, Components, Servers, ComputerSettings, Storage, Monitors, Power Supplies, Wireless Devices, Software. **Cooling:** Cooling Costs, Power Cost, Causes of Cost, Calculating CoolingNeeds, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised, Floors, Cable Management, Vapour Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Datacentre Design, Centralized Control, Design for Your Needs, Put Everything Together.	**12**
III	**Greening IT:** Green PCs, Notebooks and Servers, Green Data Centres , Green Cloud Computing, Green Data Storage , Green Software, Green Networking and Communications. **Changing the Way of Work:** Old Behaviours, starting at the Top, Process Reengineering with Green in Mind, Analysing the Global Impact of Local Actions, Steps: Water, Recycling, Energy, Pollutants, Teleworkers and Outsourcing, Telecommuting, Outsourcing, how to Outsource. **Going Paperless:** Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles.	**12**

IV	**Recycling:** Means of Disposal, Recycling, Refurbishing, Make the Decision, Life Cycle, from beginning to end, Life, Cost, Green Design, Recycling Companies, Finding the Best One, Checklist, Certifications, Hard Drive Recycling, Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal, Change the mind-set, David vs. America Online. **Hardware Considerations:** Certification Programs, EPEAT, RoHS, Energy Star, Computers, Monitors, Printers, Scanners, All-in-Ones, Thin Clients, Servers, Blade Servers, Consolidation, Products, Hardware Considerations, Planned Obsolescence, Packaging, Toxins, Other Factors, Remote Desktop, Using Remote Desktop, Establishing a Connection.	**12**
V	**Greening Your Information Systems:** Initial Improvement Calculations, Selecting Metrics, Tracking Progress, Change Business Processes, Customer Interaction, Paper Reduction, Green Supply Chain, Improve Technology Infrastructure, Reduce PCs and Servers, Shared Services, Hardware Costs, Cooling. **Staying Green:** Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, Gather Data, Tracking the data, Baseline Data, Benchmarking, Analyse Data, Conduct Audits, Certifications, Benefits, Realities, Helpful Organizations.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Green IT	Toby Velte, Anthony Velte, Robert Elsenpeter	McGraw Hill		2008
2.	Harnessing Green IT: Principles and Practices	San Murugesan, G. R. Ganadharan,	Wiley & IEEE.		
3.	Green Data Center: Steps for the Journey	Alvin Galea, Michael Schaefer, Mike Ebbers	Shroff Publishers and Distributers		2011
4.	Green IT	Deepak Shikarpur	Vishwkarma Publications,		2014
5.	Green Computing Tools and Techniques for Saving Energy, Money and Resources	Bud E. Smith	CRC Press		2014
	Green Computing and Green IT Best Practice	Jason Harris	Emereo		

Course Outcomes:

Learners will be able to,

- **Understand the concept of Green IT and problems related to it.**
- **Know different standards for Green IT.**
- **Understand the how power usage can be minimized in Technology.**
- **Learn about how the way of work is changing.**
- **Understand the concept of recycling.**
- **Know how information system can stay Green Information system.**

Annexure I

B. Sc (Information Technology)		Semester – II	
Course Name: Practical's in PL/SQL		**Course Code: USIT2P5**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Course Objectives:

- **To understand the basics of PL/SQL.**
- **To understand control and conditional statement in PL/SQL.**
- **To understand working of sequences and cursor in PL/SQL.**
- **To understand concept of stored procedure and functions.**
- **To understand triggers and packages in PL/SQL.**
- **To understand the concept of Exception handling.**

List of Practical:	
1.	**PL/SQL Basics**
a.	Use of variables.
b.	Write executable statement.
c.	Interacting with Oracle Server.
d.	Create anonymous PL/SQL block
2.	**Control Structure in PL/SQL .**
a.	Using while loop
b.	Do loop
c.	For loop
d.	Use of GOTO statement
3.	**Create conditional statement using PL/SQL**
a.	Using if statement
b.	Using if else statement
c.	Using elsif ladder
d.	Using case expression.
4.	**Creation of Sequence in PL/SQL**
5.	**Create cursor in PL/SQL**
a.	Implicit cursor
b.	Explicit

Annexure I

c.	Parameterized cursor
d.	Cursor for loop
6.	**Creation of Procedures in PL/SQL**
7.	**Functions in PL/SQL**
a.	Compute and returns the maximum value
b.	Compute factorial of given number.
8.	**Creation of Trigger**
a.	Create Row level trigger
b.	Create Statement level trigger
c.	Create instead of trigger
9.	**Handling exceptions**
a.	Creation of user defined exception
b.	Creation of system defined exception.
10.	**Creation of Package in PL/SQL**

Course Outcomes:

Learner will be able to:

- **Understand the basics of PL/SQL.**
- **Use of the control and conditional statement in PL/SQL.**
- **Apply sequences and cursor in PL/SQL.**
- **Know the concept of stored procedure and functions**
- **Create the triggers and packages in PL/SQL.**
- **Implement the concept of Exception handling.**

Academic Council 11/05/2017
Item No: 4.286

UNIVERSITY OF MUMBAI

Syllabus for S.Y.B.Sc.

Programme: B.Sc.

Course: Information Technology

with effect from the academic year

2017 – 2018

Semester – 3			
Course Code	**Course Type**	**Course Title**	**Credits**
USIT301	Skill Enhancement Course	Python Programming	2
USIT302	Core Subject	Data Structures	2
USIT303	Core Subject	Computer Networks	2
USIT304	Core Subject	Database Management Systems	2
USIT305	Core Subject	Applied Mathematics	2
USIT3P1	Skill Enhancement Course Practical	Python Programming Practical	2
USIT3P2	Core Subject Practical	Data Structures Practical	2
USIT3P3	Core Subject Practical	Computer Networks Practical	2
USIT3P4	Core Subject Practical	Database Management Systems Practical	2
USIT3P5	Core Subject Practical	Mobile Programming Practical	2
		Total Credits	**20**

Semester – 4			
Course Code	**Course Type**	**Course Title**	**Credits**
USIT401	Skill Enhancement Course	Core Java	2
USIT402	Core Subject	Introduction to Embedded Systems	2
USIT403	Core Subject	Computer Oriented Statistical Techniques	2
USIT404	Core Subject	Software Engineering	2
USIT405	Core Subject	Computer Graphics and Animation	2
USIT4P1	Skill Enhancement Course Practical	Core Java Practical	2
USIT4P2	Core Subject Practical	Introduction to Embedded Systems Practical	2
USIT4P3	Core Subject Practical	Computer Oriented Statistical Techniques Practical	2
USIT4P4	Core Subject Practical	Software Engineering Practical	2
USIT4P5	Core Subject Practical	Computer Graphics and Animation Practical	2
		Total Credits	**20**

SEMESTER III

B. Sc. (Information Technology)		Semester – III	
Course Name: Python Programming		**Course Code: USIT301**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** The Python Programming Language, History, features, Installing Python, Running Python program, Debugging : Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, Formal and Natural Languages, The Difference Between Brackets, Braces, and Parentheses, **Variables and Expressions** Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Interactive Mode and Script Mode, Order of Operations. **Conditional Statements:** if, if-else, nested if –else **Looping**: for, while, nested loops **Control statements:** Terminating loops, skipping specific conditions	**12**
II	**Functions:** Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters Are Local, Stack Diagrams, Fruitful Functions and Void Functions, Why Functions? Importing with from, Return Values, Incremental Development, Composition, Boolean Functions, More Recursion, Leap of Faith, Checking Types **Strings:** A String Is a Sequence, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, String Operations.	**12**
III	**Lists:** Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Built-in List Operators, Concatenation, Repetition, `In` Operator, Built-in List functions and methods **Tuples and Dictionaries:** Tuples, Accessing values in Tuples, Tuple Assignment, Tuples as return values, Variable-length argument tuples, Basic tuples operations, Concatenation, Repetition, `in` Operator, Iteration, Built-in Tuple Functions Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods **Files:** Text Files, The File Object Attributes, Directories	**12**

	Exceptions: Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-defined Exceptions	
IV	**Regular Expressions –** Concept of regular expression, various types of regular expressions, using match function. **Classes and Objects:** Overview of OOP (Object Oriented Programming), Class Definition, Creating Objects, Instances as Arguments, Instances as return values, Built-in Class Attributes, Inheritance, Method Overriding, Data Encapsulation, Data Hiding **Multithreaded Programming:** Thread Module, creating a thread, synchronizing threads, multithreaded priority queue **Modules:** Importing module, Creating and exploring modules, Math module, Random module, Time module	**12**
V	**Creating the GUI Form and Adding Widgets:** **Widgets:** Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Message, Radiobutton, Scale, Scrollbar, text, Toplevel, Spinbox, PanedWindow, LabelFrame, tkMessagebox. Handling Standard attributes and Properties of Widgets. **Layout Management:** Designing GUI applications with proper Layout Management features. **Look and Feel Customization**: Enhancing Look and Feel of GUI using different appearances of widgets. **Storing Data in Our MySQL Database via Our GUI :** Connecting to a MySQL database from Python, Configuring the MySQL connection, Designing the Python GUI database, Using the INSERT command, Using the UPDATE command, Using the DELETE command, Storing and retrieving data from MySQL database.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Think Python	Allen Downey	O'Reilly	1st	2012
2.	An Introduction to Computer Science using Python 3	Jason Montojo, Jennifer Campbell, Paul Gries	SPD	1st	2014
3.	Python GUI Programming Cookbook	Burkhard A. Meier	Packt		2015
4.	Introduction to Problem Solving with Python	E. Balagurusamy	TMH	1st	2016
5.	Murach's Python programming	Joel Murach, Michael Urban	SPD	1st	2017
6.	Object-oriented Programming in Python	Michael H. Goldwasser, David Letscher	Pearson Prentice Hall	1st	2008
7.	Exploring Python	Budd	TMH	1st	2016

B. Sc. (Information Technology)		Semester – III	
Course Name: Data Structures		**Course Code: USIT302**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** Data and Information, Data Structure, Classification of Data Structures, Primitive Data Types, Abstract Data Types, Data structure vs. File Organization, Operations on Data Structure, Algorithm, Importance of Algorithm Analysis, Complexity of an Algorithm, Asymptotic Analysis and Notations, Big O Notation, Big Omega Notation, Big Theta Notation, Rate of Growth and Big O Notation. **Array**: Introduction, One Dimensional Array, Memory Representation of One Dimensional Array, Traversing, Insertion, Deletion, Searching, Sorting, Merging of Arrays, Multidimensional Arrays, Memory Representation of Two Dimensional Arrays, General Multi-Dimensional Arrays, Sparse Arrays, Sparse Matrix, Memory Representation of Special kind of Matrices, Advantages and Limitations of Arrays.	**12**
II	**Linked List:** Linked List, One-way Linked List, Traversal of Linked List, Searching, Memory Allocation and De-allocation, Insertion in Linked List, Deletion from Linked List, Copying a List into Other List, Merging Two Linked Lists, Splitting a List into Two Lists, Reversing One way linked List, Circular Linked List, Applications of Circular Linked List, Two way Linked List, Traversing a Two way Linked List, Searching in a Two way linked List, Insertion of an element in Two way Linked List, Deleting a node from Two way Linked List, Header Linked List, Applications of the Linked list, Representation of Polynomials, Storage of Sparse Arrays, Implementing other Data Structures.	**12**
III	**Stack**: Introduction, Operations on the Stack Memory Representation of Stack, Array Representation of Stack, Applications of Stack, Evaluation of Arithmetic Expression, Matching Parenthesis, infix and postfix operations, Recursion**.** **Queue:** Introduction, Queue, Operations on the Queue, Memory Representation of Queue, Array representation of queue, Linked List Representation of Queue, Circular Queue, Some special kinds of queues, Deque, Priority Queue, Application of Priority Queue, Applications of Queues.	**12**

IV	**Sorting and Searching Techniques** Bubble, Selection, Insertion, Merge Sort. Searching: Sequential, Binary, Indexed Sequential Searches, Binary Search. **Tree:** Tree, Binary Tree, Properties of Binary Tree, Memory Representation of Binary Tree, Operations Performed on Binary Tree, Reconstruction of Binary Tree from its Traversals, Huffman Algorithm, Binary Search Tree, Operations on Binary Search Tree, Heap, Memory Representation of Heap, Operation on Heap, Heap Sort. **Advanced Tree Structures:** Red Black Tree, Operations Performed on Red Black Tree, AVL Tree, Operations performed on AVL Tree, 2-3 Tree, B-Tree.	**12**
V	**Hashing Techniques** Hash function, Address calculation techniques, Common hashing functions Collision resolution, Linear probing, Quadratic, Double hashing, Bucket hashing, Deletion and rehashing **Graph**: Introduction, Graph, Graph Terminology, Memory Representation of Graph, Adjacency Matrix Representation of Graph, Adjacency List or Linked Representation of Graph, Operations Performed on Graph, Graph Traversal, Applications of the Graph, Reachability, Shortest Path Problems, Spanning Trees.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	A Simplified Approach to Data Structures	Lalit Goyal, Vishal Goyal, Pawan Kumar	SPD	1st	2014
2.	An Introduction to Data Structure with Applications	Jean – Paul Tremblay and Paul Sorenson	Tata MacGraw Hill	2nd	2007
3.	Data Structure and Algorithm	Maria Rukadikar	SPD	1st	2017
4.	Schaum's Outlines Data structure	Seymour Lipschutz	Tata McGraw Hill	2nd	2005
5.	Data structure – A Pseudocode Approach with C	AM Tanenbaum, Y Langsam and MJ Augustein	Prentice Hall India	2nd	2006
6.	Data structure and Algorithm Analysis in C	Weiss, Mark Allen	Addison Wesley	1st	2006

B. Sc. (Information Technology)		Semester – III	
Course Name: Computer Networks		**Course Code: USIT303**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** Data communications, networks, network types, Internet history, standards and administration. **Network Models:** Protocol layering, TCP/IP protocol suite, The OSI model. **Introduction to Physical layer:** Data and signals, periodic analog signals, digital signals, transmission impairment, data rate limits, performance. **Digital and Analog transmission:** Digital-to-digital conversion, analog-to-digital conversion, transmission modes, digital-to-analog conversion, analog-to-analog conversion.	**12**
II	**Bandwidth Utilization: Multiplexing and Spectrum Spreading:** Multiplexing, Spread Spectrum **Transmission media:** Guided Media**,** Unguided Media **Switching:** Introduction, circuit switched networks, packet switching, structure of a switch. **Introduction to the Data Link Layer:** Link layer addressing, Data Link Layer Design Issues, Error detection and correction, block coding, cyclic codes, checksum, forward error correction, error correcting codes, error detecting codes.	**12**
III	**Data Link Control:** DLC services, data link layer protocols, HDLC, Point-to-point protocol. **Media Access Control**: Random access, controlled access, channelization, Wired LANs – Ethernet Protocol, standard ethernet, fast ethernet, gigabit ethernet, 10 gigabit ethernet, **Wireless LANs:** Introduction, IEEE 802.11 project, Bluetooth, WiMAX, Cellular telephony, Satellite networks. **Connecting devices and Virtual LANs.**	**12**
IV	**Introduction to the Network Layer**: Network layer services, packet switching, network layer performance, IPv4 addressing, forwarding of IP packets, Internet Protocol, ICMPv4, Mobile IP **Unicast Routing:** Introduction, routing algorithms, unicast routing protocols. **Next generation IP:** IPv6 addressing, IPv6 protocol, ICMPv6 protocol, transition from IPv4 to IPv6.	**12**
V	**Introduction to the Transport Layer**: Introduction, Transport layer protocols (Simple protocol, Stop-and-wait protocol, Go-Back-n	**12**

	protocol, Selective repeat protocol, Bidirectional protocols), Transport layer services, User datagram protocol, Transmission control protocol, **Standard Client0Server Protocols:** World wide-web and HTTP, FTP, Electronic mail, Telnet, Secured Shell, Domain name system.	

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Data Communication and Networking	Behrouz A. Forouzan	Tata McGraw Hill	Fifth Edition	2013
2.	TCP/IP Protocol Suite	Behrouz A. Forouzan	Tata McGraw Hill	Fourth Edition	2010
3.	Computer Networks	Andrew Tanenbaum	Pearson	Fifth	2013

B. Sc. (Information Technology)		Semester – III	
Course Name: Database Management Systems		**Course Code: USIT304**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction to Databases and Transactions** What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management **Data Models** The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction. **Database Design, ER Diagram and Unified Modeling Language** Database design and ER Model: overview, ER Model, Constraints, ER Diagrams, ERD Issues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML	**12**
II	**Relational database model:** Logical view of data, keys, integrity rules, Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF). **Relational Algebra and Calculus** Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison. **Calculus:** Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities	**12**
III	**Constraints, Views and SQL** Constraints, types of constrains, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers.	**12**
IV	**Transaction management and Concurrency** Control Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management.	**12**
V	**PL-SQL**: Beginning with PL / SQL, Identifiers and Keywords, Operators, Expressions, Sequences, Control Structures, Cursors and Transaction, Collections and composite data types, Procedures and Functions, Exceptions Handling, Packages, With Clause and Hierarchical Retrieval, Triggers.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Database System and Concepts	A Silberschatz, H Korth, S Sudarshan	McGraw-Hill	Fifth Edition	
2.	Database Systems	Rob Coronel	Cengage Learning	Twelfth Edition	
3.	Programming with PL/SQL for Beginners	H. Dand, R. Patil and T. Sambare	X –Team	First	2011
4.	Introduction to Database System	C.J.Date	Pearson	First	2003

B. Sc. (Information Technology)		Semester – III	
Course Name: Applied Mathematics		**Course Code: USIT305**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Matrices:** Inverse of a matrix, Properties of matrices, Elementary Transformation, Rank of Matrix, Echelon or Normal Matrix, Inverse of matrix, Linear equations, Linear dependence and linear independence of vectors, Linear transformation, Characteristics roots and characteristics vectors, Properties of characteristic vectors, Caley-Hamilton Theorem, Similarity of matrices, Reduction of matrix to a diagonal matrix which has elements as characteristics values. **Complex Numbers:** Complex number, Equality of complex numbers, Graphical representation of complex number(Argand's Diagram), Polar form of complex numbers, Polar form of x+iy for different signs of x,y, Exponential form of complex numbers, Mathematical operation with complex numbers and their representation on Argand's Diagram, Circular functions of complex angles, Definition of hyperbolic function, Relations between circular and hyperbolic functions, Inverse hyperbolic functions, Differentiation and Integration, Graphs of the hyperbolic functions, Logarithms of complex quality, j(=i)as an operator(Electrical circuits)	**12**
II	**Equation of the first order and of the first degree:** Separation of variables, Equations homogeneous in x and y, Non-homogeneous linear equations, Exact differential Equation, Integrating Factor, Linear Equation and equation reducible to this form, Method of substitution. **Differential equation of the first order of a degree higher than the first:** Introduction, Solvable for p (or the method of factors), Solve for y, Solve for x, Clairaut's form of the equation, Methods of Substitution, Method of Substitution. **Linear Differential Equations with Constant Coefficients:** Introduction, The Differential Operator, Linear Differential Equation f(D) y = 0, Different cases depending on the nature of the root of the equation f(D) = 0, Linear differential equation f(D) y = X, The complimentary Function, The inverse operator 1/f(D) and the symbolic expiration for the particular integral 1/f(D) X; the general methods, Particular integral : Short methods, Particular integral : Other methods, Differential equations reducible to the linear differential equations with constant coefficients.	**12**
III	**The Laplace Transform:** Introduction, Definition of the Laplace Transform, Table of Elementary Laplace Transforms, Theorems on Important Properties of Laplace Transformation, First Shifting	**12**

	Theorem, Second Shifting Theorem, The Convolution Theorem, Laplace Transform of an Integral, Laplace Transform of Derivatives, **Inverse Laplace Transform:** Shifting Theorem, Partial fraction Methods, Use of Convolution Theorem, Solution of Ordinary Linear Differential Equations with Constant Coefficients, Solution of Simultaneous Ordinary Differential Equations, Laplace Transformation of Special Function, Periodic Functions, Heaviside Unit Step Function, Dirac-delta Function(Unit Impulse Function),	
IV	**Multiple Integrals:** Double Integral, Change of the order of the integration, Double integral in polar co-ordinates, Triple integrals. **Applications of integration:** Areas, Volumes of solids.	**12**
V	**Beta and Gamma Functions –** Definitions**,** Properties and Problems. Duplication formula. **Differentiation Under the Integral Sign** **Error Functions**	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	A text book of Applied Mathematics Vol I	P. N. Wartikar and J. N. Wartikar	Pune Vidyathi Graha		
2.	Applied Mathematics II	P. N. Wartikar and J. N. Wartikar	Pune Vidyathi Graha		
3.	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publications		

B. Sc. (Information Technology)		Semester – III	
Course Name: Python Programming Practical		**Course Code: USIT3P1**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

List of Practical	
1.	**Write the program for the following:**
a.	Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.
b.	Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.
c.	Write a program to generate the Fibonacci series.
d.	Write a function that reverses the user defined value.
e.	Write a function to check the input value is Armstrong and also write the function for Palindrome.
f.	Write a recursive function to print the factorial for a given number.
2.	**Write the program for the following:**
a.	Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.
b.	Define a function that computes the *length* of a given list or string.

c.	Define a *procedure* `histogram()` that takes a list of integers and prints a histogram to the screen. For example, `histogram([4, 9, 7])` should print the following:
	
	`****`
	`*********`
	`*******`

3.	**Write the program for the following:**
a.	A *pangram* is a sentence that contains all the letters of the English alphabet at least once, for example: *The quick brown fox jumps over the lazy dog*. Your task here is to write a function to check a sentence to see if it is a pangram or not.
b.	Take a list, say for example this one: `a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]` and write a program that prints out all the elements of the list that are less than 5.
4.	**Write the program for the following:**

a.	Write a program that takes two lists and returns True if they have at least one common member.
b.	Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
c.	Write a Python program to clone or copy a list
5.	**Write the program for the following:**
a.	Write a Python script to sort (ascending and descending) a dictionary by value.
b.	Write a Python script to concatenate following dictionaries to create a new one. Sample Dictionary : dic1={1:10, 2:20} dic2={3:30, 4:40} dic3={5:50,6:60} Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}
c.	Write a Python program to sum all the items in a dictionary.
6.	**Write the program for the following:**
a.	Write a Python program to read an entire text file.
b.	Write a Python program to append text to a file and display the text.
c.	Write a Python program to read last n lines of a file.
7.	**Write the program for the following:**
a.	Design a class that store the information of student and display the same
b.	Implement the concept of inheritance using python
c.	Create a class called `Numbers`, which has a single class attribute called `MULTIPLIER`, and a constructor which takes the parameters `x` and `y` (these should all be numbers). i. Write a method called `add` which returns the sum of the attributes `x` and `y`. ii. Write a class method called multiply, which takes a single number parameter a and returns the product of a and MULTIPLIER. iii. Write a static method called subtract, which takes two number parameters, b and c, and returns b - c. iv. Write a method called value which returns a tuple containing the values of x and y. Make this method into a property, and write a setter and a deleter for manipulating the values of `x` and `y`.
8.	**Write the program for the following:**
a.	Open a new file in IDLE ("New Window" in the "File" menu) and save it as geometry.py in the directory where you keep the files you create for this course. Then copy the functions you wrote for calculating volumes and areas in the "Control Flow and Functions" exercise into this file and save it. Now open a new file and save it in the same directory. You should now be able to import your own module like this: `import geometry`

	Try and add `print dir(geometry)` to the file and run it. Now write a function pointyShapeVolume(x, y, squareBase) that calculates the volume of a square pyramid if squareBase is True and of a right circular cone if squareBase is False. x is the length of an edge on a square if squareBase is True and the radius of a circle when squareBase is False. y is the height of the object. First use squareBase to distinguish the cases. Use the circleArea and squareArea from the geometry module to calculate the base areas.
b.	Write a program to implement exception handling.
9.	**Write the program for the following:**
a.	Try to configure the widget with various options like: bg=”red”, family=”times”, size=18
b.	Try to change the widget type and configuration options to experiment with other widget types like Message, Button, Entry, Checkbutton, Radiobutton, Scale etc.
10.	**Design the database applications for the following:**
a.	Design a simple database application that stores the records and retrieve the same.
b.	Design a database application to search the specified record from the database.
c.	Design a database application to that allows the user to add, delete and modify the records.

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Think Python	Allen Downey	O’Reilly	1st	2012
2.	An Introduction to Computer Science using Python 3	Jason Montojo, Jennifer Campbell, Paul Gries	SPD	1st	2014

B. Sc. (Information Technology)		Semester – III	
Course Name: Data Structures Practical		**Course Code: USIT3P2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

List of Practical	
1.	**Implement the following:**
a.	Write a program to store the elements in 1-D array and perform the operations like searching, sorting and reversing the elements. [Menu Driven]
b.	Read the two arrays from the user and merge them and display the elements in sorted order.[Menu Driven]
c.	Write a program to perform the Matrix addition, Multiplication and Transpose Operation. [Menu Driven]
2.	**Implement the following for Linked List:**
a.	Write a program to create a single linked list and display the node elements in reverse order.
b.	Write a program to search the elements in the linked list and display the same
c.	Write a program to create double linked list and sort the elements in the linked list.
3.	**Implement the following for Stack:**
a.	Write a program to implement the concept of Stack with Push, Pop, Display and Exit operations.
b.	Write a program to convert an infix expression to postfix and prefix conversion.
c.	Write a program to implement Tower of Hanoi problem.
4.	**Implement the following for Queue:**
a.	Write a program to implement the concept of Queue with Insert, Delete, Display and Exit operations.
b.	Write a program to implement the concept of Circular Queue
c.	Write a program to implement the concept of Deque.
5.	**Implement the following sorting techniques:**
a.	Write a program to implement bubble sort.
b.	Write a program to implement selection sort.
c.	Write a program to implement insertion sort.
6.	**Implement the following data structure techniques:**
a.	Write a program to implement merge sort.
b.	Write a program to search the element using sequential search.
c.	Write a program to search the element using binary search.

7.	**Implement the following data structure techniques:**
a.	Write a program to create the tree and display the elements.
b.	Write a program to construct the binary tree.
c.	Write a program for inorder, postorder and preorder traversal of tree
8.	**Implement the following data structure techniques:**
a.	Write a program to insert the element into maximum heap.
b.	Write a program to insert the element into minimum heap.
9.	**Implement the following data structure techniques:**
a.	Write a program to implement the collision technique.
b.	Write a program to implement the concept of linear probing.
10.	**Implement the following data structure techniques:**
a.	Write a program to generate the adjacency matrix.
b.	Write a program for shortest path diagram.

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Data Structures and Algorithms Using Python	Rance Necaise	Wiley	First	2016
2.	Data Structures Using C and C++	Langsam , Augenstein, Tanenbaum	Pearson	First	2015

B. Sc. (Information Technology)		Semester – III	
Course Name: Computer Networks		**Course Code: USIT3P3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

List of Practical	
1.	**IPv4 Addressing and Subnetting** a) Given an IP address and network mask, determine other information about the IP address such as: • Network address • Network broadcast address • Total number of host bits • Number of hosts b) Given an IP address and network mask, determine other information about the IP address such as: • The subnet address of this subnet • The broadcast address of this subnet • The range of host addresses for this subnet • The maximum number of subnets for this subnet mask • The number of hosts for each subnet • The number of subnet bits • The number of this subnet
2.	Use of ping and tracert / traceroute, ipconfig / ifconfig, route and arp utilities.
3.	Configure IP static routing.
4.	Configure IP routing using RIP.
5.	Configuring Simple OSPF.
6.	Configuring DHCP server and client.
7.	Create virtual PC based network using virtualization software and virtual NIC.
8.	Configuring DNS Server and client.
9.	Configuring OSPF with multiple areas.
10.	Use of Wireshark to scan and check the packet information of following protocols • HTTP • ICMP • TCP • SMTP • POP3

B. Sc. (Information Technology)		Semester – III	
Course Name: Database Management System		**Course Code: USIT3P4**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

List of Practical	
1.	**SQL Statements – 1**
a.	Writing Basic SQL SELECT Statements
b.	Restricting and Sorting Data
c.	Single-Row Functions
2.	**SQL Statements – 2**
a.	Displaying Data from Multiple Tables
b.	Aggregating Data Using Group Functions
c.	Subqueries
3.	**Manipulating Data**
a.	Using INSERT statement
b.	Using DELETE statement
c.	Using UPDATE statement
4.	**Creating and Managing Tables**
a.	Creating and Managing Tables
b.	Including Constraints
5.	**Creating and Managing other database objects**
a.	Creating Views
b.	Other Database Objects
c.	Controlling User Access
6.	**Using SET operators, Date/Time Functions, GROUP BY clause (advanced features) and advanced subqueries**
a.	Using SET Operators
b.	Datetime Functions
c.	Enhancements to the GROUP BY Clause
d.	Advanced Subqueries
7.	**PL/SQL Basics**
a.	Declaring Variables
b.	Writing Executable Statements
c.	Interacting with the Oracle Server
d.	Writing Control Structures

8.	**Composite data types, cursors and exceptions.**
a.	Working with Composite Data Types
b.	Writing Explicit Cursors
c.	Handling Exceptions
9.	**Procedures and Functions**
a.	Creating Procedures
b.	Creating Functions
c.	Managing Subprograms
d.	Creating Packages
10.	**Creating Database Triggers**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Database System and Concepts	A Silberschatz, H Korth, S Sudarshan	McGraw-Hill	Fifth Edition	
2.	Programming with PL/SQL for Beginners	H.Dand , R.Patil and T. Sambare	X –Team	First	2011
3.	PL/SQL Programming	Ivan Bayross	BPB	First	2010

B. Sc. (Information Technology)		Semester – III	
Course Name: Mobile Programming		**Course Code: USIT3P5**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

The practical's will be based on HTML5, CSS, CORDOVA and PhoneGAP API. (Android will be introduced later after they learn Java)

List of Practical	
	Setting up CORDOVA, PhoneGAP Project and environment.
1.	• Creating and building simple "Hello World" App using Cordova • Adding and Using Buttons • Adding and Using Event Listeners
2.	• Creating and Using Functions • Using Events • Handling and Using Back Button
3.	• Installing and Using Plugins • Installing and Using Battery Plugin • Installing and Using Camera Plugin
4.	• Installing and Using Contacts Plugin • Installing and Using Device Plugin • Installing and Using Accelerometer Plugin
5.	• Install and Using Device Orientation plugin • Install and Using Device Orientation plugin • Create and Using Prompt Function
6.	• Installing and Using File Plugin • Installing and Using File Transfer Plugin • Using Download and Upload functions
7.	• Installing and Using Globalization Plugin • Installing and Using Media Plugin • Installing and Using Media Capture Plugin
8.	• Installing and Using Network Information Plugin • Installing and Using Splash Screen Plugin • Installing and Using Vibration Plugin

9.	• Developing Single Page Apps • Developing Multipage Apps • Storing Data Locally in a Cordova App
10.	• Use of sqlite plugin with PhoneGap / apache Cordova • Using Sqlite read/write and search • Populating Cordova SQLite storage with the JQuery API

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Apache Cordova 4 Programming	John M. Wargo	Addison-Wesley Professional	1st	2015
2.	Apache Cordova in Action	Raymond Camden	Manning Publications	1st	2015
3.	PhoneGap By Example	Andrey Kovalenko	PACKT Publishing	1st	2015

SEMESTER IV

B. Sc. (Information Technology)		Semester – IV	
Course Name: Core Java		**Course Code: USIT401**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** History, architecture and its components, Java Class File, Java Runtime Environment, The Java Virtual Machine, JVM Components, The Java API, java platform, java development kit, Lambda Expressions, Methods References, Type Annotations, Method Parameter Reflection, setting the path environment variable, Java Compiler And Interpreter, java programs, java applications, main(), public, static, void, string[] args, statements, white space, case sensitivity, identifiers, keywords, comments, braces and code blocks, variables, variable name **Data types:** primitive data types, Object Reference Types, Strings, Auto boxing, operators and properties of operators, Arithmetic operators, assignment operators, increment and decrement operator, relational operator, logical operator, bitwise operator, conditional operator.	**12**
II	**Control Flow Statements:** The If…Else If…Else Statement, The Switch…Case Statement **Iterations:** The While Loop, The Do … While Loop, The For Loop, The Foreach Loop, Labeled Statements, The Break And Continue Statements, The Return Statement **Classes:** Types of Classes, Scope Rules, Access Modifier, Instantiating Objects From A Class, Initializing The Class Object And Its Attributes, Class Methods, Accessing A Method, Method Returning A Value, Method's Arguments, Method Overloading, Variable Arguments [Varargs], Constructors, this Instance, super Instance, Characteristics Of Members Of A Class, constants, this instance, static fields of a class, static methods of a class, garbage collection.	**12**
III	**Inheritance:** Derived Class Objects, Inheritance and Access Control, Default Base Class Constructors, this and super keywords. Abstract Classes And Interfaces, Abstract Classes, Abstract Methods, Interfaces, What Is An Interface? How Is An Interface Different From An Abstract Class?, Multiple Inheritance, Default Implementation, Adding New Functionality, Method Implementation, Classes V/s Interfaces, Defining An Interface, Implementing Interfaces. **Packages:** Creating Packages, Default Package, Importing Packages, Using A Package.	**12**

IV	**Enumerations, Arrays:** Two Dimensional Arrays, Multi-Dimensional Arrays, Vectors, Adding Elements To A Vector, Accessing Vector Elements, Searching For Elements In A Vector, Working With The Size of The Vector. **Multithreading:** the thread control methods, thread life cycle, the main thread, creating a thread, extending the thread class. **Exceptions:** Catching Java Exceptions, Catching Run-Time Exceptions, Handling Multiple Exceptions, The finally Clause, The throws Clause **Byte streams:** reading console input, writing console output, reading file, writing file, writing binary data, reading binary data, getting started with character streams, writing file, reading file	**12**
V	**Event Handling:** Delegation Event Model, Events, Event classes, Event listener interfaces, Using delegation event model, adapter classes and inner classes. **Abstract Window Toolkit:** Window Fundamentals, Component, Container, Panel, Window, Frame, Canvas. Components – Labels, Buttons, Check Boxes, Radio Buttons, Choice Menus, Text Fields, Text, Scrolling List, Scrollbars, Panels, Frames **Layouts:** Flow Layout, Grid Layout, Border Layout, Card Layout.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Core Java 8 for Beginners	Vaishali Shah, Sharnam Shah	SPD	1st	2015
2.	Java: The Complete Reference	Herbert Schildt	McGraw Hill	9th	2014
3.	Murach's beginning Java with Net Beans	Joel Murach , Michael Urban	SPD	1st	2016
4.	Core Java, Volume I: Fundamentals	Hortsman	Pearson	9th	2013
5.	Core Java, Volume II: Advanced Features	Gary Cornell and Hortsman	Pearson	8th	2008
6.	Core Java: An Integrated Approach	R. Nageswara Rao	DreamTech	1st	2008

B. Sc. (Information Technology)		Semester – IV	
Course Name: Introduction to Embedded Systems		**Course Code: USIT402**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems **Core of embedded systems:** microprocessors and microcontrollers, RISC and CISC controllers, Big endian and Little endian processors, Application specific ICs, Programmable logic devices, COTS, sensors and actuators, communication interface, embedded firmware, other system components. **Characteristics and quality attributes of embedded systems:** Characteristics, operational and non-operational quality attributes.	**12**
II	**Embedded Systems – Application and Domain Specific:** Application specific – washing machine, domain specific - automotive. **Embedded Hardware:** Memory map, i/o map, interrupt map, processor family, external peripherals, memory – RAM , ROM, types of RAM and ROM, memory testing, CRC ,Flash memory. **Peripherals:** Control and Status Registers, Device Driver, Timer Driver - Watchdog Timers.	**12**
III	**The 8051 Microcontrollers:** Microcontrollers and Embedded processors, Overview of 8051 family. 8051 Microcontroller hardware, Input/output pins, Ports, and Circuits, External Memory. **8051 Programming in C:** Data Types and time delay in 8051 C, I/O Programming, Logic operations, Data conversion Programs.	**12**
IV	**Designing Embedded System with 8051 Microcontroller:** Factors to be considered in selecting a controller, why 8051 Microcontroller, Designing with 8051. **Programming embedded systems:** structure of embedded program, infinite loop, compiling, linking and debugging.	**12**
V	**Real Time Operating System (RTOS):** Operating system basics, types of operating systems, Real-Time Characteristics, Selection Process of an RTOS. **Design and Development:** Embedded system development Environment – IDE, types of file generated on cross compilation, disassembler/ de-compiler, simulator, emulator and debugging, embedded product development life-cycle, trends in embedded industry.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Programming Embedded Systems in C and C++	Michael Barr	O'Reilly	First	1999
2.	Introduction to embedded systems	Shibu K V	Tata Mcgraw-Hill	First	2012
3.	The 8051 Microcontroller and Embedded Systems	Muhammad Ali Mazidi	Pearson	Second	2011
4.	Embedded Systems	Rajkamal	Tata Mcgraw-Hill		

B. Sc. (Information Technology)		Semester – IV	
Course Name: Computer Oriented Statistical Techniques		**Course Code: USIT403**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**The Mean, Median, Mode, and Other Measures of Central Tendency**: Index, or Subscript, Notation, Summation Notation, Averages, or Measures of Central Tendency ,The Arithmetic Mean , The Weighted Arithmetic Mean ,Properties of the Arithmetic Mean ,The Arithmetic Mean Computed from Grouped Data ,The Median ,The Mode, The Empirical Relation Between the Mean, Median, and Mode, The Geometric Mean G, The Harmonic Mean H ,The Relation Between the Arithmetic, Geometric, and Harmonic Means, The Root Mean Square, Quartiles, Deciles, and Percentiles, Software and Measures of Central Tendency. **The Standard Deviation and Other Measures of Dispersion**: Dispersion, or Variation, The Range, The Mean Deviation, The Semi-Interquartile Range, The 10–90 Percentile Range, The Standard Deviation, The Variance, Short Methods for Computing the Standard Deviation, Properties of the Standard Deviation, Charlie's Check, Sheppard's Correction for Variance, Empirical Relations Between Measures of Dispersion, Absolute and Relative Dispersion; Coefficient of Variation, Standardized Variable; Standard Scores, Software and Measures of Dispersion. **Introduction to R:** Basic syntax, data types, variables, operators, control statements, R-functions, R –Vectors, R – lists, R Arrays.	**12**
II	**Moments, Skewness, and Kurtosis** : Moments , Moments for Grouped Data ,Relations Between Moments , Computation of Moments for Grouped Data, Charlie's Check and Sheppard's Corrections, Moments in Dimensionless Form, Skewness, Kurtosis, Population Moments, Skewness, and Kurtosis, Software Computation of Skewness and Kurtosis. **Elementary Probability Theory**: Definitions of Probability, Conditional Probability; Independent and Dependent Events, Mutually Exclusive Events, Probability Distributions, Mathematical Expectation, Relation Between Population, Sample Mean, and Variance, Combinatorial Analysis, Combinations, Stirling's Approximation to n!, Relation of Probability to Point Set Theory, Euler or Venn Diagrams and Probability. **Elementary Sampling Theory** : Sampling Theory, Random Samples and Random Numbers, Sampling With and Without Replacement,	**12**

	Sampling Distributions, Sampling Distribution of Means, Sampling Distribution of Proportions, Sampling Distributions of Differences and Sums, Standard Errors, Software Demonstration of Elementary Sampling Theory.	
III	**Statistical Estimation Theory**: Estimation of Parameters, Unbiased Estimates, Efficient Estimates, Point Estimates and Interval Estimates; Their Reliability, Confidence-Interval Estimates of Population Parameters, Probable Error. **Statistical Decision Theory:** Statistical Decisions, Statistical Hypotheses, Tests of Hypotheses and Significance, or Decision Rules, Type I and Type II Errors, Level of Significance, Tests Involving Normal Distributions, Two-Tailed and One-Tailed Tests, Special Tests, Operating-Characteristic Curves; the Power of a Test, p-Values for Hypotheses Tests, Control Charts, Tests Involving Sample Differences, Tests Involving Binomial Distributions. **Statistics in R:** mean, median, mode, Normal Distribution , Binomial Distribution, Frequency Distribution in R.	**12**
IV	**Small Sampling Theory**: Small Samples, Student's t Distribution, Confidence Intervals, Tests of Hypotheses and Significance, The Chi-Square Distribution, Confidence Intervals for Sigma , Degrees of Freedom, The F Distribution. **The Chi-Square Test**: Observed and Theoretical Frequencies, Definition of chi-square, Significance Tests, The Chi-Square Test for Goodness of Fit, Contingency Tables, Yates' Correction for Continuity, Simple Formulas for Computing chi-square, Coefficient of Contingency, Correlation of Attributes, Additive Property of chi-square.	**12**
V	**Curve Fitting and the Method of Least Squares:** Relationship Between Variables, Curve Fitting, Equations of Approximating Curves, Freehand Method of Curve Fitting, The Straight Line, The Method of Least Squares, The Least-Squares Line, Nonlinear Relationships, The Least-Squares Parabola, Regression, Applications to Time Series, Problems Involving More Than Two Variables. **Correlation Theory:** Correlation and Regression, Linear Correlation, Measures of Correlation, The Least-Squares Regression Lines, Standard Error of Estimate, Explained and Unexplained Variation, Coefficient of Correlation, Remarks Concerning the Correlation Coefficient, Product-Moment Formula for the Linear Correlation Coefficient, Short Computational Formulas, Regression Lines and the Linear Correlation Coefficient, Correlation of Time Series, Correlation of Attributes, Sampling Theory of Correlation, Sampling Theory of Regression.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	STATISTICS	Murray R. Spiegel, Larry J. Stephens.	McGRAW – HILL ITERNATIONAL	FOURTH	
2.	A Practical Approach using R	R.B. Patil, H.J. Dand and R. Bhavsar	SPD	1st	2017
3.	FUNDAMENTAL OF MATHEMATICAL STATISTICS	S.C. GUPTA and V.K. KAPOOR	SULTAN CHAND and SONS	ELEVENTH REVISED	2011
4.	MATHEMATICAL STATISTICS	J.N. KAPUR and H.C. SAXENA	S. CHAND	TWENTIETH REVISED	2005

B. Sc. (Information Technology)		Semester – IV	
Course Name: Software Engineering		**Course Code: USIT404**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** What is software engineering? Software Development Life Cycle, Requirements Analysis, Software Design, Coding, Testing, Maintenance etc. **Software Requirements:** Functional and Non-functional requirements, User Requirements, System Requirements, Interface Specification, Documentation of the software requirements. **Software Processes:** Process and Project, Component Software Processes. **Software Development Process Models.** • Waterfall Model. • Prototyping. • Iterative Development. • Rational Unified Process. • The RAD Model • Time boxing Model. **Agile software development**: Agile methods, Plan-driven and agile development, Extreme programming, Agile project management, Scaling agile methods.	**12**
II	**Socio-technical system:** Essential characteristics of socio technical systems, Emergent System Properties, Systems Engineering, Components of system such as organization, people and computers, Dealing Legacy Systems. **Critical system:** Types of critical system, A simple safety critical system, Dependability of a system, Availability and Reliability, Safety and Security of Software systems. **Requirements Engineering Processes:** Feasibility study, Requirements elicitation and analysis, Requirements Validations, Requirements Management. **System Models:** Models and its types, Context Models, Behavioural Models, Data Models, Object Models, Structured Methods.	**12**
III	**Architectural Design:** Architectural Design Decisions, System Organisation, Modular Decomposition Styles, Control Styles, Reference Architectures.	**12**

	User Interface Design: Need of UI design, Design issues, The UI design Process, User analysis, User Interface Prototyping, Interface Evaluation. **Project Management** Software Project Management, Management activities, Project Planning, Project Scheduling, Risk Management. **Quality Management:** Process and Product Quality, Quality assurance and Standards, Quality Planning, Quality Control, Software Measurement and Metrics.	
IV	**Verification and Validation:** Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods. **Software Testing:** System Testing, Component Testing, Test Case Design, Test Automation. **Software Measurement**: Size-Oriented Metrics, Function-Oriented Metrics, Extended Function Point Metrics **Software Cost Estimation:** Software Productivity, Estimation Techniques, Algorithmic Cost Modelling, Project Duration and Staffing	**12**
V	**Process Improvement:** Process and product quality, Process Classification, Process Measurement, Process Analysis and Modeling, Process Change, The CMMI Process Improvement Framework. **Service Oriented Software Engineering:** Services as reusable components, Service Engineering, Software Development with Services. **Software reuse:** The reuse landscape, Application frameworks, Software product lines, COTS product reuse. **Distributed software engineering**: Distributed systems issues, Client–server computing, Architectural patterns for distributed systems, Software as a service	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Software Engineering, edition,	Ian Somerville	Pearson Education.	Ninth	
2.	Software Engineering	Pankaj Jalote	Narosa Publication		
3.	Software engineering, a practitioner's approach	Roger Pressman	Tata Mcgraw-hill	Seventh	
4.	Software Engineering principles and practice	WS Jawadekar	Tata Mcgraw-hill		
5.	Software Engineering-A Concise Study	S.A Kelkar	PHI India.		

6.	Software Engineering Concept and Applications	Subhajit Datta	Oxford Higher Education		
7.	Software Design	D.Budgen	Pearson education	2nd	
8.	Software Engineering	KL James	PHI	EEE	2009

B. Sc. (Information Technology)		Semester – IV	
Course Name: Computer Graphics and Animation		**Course Code: USIT405**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction to Computer Graphics:** Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays. **Scan conversion** – Digital Differential Analyzer (DDA) algorithm, Bresenhams' Line drawing algorithm. Bresenhams' method of Circle drawing, Midpoint Circle Algorithm, Midpoint Ellipse Algorithm, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky, Clipping Polygons, problem with multiple components.	**12**
II	**Two-Dimensional Transformations:** Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Transformation of The Unit Square, Solid Body Transformations, Rotation About an Arbitrary Point, Reflection through an Arbitrary Line, A Geometric Interpretation of Homogeneous Coordinates, The Window-to-Viewport Transformations. **Three-Dimensional Transformations:** Three-Dimensional Scaling, Three-Dimensional Shearing, Three-Dimensional Rotation, Three-Dimensional Reflection, Three-Dimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D Transformations, Affine and Perspective Geometry, Perspective Transformations, Techniques for Generating Perspective Views, Vanishing Points, the Perspective Geometry and camera models, Orthographic Projections, Axonometric Projections, Oblique Projections, View volumes for projections.	**12**

III	**Viewing in 3D** Stages in 3D viewing, Canonical View Volume (CVV), Specifying an Arbitrary 3D View, Examples of 3D Viewing, The Mathematics of Planar Geometric Projections, Combined transformation matrices for projections and viewing, Coordinate Systems and matrices, camera model and viewing pyramid. **Light:** Radiometry, Transport, Equation, Photometry **Color:** Colorimetry, Color Spaces, Chromatic Adaptation, Color Appearance	**12**
IV	**Visible-Surface Determination:** Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting), Area sub-division method, BSP trees, Visible-Surface Ray Tracing, comparison of the methods. **Plane Curves and Surfaces:** Curve Representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Parametric Representation of an Ellipse, Parametric Representation of a Parabola, Parametric Representation of a Hyperbola, Representation of Space Curves, Cubic Splines, , Bezier Curves, B-spline Curves, B-spline Curve Fit, B-spline Curve Subdivision, Parametric Cubic Curves, Quadric Surfaces. Bezier Surfaces.	**12**
V	**Computer Animation:** Principles of Animation, Key framing, Deformations, Character Animation, Physics-Based Animation, Procedural Techniques, Groups of Objects. **Image Manipulation and Storage:** What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing - Digital image enhancement, contrast stretching, Histogram Equalization, smoothing and median Filtering.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer Graphics - Principles and Practice	J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes	Pearson	2nd	
2.	Steve Marschner, Peter Shirley	Fundamentals of Computer Graphics	CRC press	4th	2016
3.	Computer Graphics	Hearn, Baker	Pearson	2nd	
4.	Principles of Interactive Computer Graphics	William M. Newman and Robert F. Sproull	TMH	2nd	
5.	Mathematical Elements for CG	D. F. Rogers, J. A. Adams	TMH	2nd	

B. Sc. (Information Technology)		Semester –IV	
Course Name: Core Java Practical		**Course Code: USIT4P1**	
Periods per week **1 Period is 50 minutes**	**Lectures per week**	**3**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**

List of Practical	
1.	**Java Basics**
a.	Write a Java program that takes a number as input and prints its multiplication table upto 10.
b.	Write a Java program to display the following pattern. ***** **** *** ** *
c.	Write a Java program to print the area and perimeter of a circle.
2.	**Use of Operators**
a.	Write a Java program to add two binary numbers.
b.	Write a Java program to convert a decimal number to binary number and vice versa.
c.	Write a Java program to reverse a string.
3.	**Java Data Types**
a.	Write a Java program to count the letters, spaces, numbers and other characters of an input string.
b.	Implement a Java function that calculates the sum of digits for a given char array consisting of the digits '0' to '9'. The function should return the digit sum as a long value.
c.	Find the smallest and largest element from the array
4.	**Methods and Constructors**
a.	Designed a class SortData that contains the method asec() and desc().
b.	Designed a class that demonstrates the use of constructor and destructor.
c.	Write a java program to demonstrate the implementation of abstract class.
5.	**Inheritance**
a.	Write a java program to implement single level inheritance.
b.	Write a java program to implement method overriding
c.	Write a java program to implement multiple inheritance.

6.	**Packages and Arrays**
a.	Create a package, Add the necessary classes and import the package in java class.
b.	Write a java program to add two matrices and print the resultant matrix.
c.	Write a java program for multiplying two matrices and print the product for the same.
7.	**Vectors and Multithreading**
a.	Write a java program to implement the vectors.
b.	Write a java program to implement thread life cycle.
c.	Write a java program to implement multithreading.
8.	**File Handling**
a.	Write a java program to open a file and display the contents in the console window.
b.	Write a java program to copy the contents from one file to other file.
c.	Write a java program to read the student data from user and store it in the file.
9.	**GUI and Exception Handling**
a.	Design a AWT program to print the factorial for an input value.
b.	Design an AWT program to perform various string operations like reverse string, string concatenation etc.
c.	Write a java program to implement exception handling.
10.	**GUI Programming.**
a.	Design an AWT application that contains the interface to add student information and display the same.
b.	Design a calculator based on AWT application.
c.	Design an AWT application to generate result marks sheet.

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Core Java 8 for Beginners	Vaishali Shah, Sharnam Shah	SPD	1st	2015
2.	Java: The Complete Reference	Herbert Schildt	McGraw Hill	9th	2014
3.	Murach's beginning Java with Net Beans	Joel Murach , Michael Urban	SPD	1st	2016
4.	Core Java, Volume I: Fundamentals	Hortsman	Pearson	9th	2013
5.	Core Java, Volume II: Advanced Features	Gary Cornell and Hortsman	Pearson	8th	2008
6.	Core Java: An Integrated Approach	R. Nageswara Rao	DreamTech	1st	2008

B. Sc. (Information Technology)		Semester – IV	
Course Name: Introduction to Embedded Systems Practical		**Course Code: USIT4P2**	
Periods per week **1 Period is 50 minutes**	**Lectures per week**	**3**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**

List of Practical	
1.	Design and develop a reprogrammable embedded computer using 8051 microcontrollers and to show the following aspects. a. Programming b. Execution c. Debugging
2. A	Configure timer control registers of 8051 and develop a program to generate given time delay.
B	To demonstrate use of general purpose port i.e. Input/ output port of two controllers for data transfer between them.
3. A	Port I / O: Use one of the four ports of 8051 for O/P interfaced to eight LED's. Simulate binary counter (8 bit) on LED's
B	To interface 8 LEDs at Input-output port and create different patterns.
C	To demonstrate timer working in timer mode and blink LED without using any loop delay routine.
4. A	Serial I / O: Configure 8051 serial port for asynchronous serial communication with serial port of PC exchange text messages to PC and display on PC screen. Signify end of message by carriage return.
B	To demonstrate interfacing of seven-segment LED display and generate counting from 0 to 99 with fixed time delay.
C	Interface 8051 with D/A converter and generate square wave of given frequency on oscilloscope.
5. A	Interface 8051 with D/A converter and generate triangular wave of given frequency on oscilloscope.
B	Using D/A converter generate sine wave on oscilloscope with the help of lookup table stored in data area of 8051.
6.	Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clock wise direction.

7.	Generate traffic signal.
8.	Implement Temperature controller.
9.	Implement Elevator control.
10.	**Using FlashMagic**
A	To demonstrate the procedure for flash programming for reprogrammable embedded system board using FlashMagic
B	To demonstrate the procedure and connections for multiple controllers programming of same type of controller with same source code in one go, using flash magic.

B. Sc. (Information Technology)		Semester – IV	
Course Name: Computer Oriented Statistical Techniques Practical		**Course Code: USIT4P3**	
Periods per week **1 Period is 50 minutes**	**Lectures per week**	**3**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**

List of Practical	
1.	Using R execute the basic commands, array, list and frames.
2.	Create a Matrix using R and Perform the operations addition, inverse, transpose and multiplication operations.
3.	Using R Execute the statistical functions: mean, median, mode, quartiles, range, inter quartile range histogram
4.	Using R import the data from Excel / .CSV file and Perform the above functions.
5.	Using R import the data from Excel / .CSV file and Calculate the standard deviation, variance, co-variance.
6.	Using R import the data from Excel / .CSV file and draw the skewness.
7.	Import the data from Excel / .CSV and perform the hypothetical testing.
8.	Import the data from Excel / .CSV and perform the Chi-squared Test.
9.	Using R perform the binomial and normal distribution on the data.
10.	Perform the Linear Regression using R.
11.	Compute the Least squares means using R.
12.	Compute the Linear Least Square Regression

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	A Practical Approach to R Tool	R.B. Patil, H.J. Dand and R. Dahake	SPD	First	2011
2.	STATISTICS	Murray R. Spiegel, Larry J. Stephens.	McGRAW –HILL INTERNATIONAL	FOURTH	2006

B. Sc. (Information Technology)		Semester – IV	
Course Name: Software Engineering		**Course Code: USIT4P4**	
Periods per week **1 Period is 50 minutes**	**Lectures per week**	**3**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**

List of Practical (To be executed using Star UML or any similar software)	
1.	Study and implementation of class diagrams.
2.	Study and implementation of Use Case Diagrams.
3.	Study and implementation of Entity Relationship Diagrams.
4.	Study and implementation of Sequence Diagrams.
5.	Study and implementation of State Transition Diagrams.
6.	Study and implementation of Data Flow Diagrams.
7.	Study and implementation of Collaboration Diagrams.
8.	Study and implementation of Activity Diagrams.
9.	Study and implementation of Component Diagrams.
10.	Study and implementation of Deployment Diagrams.

Books and References:

Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
3.	Object - Oriented Modeling and Design	Michael Blaha, James Rumbaugh	Pearson		2011
4.	Learning UML 2. 0	Kim Hamilton, Russ Miles	O'Reilly Media		2006
5.	The unified modeling language user guide	Grady Booch, James Rumbaugh, Ivar Jacobson	Addison-Wesley		2005
6.	UML A Beginners Guide	Jason T. Roff	McGraw Hill Professional		2003

B. Sc. (Information Technology)		Semester – IV	
Course Name: Computer Graphics and Animation		**Course Code: USIT4P5**	
Periods per week **1 Period is 50 minutes**	**Lectures per week**	**3**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**

List of Practical	
1.	**Solve the following:**
a.	Study and enlist the basic functions used for graphics in C / C++ / Python language. Give an example for each of them.
b.	Draw a co-ordinate axis at the center of the screen.
2.	**Solve the following:**
a.	Divide your screen into four region, draw circle, rectangle, ellipse and half ellipse in each region with appropriate message.
b.	Draw a simple hut on the screen.
3.	**Draw the following basic shapes in the center of the screen :**
	i. Circle ii. Rectangle iii. Square iv. Concentric Circles v. Ellipse vi. Line
4.	**Solve the following:**
a.	Develop the program for DDA Line drawing algorithm.
b.	Develop the program for Bresenham's Line drawing algorithm.
5.	**Solve the following:**
a.	Develop the program for the mid-point circle drawing algorithm.
b.	Develop the program for the mid-point ellipse drawing algorithm.
6.	**Solve the following:**
a.	Write a program to implement 2D scaling.
b.	Write a program to perform 2D translation
7.	**Solve the following:**
a.	Perform 2D Rotation on a given object.
b.	Program to create a house like figure and perform the following operations. i. Scaling about the origin followed by translation. ii. Scaling with reference to an arbitrary point. iii. Reflect about the line y = mx + c.

8.	**Solve the following:**
a.	Write a program to implement Cohen-Sutherland clipping.
b.	Write a program to implement Liang - Barsky Line Clipping Algorithm
9.	**Solve the following:**
a.	Write a program to fill a circle using Flood Fill Algorithm.
b.	Write a program to fill a circle using Boundary Fill Algorithm.
10.	**Solve the following:**
a.	Develop a simple text screen saver using graphics functions.
b.	Perform smiling face animation using graphic functions.
c.	Draw the moving car on the screen.

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer Graphics - Principles and Practice	J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes	Pearson Education	Second Edition	
2.	Steve Marschner, Peter Shirley	Fundamentals of Computer Graphics	CRC press	Fourth Edition	2016
3.	Computer Graphics	Hearn, Baker	Pearson Education	Second	
4.	Principles of Interactive Computer Graphics	William M. Newman and Robert F. Sproull	Tata McGraw Hill	Second	

Academic Council 14/06/2018
Item No: 4.49

UNIVERSITY OF MUMBAI

Syllabus for T.Y.B.Sc.

Programme: B.Sc.

Subject: Information Technology

with effect from the academic year

2018 – 2019

Semester – 5			
Course Code	**Course Type**	**Course Title**	**Credits**
USIT501	Skill Enhancement Course	Software Project Management	2
USIT502	Skill Enhancement Course	Internet of Things	2
USIT503	Skill Enhancement Course	Advanced Web Programming	2
USIT504	Discipline Specific Elective (Any One)	Artificial Intelligence	2
USIT505		Linux System Administration	
USIT506	Discipline Specific Elective (Any One)	Enterprise Java	2
USIT507		Next Generation Technologies	
USIT5P1	Skill Enhancement Course Practical	Project Dissertation	2
USIT5P2	Skill Enhancement Course Practical	Internet of Things Practical	2
USIT5P3	Skill Enhancement Course Practical	Advanced Web Programming Practical	2
USIT5P4	Discipline Specific Elective Practical (Any One)*	Artificial Intelligence Practical	2
USIT5P5		Linux Administration Practical	
USIT5P6	Discipline Specific Elective Practical (Any One)*	Enterprise Java Practical	2
USIT5P7		Next Generation Technologies Practical	
		Total Credits	**20**

(All the practical mentioned in the syllabi are compulsory as per the courses chosen)

Semester – 6			
Course Code	**Course Type**	**Course Title**	**Credits**
USIT601	Skill Enhancement Course	Software Quality Assurance	2
USIT602	Skill Enhancement Course	Security in Computing	2
USIT603	Skill Enhancement Course	Business Intelligence	2
USIT604	Discipline Specific Elective (Any One)	Principles of Geographic Information Systems	2
USIT605		Enterprise Networking	
USIT606	Discipline Specific Elective (Any One)	IT Service Management	2
USIT607		Cyber Laws	
USIT6P1	Skill Enhancement Course Practical	Project Implementation	2
USIT6P2	Skill Enhancement Course Practical	Security in Computing Practical	2
USIT6P3	Skill Enhancement Course Practical	Business Intelligence Practical	2
USIT6P4	Discipline Specific Elective Practical (Any One)*	Principles of Geographic Information Systems Practical	2
USIT6P5		Enterprise Networking Practical	
USIT6P6	Skill Enhancement Course Practical	Advanced Mobile Programming	2
		Total Credits	**20**

***The choice of Practical course is based on the theory Course. For Semester V, USIT504, USIT505, USIT506 and USIT507, the practical courses are USIT5P4, USIT5P5 USIT5P6, USIT5P7. For Semester VI, USIT604, USIT605 the practical courses are USIT6P4, USIT6P5 respectively. Practical Course USIT6P6 is compulsory.**

SEMESTER V

B. Sc. (Information Technology)		Semester – V	
Course Name: Software Project Management		**Course Code: USIT501**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction to Software Project Management**: Introduction, Why is Software Project Management Important? What is a Project? Software Projects versus Other Types of Project, Contract Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some Ways of Categorizing Software Projects, Project Charter, Stakeholders, Setting Objectives, The Business Case, Project Success and Failure, What is Management? Management Control, Project Management Life Cycle, Traditional versus Modern Project Management Practices. **Project Evaluation and Programme Management**: Introduction, Business Case, Project Portfolio Management, Evaluation of Individual Projects, Cost–benefit Evaluation Techniques, Risk Evaluation, Programme Management, Managing the Allocation of Resources within Programmes, Strategic Programme Management, Creating a Programme, Aids to Programme Management, Some Reservations about Programme Management, Benefits Management. **An Overview of Project Planning** : Introduction to Step Wise Project Planning, Step 0: Select Project, Step 1: Identify Project Scope and Objectives, Step 2: Identify Project Infrastructure, Step 3: Analyse Project Characteristics, Step 4: Identify Project Products and Activities, Step 5: Estimate Effort for Each Activity, Step 6: Identify Activity Risks, Step 7: Allocate Resources, Step 8: Review/Publicize Plan, Steps 9 and 10: Execute Plan/Lower Levels of Planning	**12**
II	**Selection of an Appropriate Project Approach:** Introduction, Build or Buy? Choosing Methodologies and Technologies, Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, The Waterfall Model, The Spiral Model, Software Prototyping, Other Ways of Categorizing Prototypes, Incremental Delivery, Atern/Dynamic Systems Development Method, Rapid Application Development, Agile Methods, Extreme Programming (XP), Scrum, Lean Software Development, Managing Iterative Processes, Selecting the Most Appropriate Process Model. **Software Effort Estimation:** Introduction, Where are the Estimates Done? Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Bottom-up Estimating, The Top-down Approach and Parametric Models, Expert Judgement, Estimating by Analogy, Albrecht Function Point	**12**

	Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb.	
III	**Activity Planning:** Introduction, Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks. **Risk Management**: Introduction, Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Boehm's Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts. **Resource Allocation**: Introduction, Nature of Resources, Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, Scheduling Sequence.	**12**
IV	**Monitoring and Control**: Introduction, Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management (SCM). **Managing Contracts**: Introduction, Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance. **Managing People in Software Environments**: Introduction, Understanding Behaviour, Organizational Behaviour: A Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham–Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns.	**12**
V	**Working in Teams:** Introduction, Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership. **Software Quality :** Introduction, The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans.	**12**

	Project Closeout: Introduction, Reasons for Project Closure, Project Closure Process, Performing a Financial Closure, Project Closeout Report.	

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Software Project Management	Bob Hughes, Mike Cotterell, Rajib Mall	TMH	6th	2018
2.	Project Management and Tools & Technologies – An overview	Shailesh Mehta	SPD	1st	2017
3.	Software Project Management	Walker Royce	Pearson		2005

B. Sc. (Information Technology)		Semester – V	
Course Name: Internet of Things		**Course Code: USIT502**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**The Internet of Things: An Overview** : The Flavour of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things? **Design Principles for Connected Devices:** Calm and Ambient Technology, Magic as Metaphor, Privacy, Keeping Secrets, Whose Data Is It Anyway? Web Thinking for Connected Devices, Small Pieces, Loosely Joined, First-Class Citizens On The Internet, Graceful Degradation, Affordances. **Internet Principles:** Internet Communications: An Overview, IP, TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports, An Example: HTTP Ports, Other Common Ports, Application Layer Protocols, HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols.	**12**
II	**Thinking About Prototyping:** Sketching, Familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Changing Embedded Platform, Physical Prototypes and Mass Personalisation, Climbing into the Cloud, Open Source versus Closed Source, Why Closed? Why Open? Mixing Open and Closed Source, Closed Source for Mass Market Projects, Tapping into the Community. **Prototyping Embedded Devices:** Electronics, Sensors, Actuators, Scaling Up the Electronics, Embedded Computing Basics, Microcontrollers, System-on-Chips, Choosing Your Platform, Arduino, Developing on the Arduino, Some Notes on the Hardware, Openness, Raspberry Pi, Cases and Extension Boards, Developing on the Raspberry Pi, Some Notes on the Hardware, Openness.	**12**
III	**Prototyping the Physical Design:** Preparation, Sketch, Iterate, and Explore, Nondigital Methods, Laser Cutting, Choosing a Laser Cutter, Software, Hinges and Joints, 3D Printing, Types of 3D Printing, Software, CNC Milling, Repurposing/Recycling. **Prototyping Online Components:** Getting Started with an API, Mashing Up APIs, Scraping, Legalities, Writing a New API, Clockodillo, Security, Implementing the API, Using Curl to Test, Going Further, Real-Time Reactions, Polling, Comet, Other Protocols, MQ Telemetry Transport,	**12**

	Extensible Messaging and Presence Protocol, Constrained Application Protocol.	
IV	**Techniques for Writing Embedded Code:** Memory Management, Types of Memory, Making the Most of Your RAM, Performance and Battery Life, Libraries, Debugging, **Business Models:** A Short History of Business Models, Space and Time, From Craft to Mass Production, The Long Tail of the Internet, Learning from History, The Business Model Canvas, Who Is the Business Model For? Models, Make Thing, Sell Thing, Subscriptions, Customisation, Be a Key Resource, Provide Infrastructure: Sensor Networks, Take a Percentage, Funding an Internet of Things Startup, Hobby Projects and Open Source, Venture Capital, Government Funding, Crowdfunding, Lean Startups.	**12**
V	**Moving to Manufacture:** What Are You Producing? Designing Kits, Designing Printed circuit boards, Software Choices, The Design Process, Manufacturing Printed Circuit Boards, Etching Boards, Milling Boards. Assembly, Testing, Mass-Producing the Case and Other Fixtures, Certification, Costs, Scaling Up Software, Deployment, Correctness and Maintainability, Security, Performance, User Community. **Ethics:** Characterizing the Internet of Things, Privacy, Control, Disrupting Control, Crowdsourcing, Environment, Physical Thing, Electronics, Internet Service, Solutions, The Internet of Things as Part of the Solution, Cautious Optimism, The Open Internet of Things Definition.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Designing the Internet of Things	Adrian McEwen, Hakim Cassimally	WILEY	First	2014
2.	Internet of Things – Architecture and Design	Raj Kamal	McGraw Hill	First	2017
3.	Getting Started with the Internet of Things	Cuno Pfister	O'Reilly	Sixth	2018
4.	Getting Started with Raspberry Pi	Matt Richardson and Shawn Wallace	SPD	Third	2016

B. Sc. (Information Technology)		Semester – V	
Course Name: Advanced Web Programming		**Course Code: USIT503**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introducing .NET**: The .NET Framework, C#, VB, and the .NET Languages, The Common Language Runtime, The .NET Class Library. **The C# Language**: C# Language Basics, Variables and Data Types, Variable Operations, Object-Based Manipulation, Conditional Logic, Loops, Methods. **Types, Objects, and Namespaces**: The Basics About Classes, Building a Basic Class, Value Types and Reference Types, Understanding Namespaces and Assemblies, Advanced Class Programming.	**12**
II	**Web Form Fundamentals**: Writing Code, Using the Code-Behind Class, Adding Event Handlers, Understanding the Anatomy of an ASP.NET Application, Introducing Server Controls, Using the Page Class, Using Application Events, Configuring an ASP.NET Application. **Form Controls**: Stepping Up to Web Controls, Web Control Classes, List Controls, Table Controls, Web Control Events and AutoPostBack, Validation, Understanding Validation, Using the Validation Controls, Rich Controls, The Calendar, The AdRotator, Pages with Multiple Views, User Controls and Graphics, User Controls, Dynamic Graphics, The Chart Control, Website Navigation: Site Maps, URL Mapping and Routing, The SiteMapPath Control, The TreeView Control, The Menu Control.	**12**
III	**Error Handling, Logging, and Tracing** : Avoiding Common Errors, Understanding Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Using Page Tracing **State Management** : Understanding the Problem of State, Using View State, Transferring Information Between Pages, Using Cookies, Managing Session State, Configuring Session State, Using Application State, Comparing State Management Options **Styles, Themes, and Master Pages** : Styles, Themes, Master Page Basics, Advanced Master Pages,	**12**
IV	**ADO.NET Fundamentals**: Understanding Databases, Configuring Your Database, Understanding SQL Basics, Understanding the Data Provider Model, Using Direct Data Access, Using Disconnected Data Access. **Data Binding**: Introducing Data Binding, Using Single-Value Data Binding, Using Repeated-Value Data Binding, Working with Data Source Controls,	**12**

	The Data Controls: The GridView, Formatting the GridView, Selecting a GridView Row, Editing with the GridView, Sorting and Paging the GridView, Using GridView Templates, The DetailsView and FormView	
V	**XML**: XML Explained, The XML Classes, XML Validation, XML Display and Transforms. **Security Fundamentals**: Understanding Security Requirements, Authentication and Authorization, Forms Authentication, Windows Authentication. **ASP.NET AJAX**: Understanding Ajax, Using Partial Refreshes, Using Progress Notification, Implementing Timed Refreshes, Working with the ASP.NET AJAX Control Toolkit.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Beginning ASP.NET 4.5 in C#	Matthew MacDonald	Apress		2012
2.	C# 2015	Anne Bohem and Joel Murach	Murach	Third	2016
3.	Murach's ASP.NET 4.6 Web Programming in C#2015	Mary Delamater and Anne Bohem	SPD	Sixth	2016
4.	ASP.NET 4.0 programming	J. Kanjilal	Tata McGraw-Hill		2011
5.	Programming ASP.NET	D.Esposito	Microsoft Press (Dreamtech)		2011
6.	Beginning Visual C# 2010	K. Watson, C. Nagel, J.H Padderson, J.D. Reid, M.Skinner	Wrox (Wiley)		2010

B. Sc. (Information Technology)		Semester – V	
Course Name: Artificial Intelligence		**Course Code: USIT504 (Elective I)**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction:** What is Artificial Intelligence? Foundations of AI, history, the state of art AI today. **Intelligent Agents:** agents and environment, good behavior, nature of environment, the structure of agents.	**12**
II	**Solving Problems by Searching:** Problem solving agents, examples problems, searching for solutions, uninformed search, informed search strategies, heuristic functions. **Beyond Classical Search:** local search algorithms, searching with non-deterministic action, searching with partial observations, online search agents and unknown environments.	**12**
III	**Adversarial Search:** Games, optimal decisions in games, alpha-beta pruning, stochastic games, partially observable games, state-of-the-are game programs. **Logical Agents:** Knowledge base agents, The Wumpus world, logic, propositional logic, propositional theorem proving, effective propositional model checking, agents based on propositional logic.	**12**
IV	**First Order Logic:** Syntax and semantics, using First Order Logic, Knowledge engineering in First Order Logic. **Inference in First Order Logic:** propositional vs. First Order, unification and lifting, forward and backward chaining, resolution.	**12**
V	**Planning:** Definition of Classical Planning, Algorithms for planning as state space search, planning graphs, other classical planning approaches, analysis of planning approaches, Time, Schedules and resources, hierarchical planning, Planning and Acting in Nondeterministic Domains, multiagent planning, **Knowledge Representation:** Categories and Objects, events, mental events and objects, reasoning systems for categories, reasoning with default information, Internet shopping world	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Artificial Intelligence: A Modern Approach	Stuart Russel and Peter Norvig	Pearson	3rd	2015

2.	A First Course in Artificial Intelligence	Deepak Khemani	TMH	First	2017
3.	Artificial Intelligence: A Rational Approach	Rahul Deva	Shroff publishers	1st	2018
4.	Artificial Intelligence	Elaine Rich, Kevin Knight and Shivashankar Nair	TMH	3rd	2009
5.	Artificial Intelligence & Soft Computing for Beginners	Anandita Das Bhattacharjee	SPD	1st	2013

B. Sc. (Information Technology)		Semester – V	
Course Name: Linux System Administration		**Course Code: USIT505 (Elective I)**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction to Red Hat Enterprise Linux:** Linux, Open Source and Red Hat, Origins of Linux, Distributions, Duties of Linux System Administrator. **Command Line:** Working with the Bash Shell, Getting the Best of Bash, Useful Bash Key Sequences, Working with Bash History, Performing Basic File System Management Tasks, Working with Directories, Piping and Redirection, Finding Files **System Administration Tasks:** Performing Job Management Tasks, System and Process Monitoring and Management, Managing Processes with ps, Sending Signals to Processes with the kill Command, Using top to Show Current System Activity, Managing Process Niceness, Scheduling Jobs, Mounting Devices, Working with Links, Creating Backups, Managing Printers, Setting Up System Logging, Setting Up Rsyslog, Common Log Files, Setting Up Logrotate **Managing Software:** Understanding RPM, Understanding Meta Package Handlers, Creating Your Own Repositories, Managing Repositories, Installing Software with Yum, Querying Software, Extracting Files from RPM Packages	**12**
II	**Configuring and Managing Storage:** Understanding Partitions and Logical Volumes, Creating Partitions, Creating File Systems, File Systems Overview, Creating File Systems, Changing File System Properties, Checking the File System Integrity, Mounting File Systems Automatically Through fstab, Working with Logical Volumes, Creating Logical Volumes, Resizing Logical Volumes, Working with Snapshots, Replacing Failing Storage Devices, Creating Swap Space, Working with Encrypted Volumes **Connecting to the Network:** Understanding NetworkManager, Working with Services and Runlevels, Configuring the Network with NetworkManager, Working with system-config-network, NetworkManager Configuration Files, Network Service Scripts, Networking from the Command Line, Troubleshooting Networking, Setting Up IPv6, Configuring SSH, Enabling the SSH Server, Using the SSH Client, Using PuTTY on Windows Machines, Configuring Key-Based SSH Authentication, Using Graphical Applications with SSH, Using SSH Port Forwarding, Configuring VNC Server Access	**12**

	Working with Users, Groups, and Permissions: Managing Users and Groups, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Using Graphical Tools for User, and Group Management, Using External Authentication Sources, the Authentication Process, sssd, nsswitch, Pluggable Authentication Modules, Managing Permissions, the Role of Ownership, Basic Permissions: Read, Write, and Execute, Advanced Permissions, Working with Access Control Lists, Setting Default Permissions with umask, Working with Attributes	
III	**Securing Server with iptables:** Understanding Firewalls, Setting Up a Firewall with system-config-firewall, Allowing Services, Trusted Interfaces, Masquerading, Configuration Files, Setting Up a Firewall with iptables, Tables, Chains, and Rules, Composition of Rule, Configuration Example, Advanced iptables Configuration, Configuring Logging, The Limit Module, Configuring NAT **Setting Up Cryptographic Services:** Introducing SSL, Proof of Authenticity: the Certificate Authority, Managing Certificates with openssl, Creating a Signing Request, Working with GNU Privacy Guard, Creating GPG Keys, Key Transfer, Managing GPG Keys, Encrypting Files with GPG, GPG Signing, Signing RPM Files **Configuring Server for File Sharing:** What is NFS? Advantages and Disadvantages of NFS, Configuring NFS4, Setting Up NFSv4, Mounting an NFS Share, Making NFS Mounts Persistent, Configuring Automount, Configuring Samba, Setting Up a Samba File Server, Samba Advanced Authentication Options, Accessing Samba Shares, Offering FTP Services.	**12**
IV	**Configuring DNS and DHCP:** Introduction to DNS, The DNS Hierarchy, DNS Server Types, The DNS Lookup Process, DNS Zone Types, Setting Up a DNS Server, Setting Up a Cache-Only Name Server, Setting Up a Primary Name Server, Setting Up a Secondary Name Server, Understanding DHCP, Setting Up a DHCP Server **Setting Up a Mail Server:** Using the Message Transfer Agent, the Mail Delivery Agent, the Mail User Agent, Setting Up Postfix as an SMTP Server, Working with Mutt, Basic Configuration, Internet Configuration, Configuring Dovecot for POP and IMAP **Configuring Apache on Red Hat Enterprise Linux:** Configuring the Apache Web Server, Creating a Basic Website, Understanding the Apache Configuration Files, Apache Log Files, Working with Virtual Hosts, Securing the Web Server with TLS Certificates, Configuring Authentication, Setting Up Authentication with .htpasswd, Configuring LDAP Authentication, Setting Up MySQL	**12**

V	**Introducing Bash Shell Scripting:** Introduction, Elements of a Good Shell Script, Executing the Script, Working with Variables and Input, Understanding Variables, Variables, Subshells, and Sourcing, Working with Script Arguments, Asking for Input, Using Command Substitution, Substitution Operators, Changing Variable Content with Pattern Matching, Performing Calculations, Using Control Structures, Using if...then...else, Using case, Using while, Using until, Using for, Configuring booting with GRUB. **High-Availability Clustering:** High-Availability Clustering, The Workings of High Availability, High-Availability Requirements, Red Hat High-Availability Add-on Software, Components, Configuring Cluster-Based Services, Setting Up Bonding, Setting Up Shared Storage, Installing the Red Hat High Availability Add-On, Building the Initial State of the Cluster, Configuring Additional Cluster Properties, Configuring a Quorum Disk, Setting Up Fencing, Creating Resources and Services, Troubleshooting a Nonoperational Cluster, Configuring GFS2 File Systems **Setting Up an Installation Server:** Configuring a Network Server as an Installation Server, Setting Up a TFTP and DHCP Server for PXE Boot, Installing the TFTP Server, Configuring DHCP for PXE Boot, Creating the TFTP PXE Server Content, Creating a Kickstart File, Using a Kickstart File to Perform an Automated, Installation, Modifying the Kickstart File with, system-config-kickstart, Making Manual Modifications to the Kickstart File	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Red Hat Enterprise Linux 6 Administration	Sander van Vugt	John Wiley and Sons		2013
2.	Red hat Linux Networking and System Administration	Terry Collings and Kurt Wall	Wiley	3rd	
3.	Linux Administration: A Beginner's Guide	Wale Soyinka	TMH	Fifth Edition	

B. Sc. (Information Technology)		Semester – V	
Course Name: Enterprise Java		**Course Code: USIT506 (Elective II)**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Understanding Java EE:** What is an Enterprise Application? What is java enterprise edition? Java EE Technologies, Java EE evolution, Glassfish server **Java EE Architecture, Server and Containers:** Types of System Architecture, Java EE Server, Java EE Containers. **Introduction to Java Servlets:** The Need for Dynamic Content, Java Servlet Technology, Why Servlets? What can Servlets do? **Servlet API and Lifecycle:** Java Servlet API, The Servlet Skeleton, The Servlet Life Cycle, A Simple Welcome Servlet **Working With Servlets:** Getting Started, Using Annotations Instead of Deployment Descriptor. **Working with Databases:** What Is JDBC? JDBC Architecture, Accessing Database, The Servlet GUI and Database Example.	**12**
II	**Request Dispatcher:** Resquestdispatcher Interface, Methods of Requestdispatcher, Requestdispatcher Application. **COOKIES:** Kinds Of Cookies, Where Cookies Are Used? Creating Cookies Using Servlet, Dynamically Changing The Colors Of A Page **SESSION:** What Are Sessions? Lifecycle Of Http Session, Session Tracking With Servlet API, A Servlet Session Example **Working With Files:** Uploading Files, Creating an Upload File Application, Downloading Files, Creating a Download File Application. **Working With Non-Blocking I/O:** Creating a Non-Blocking Read Application, Creating The Web Application, Creating Java Class, Creating Servlets, Retrieving The File, Creating index.jsp	**12**
III	**Introduction To Java Server Pages:** Why use Java Server Pages? Disadvantages Of JSP, JSP v\s Servlets, Life Cycle of a JSP Page, How does a JSP function? How does JSP execute? About Java Server Pages **Getting Started With Java Server Pages:** Comments, JSP Document, JSP Elements, JSP GUI Example. **Action Elements:** Including other Files, Forwarding JSP Page to Another Page, Passing Parameters for other Actions, Loading a Javabean. **Implicit Objects, Scope And El Expressions:** Implicit Objects, Character Quoting Conventions, Unified Expression Language [Unified El], Expression Language.	**12**

	Java Server Pages Standard Tag Libraries: What is wrong in using JSP Scriptlet Tags? How JSTL Fixes JSP Scriptlet's Shortcomings? Disadvantages Of JSTL, Tag Libraries.	
IV	**Introduction To Enterprise Javabeans:** Enterprise Bean Architecture, Benefits of Enterprise Bean, Types of Enterprise Bean, Accessing Enterprise Beans, Enterprise Bean Application, Packaging Enterprise Beans **Working With Session Beans:** When to use Session Beans? Types of Session Beans, Remote and Local Interfaces, Accessing Interfaces, Lifecycle of Enterprise Beans, Packaging Enterprise Beans, Example of Stateful Session Bean, Example of Stateless Session Bean, Example of Singleton Session Beans. **Working with Message Driven Beans:** Lifecycle of a Message Driven Bean, Uses of Message Driven Beans, The Message Driven Beans Example. **Interceptors:** Request And Interceptor, Defining An Interceptor, AroundInvoke Method, Applying Interceptor, Adding An Interceptor To An Enterprise Bean, Build and Run the Web Application. **Java Naming and Directory Interface**: What is Naming Service? What is Directory Service? What is Java Naming and Directory interface? Basic Lookup, JNDI Namespace in Java EE, Resources and JNDI, Datasource Resource Definition in Java EE.	**12**
V	**Persistence, Object/Relational Mapping And JPA:** What is Persistence? Persistence in Java, Current Persistence Standards in Java, Why another Persistence Standards? Object/Relational Mapping, **Introduction to Java Persistence API:** The Java Persistence API, JPA, ORM, Database and the Application, Architecture of JPA, How JPA Works? JPA Specifications. **Writing JPA Application:** Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database And Tables in Mysql, Creating a Web Application, Adding the Required Library Files, Creating a Javabean Class, Creating Persistence Unit [Persistence.Xml], Creating JSPS, The JPA Application Structure, Running The JPA Application. **Introduction to Hibernate:** What is Hibernate? Why Hibernate? Hibernate, Database and The Application, Components of Hibernate, Architecture of Hibernate, How Hibernate Works? **Writing Hibernate Application:** Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, Creating a Web Application, Adding The Required Library Files, Creating a Javabean Class, Creating Hibernate Configuration File, Adding a Mapping Class, Creating JSPS, Running The Hibernate Application.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Java EE 7 For Beginners	Sharanam Shah, Vaishali Shah	SPD	First	2017
2.	Java EE 8 Cookbook: Build reliable applications with the most robust and mature technology for enterprise development	Elder Moraes	Packt	First	2018
3.	Advanced Java Programming	Uttam Kumar Roy	Oxford Press		2015

B. Sc. (Information Technology)		Semester – V	
Course Name: Next Generation Technologies		Course Code: USIT507 (Elective II)	
Periods per week (1 Period is 50 minutes),		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2½	75
	Internal	--	25

Unit	Details	Lectures
I	**Big Data:** Getting Started, Big Data, Facts About Big Data, Big Data Sources, Three Vs of Big Data, Volume, Variety, Velocity, Usage of Big Data, Visibility, Discover and Analyze Information, Segmentation and Customizations, Aiding Decision Making, Innovation, Big Data Challenges, Policies and Procedures, Access to Data, Technology and Techniques, Legacy Systems and Big Data, Structure of Big Data, Data Storage, Data Processing, Big Data Technologies **NoSQL:** SQL, NoSQL, Definition, A Brief History of NoSQL, ACID vs. BASE, CAP Theorem (Brewer's Theorem), The BASE, NoSQL Advantages and Disadvantages, Advantages of NoSQL, Disadvantages of NoSQL, SQL vs. NoSQL Databases, Categories of NoSQL Databases **Introducing MongoDB:** History, MongoDB Design Philosophy, Speed, Scalability, and Agility, Non-Relational Approach, JSON-Based Document Store, Performance vs. Features, Running the Database Anywhere, SQL Comparison	**12**
II	**The MongoDB Data Model:** The Data Model, JSON and BSON, The Identifier (_id), Capped Collection, Polymorphic Schemas, Object-Oriented Programming, Schema Evolution **Using MongoDB Shell:** Basic Querying, Create and Insert, Explicitly Creating Collections, Inserting Documents Using Loop, Inserting by Explicitly Specifying _id, Update, Delete, Read, Using Indexes, Stepping Beyond the Basics, Using Conditional Operators, Regular Expressions, MapReduce, aggregate(), Designing an Application's Data Model, Relational Data Modeling and Normalization, MongoDB Document Data Model Approach **MongoDB Architecture:** Core Processes, mongod, mongo, mongos, MongoDB Tools, Standalone Deployment, Replication, Master/Slave Replication, Replica Set, Implementing Advanced Clustering with Replica Sets, Sharding, Sharding Components, Data Distribution Process, Data Balancing Process, Operations, Implementing Sharding, Controlling Collection Distribution (Tag-Based Sharding), Points to	**12**

	Remember When Importing Data in a ShardedEnvironment, Monitoring for Sharding, Monitoring the Config Servers, Production Cluster Architecture, Scenario 1, Scenario 2, Scenario 3, Scenario 4	
III	**MongoDB Storage Engine:** Data Storage Engine, Data File (Relevant for MMAPv1), Namespace (.ns File), Data File (Relevant for WiredTiger), Reads and Writes, How Data Is Written Using Journaling, GridFS – The MongoDB File System, The Rationale of GridFS, GridFSunder the Hood, Using GridFS, Indexing, Types of Indexes, Behaviors and Limitations **MongoDB Use Cases:** Use Case 1 -Performance Monitoring, Schema Design, Operations, Sharding, Managing the Data, Use Case 2 – Social Networking, Schema Design, Operations, Sharding **MongoDB Limitations:** MongoDB Space Is Too Large (Applicable for MMAPv1), Memory Issues (Applicable for Storage Engine MMAPv1), 32-bit vs. 64-bit, BSON Documents, Namespaces Limits, Indexes Limit, Capped Collections Limit - Maximum Number of Documents in a Capped Collection, Sharding Limitations, Shard Early to Avoid Any Issues, Shard Key Can't Be Updated, Shard Collection Limit, Select the Correct Shard Key, Security Limitations, No Authentication by Default, Traffi c to and from MongoDB Isn't Encrypted, Write and Read Limitations, Case-Sensitive Queries, Type-Sensitive Fields, No JOIN, Transactions, MongoDB Not Applicable Range **MongoDB Best Practices:** Deployment, Hardware Suggestions from the MongoDB Site, Few Points to be Noted, Coding, Application Response Time Optimization, Data Safety, Administration, Replication Lag, Sharding, Monitoring	**12**
IV	**The End of Disk? SSD and In-Memory Databases:** The End of Disk?, Solid State Disk, The Economics of Disk, SSD-Enabled Databases, In-Memory Databases, TimesTen, Redis, SAP HANA, VoltDB, Oracle 12c "in-Memory Database, Berkeley Analytics Data Stack and Spark, Spark Architecture **jQuery:** Introduction, Traversing the DOM, DOM Manipulation with jQuery, Events, Ajax with jQuery, jQuery Plug-ins, jQuery Image Slider	**12**
V	**JSON:** Introduction, JSON Grammar, JSON Values, JSON Tokens, Syntax, JSON vs XML, Data Types, Objects, Arrays, Creating JSON, JSON Object, Parsing JSON, Persisting JSON, Data Interchange, JSON PHP, JSON HTML, JSONP	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Practical MongoDB	Shakuntala Gupta Edward Navin Sabharwal	Apress		
2.	Beginning jQuery	Jack Franklin Russ Ferguson	Apress	Second	
3.	Next Generation Databases	Guy Harrison	Apress		
4.	Beginning JSON	Ben Smith	Apress		

B. Sc. (Information Technology)		Semester – V	
Course Name: Project Dissertation		**Course Code: USIT5P1**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

The details are given in Appendix – I

B. Sc. (Information Technology)		Semester – V	
Course Name: Internet of Things Practical		Course Code: USIT5P2	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	--

Practical No	Details
0	Starting Raspbian OS, Familiarising with Raspberry Pi Components and interface, Connecting to ethernet, Monitor, USB.
1	Displaying different LED patterns with Raspberry Pi.
2	Displaying Time over 4-Digit 7-Segment Display using Raspberry Pi
3	Raspberry Pi Based Oscilloscope
4	Controlling Raspberry Pi with WhatsApp.
5	Setting up Wireless Access Point using Raspberry Pi
6	Fingerprint Sensor interfacing with Raspberry Pi
7	Raspberry Pi GPS Module Interfacing
8	IoT based Web Controlled Home Automation using Raspberry Pi
9	Visitor Monitoring with Raspberry Pi and Pi Camera
10	Interfacing Raspberry Pi with RFID.
11	Building Google Assistant with Raspberry Pi.
12	Installing Windows 10 IoT Core on Raspberry Pi

Raspberry Pi Kits and components should be made available in the ratio of 1 kit : 3 students minimum.

B. Sc. (Information Technology)		Semester – V	
Course Name: Advanced Web Programming Practical		**Course Code: USIT5P3**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

List of Practical	
1.	**Working with basic C# and ASP .NET**
a.	Create an application that obtains four int values from the user and displays the product.
b.	Create an application to demonstrate string operations.
c.	Create an application that receives the (Student Id, Student Name, Course Name, Date of Birth) information from a set of students. The application should also display the information of all the students once the data entered.
	Create an application to demonstrate following operations i. Generate Fibonacci series. ii. Test for prime numbers. iii. Test for vowels. iv. Use of foreach loop with arrays v. Reverse a number and find sum of digits of a number.
2.	**Working with Object Oriented C# and ASP .NET**
a.	Create simple application to perform following operations i. Finding factorial Value ii. Money Conversion iii. Quadratic Equation iv. Temperature Conversion
b.	Create simple application to demonstrate use of following concepts i. Function Overloading ii. Inheritance (all types) iii. Constructor overloading iv. Interfaces
c.	Create simple application to demonstrate use of following concepts i. Using Delegates and events ii. Exception handling
3.	**Working with Web Forms and Controls**
a.	Create a simple web page with various sever controls to demonstrate setting and use of their properties. (Example : AutoPostBack)
b.	Demonstrate the use of Calendar control to perform following operations. a) Display messages in a calendar control b) Display vacation in a calendar control c) Selected day in a calendar control using style d) Difference between two calendar dates
c.	Demonstrate the use of Treeview control perform following operations. a) Treeview control and datalist b) Treeview operations
4.	**Working with Form Controls**
a.	Create a Registration form to demonstrate use of various Validation controls.
b.	Create Web Form to demonstrate use of Adrotator Control.
c.	Create Web Form to demonstrate use User Controls.

5.	**Working with Navigation, Beautification and Master page.**
a.	Create Web Form to demonstrate use of Website Navigation controls and Site Map.
b.	Create a web application to demonstrate use of Master Page with applying Styles and Themes for page beautification.
c.	Create a web application to demonstrate various states of ASP.NET Pages.
6.	**Working with Database**
a.	Create a web application bind data in a multiline textbox by querying in another textbox.
b.	Create a web application to display records by using database.
c.	Demonstrate the use of Datalist link control.
7.	**Working with Database**
a.	Create a web application to display Databinding using dropdownlist control.
b.	Create a web application for to display the phone no of an author using database.
c.	Create a web application for inserting and deleting record from a database. (Using Execute-Non Query).
8.	**Working with data controls**
a.	Create a web application to demonstrate various uses and properties of SqlDataSource.
b.	Create a web application to demonstrate data binding using DetailsView and FormView Control.
c.	Create a web application to display Using Disconnected Data Access and Databinding using GridView.
9.	**Working with GridView control**
a.	Create a web application to demonstrate use of GridView control template and GridView hyperlink.
b.	Create a web application to demonstrate use of GridView button column and GridView events.
c.	Create a web application to demonstrate GridView paging and Creating own table format using GridView.
10.	**Working with AJAX and XML**
a.	Create a web application to demonstrate reading and writing operation with XML.
b.	Create a web application to demonstrate Form Security and Windows Security with proper Authentication and Authorization properties.
c.	Create a web application to demonstrate use of various Ajax controls.
11.	**Programs to create and use DLL**

B. Sc. (Information Technology)		Semester – V	
Course Name: Artificial Intelligence Practical		**Course Code: USIT5P4 (Elective I)**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No		Details
1	a	Write a program to implement depth first search algorithm.
	b	Write a program to implement breadth first search algorithm.
2	a	Write a program to simulate 4-Queen / N-Queen problem.
	b	Write a program to solve tower of Hanoi problem.
3	a	Write a program to implement alpha beta search.
	b	Write a program for Hill climbing problem.
4	a	Write a program to implement A* algorithm.
	b	Write a program to implement AO* algorithm.
5	a	Write a program to solve water jug problem.
	b	Design the simulation of tic – tac – toe game using min-max algorithm.
6	a	Write a program to solve Missionaries and Cannibals problem.
	b	Design an application to simulate number puzzle problem.
7	a	Write a program to shuffle Deck of cards.
	b	Solve traveling salesman problem using artificial intelligence technique.
8	a	Solve the block of World problem.
	b	Solve constraint satisfaction problem
9	a	Derive the expressions based on Associative law
	b	Derive the expressions based on Distributive law
10	a	Write a program to derive the predicate. (for e.g.: Sachin is batsman , batsman is cricketer) - > Sachin is Cricketer.
	b	Write a program which contains three predicates: male, female, parent. Make rules for following family relations: father, mother, grandfather,grandmother, brother, sister, uncle, aunt, nephew and niece, cousin. Question: i. Draw Family Tree. ii. Define: Clauses, Facts, Predicates and Rules with conjunction and disjunction

The practicals can be implemented in C / C++ / Java/ Python / R /Prolog / LISP or any other language.

B. Sc. (Information Technology)		Semester – V	
Course Name: Linux System Administration		**Course Code: USIT5P5 (Elective I)**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No	Details
0	**Installation of RHEL 6.X**
1	**Graphical User Interface and Command Line Interface and Processes**
a	Exploring the Graphical Desktop
b	The Command Line Interface
c	Managing Processes
2	**Storage Devices and Links, Backup and Repository**
b	Working with Storage Devices and Links
a	Making a Backup
b	Creating a Repository
3	**Working with RPMsm Storage and Networking**
a	Using Query Options
b	Extracting Files From RPMs
c	Configuring and Managing Storage
d	Connecting to the Network
4	**Working with Users, Groups, and Permissions**
5	**Firewall and Cryptographic services**
a	Securing Server with iptables
b	Setting Up Cryptographic Services
6	**Configuring Server for File Sharing**
a	Configuring NFS Server and Client
b	Configuring Samba
c	Configuring FTP
7	**DNS, DHCP and Mail Server**
a	Configuring DNS
b	Configuring DHCP
c	Setting Up a Mail Server

8	**Web Server**
a	Configuring Apache on Red Hat Enterprise Linux
b	Writing a Script to Monitor Activity on the Apache Web Server
c	Using the select Command
9	**Shell Scripts and High-Availability Clustering**
a	Writing Shell Scripts
b	Configuring Booting with GRUB
c	Configuring High Availability Clustering
10	**Setting Up an Installation Server**
a	Configuring Network Server as an Installation Server
b	Setting Up a TFTP and DHCP Server for PXE Boot

B. Sc. (Information Technology)		Semester – V	
Course Name: Enterprise Java		**Course Code: USIT5P6 (Elective II)**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

List of Practical	
1.	**Implement the following Simple Servlet applications.**
a.	Create a simple calculator application using servlet.
b.	Create a servlet for a login page. If the username and password are correct then it says message "Hello <username>" else a message "login failed"
c.	Create a registration servlet in Java using JDBC. Accept the details such as Username, Password, Email, and Country from the user using HTML Form and store the registration details in the database.
2.	**Implement the following Servlet applications with Cookies and Sessions.**
a.	Using Request Dispatcher Interface create a Servlet which will validate the password entered by the user, if the user has entered "Servlet" as password, then he will be forwarded to Welcome Servlet else the user will stay on the index.html page and an error message will be displayed.
b.	Create a servlet that uses Cookies to store the number of times a user has visited servlet.
c.	Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions.
3.	**Implement the Servlet IO and File applications.**
a.	Create a Servlet application to upload and download a file.
b.	Develop Simple Servlet Question Answer Application using Database.
c.	Create simple Servlet application to demonstrate Non-Blocking Read Operation.
4.	**Implement the following JSP applications.**
a.	Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types.
b.	Develop a simple JSP application to pass values from one page to another with validations. (Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button).
c.	Create a registration and login JSP application to register and authenticate the user based on username and password using JDBC.
5.	**Implement the following JSP JSTL and EL Applications.**
a.	Create an html page with fields, eno, name, age, desg, salary. Now on submit this data to a JSP page which will update the employee table of database with matching eno.
b.	Create a JSP page to demonstrate the use of Expression language.
c.	Create a JSP application to demonstrate the use of JSTL.

6.	**Implement the following EJB Applications.**
a.	Create a Currency Converter application using EJB.
b.	Develop a Simple Room Reservation System Application Using EJB.
c.	Develop simple shopping cart application using EJB [Stateful Session Bean].
7.	**Implement the following EJB applications with different types of Beans.**
a.	Develop simple EJB application to demonstrate Servlet Hit count using Singleton Session Beans.
b.	Develop simple visitor Statistics application using Message Driven Bean [Stateless Session Bean].
c.	Develop simple Marks Entry Application to demonstrate accessing Database using EJB.
8.	**Implement the following JPA applications.**
a.	Develop a simple Inventory Application Using JPA.
b.	Develop a Guestbook Application Using JPA.
c.	Create simple JPA application to store and retrieve Book details.
9.	**Implement the following JPA applications with ORM and Hibernate.**
a.	Develop a JPA Application to demonstrate use of ORM associations.
b.	Develop a Hibernate application to store Feedback of Website Visitor in MySQL Database.
c.	Develop a Hibernate application to store and retrieve employee details in MySQL Database.
10.	**Implement the following Hibernate applications.**
a.	Develop an application to demonstrate Hibernate One- To -One Mapping Using Annotation.
b.	Develop Hibernate application to enter and retrieve course details with ORM Mapping.
c.	Develop a five page web application site using any two or three Java EE Technologies.

B. Sc. (Information Technology)		Semester – V	
Course Name: Next Generation Technologies Practical		**Course Code: USIT5P7 (Elective II)**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No	Details
1	**MongoDB Basics**
a	Write a MongoDB query to create and drop database.
b	Write a MongoDB query to create, display and drop collection
c	Write a MongoDB query to insert, query, update and delete a document.
2	**Simple Queries with MongoDB**
3	**Implementing Aggregation**
a	Write a MongoDB query to use sum, avg, min and max expression.
b	Write a MongoDB query to use push and addToSet expression.
c	Write a MongoDB query to use first and last expression.
4	**Replication, Backup and Restore**
a	Write a MongoDB query to create Replica of existing database.
b	Write a MongoDB query to create a backup of existing database.
c	Write a MongoDB query to restore database from the backup.
5	**Java and MongoDB**
a	Connecting Java with MongoDB and inserting, retrieving, updating and deleting.
6	**PHP and MongoDB**
a	Connecting PHP with MongoDB and inserting, retrieving, updating and deleting.
7	**Python and MongoDB**
a	Connecting Python with MongoDB and inserting, retrieving, updating and deleting.
8	**Programs on Basic jQuery**
a	jQuery Basic, jQuery Events
b	jQuery Selectors, jQuery Hide and Show effects
c	jQuery fading effects, jQuery Sliding effects

9	**jQuery Advanced**
a	jQuery Animation effects, jQuery Chaining
b	jQuery Callback, jQuery Get and Set Contents
c	jQuery Insert Content, jQuery Remove Elements and Attribute
10	**JSON**
a	Creating JSON
b	Parsing JSON
c	Persisting JSON
11	**Create a JSON file and import it to MongoDB**
a	Export MongoDB to JSON.
b	Write a MongoDB query to delete JSON object from MongoDB

SEMESTER VI

B. Sc. (Information Technology)		Semester – VI	
Course Name: Software Quality Assurance		**Course Code: USIT601**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Introduction to Quality:** Historical Perspective of Quality, What is Quality? (Is it a fact or perception?), Definitions of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools. **Software Quality:** Introduction, Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software Development Life Cycle, Software Quality Management, Why Software Has Defects? Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, Important Aspects of Quality Management.	**12**
II	**Fundamentals of testing:** Introduction, Necessity of testing, What is testing? Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process, Misconceptions About Testing, Principles of Software Testing, Salient Features of Good Testing, Test Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing, Test Team Approach, Process Problems Faced by Testing, Cost Aspect of Testing, Establishing Testing Policy, Methods, Structured Approach to Testing, Categories of Defect, Defect, Error, or Mistake in Software, Developing Test Strategy, Developing Testing Methodologies (Test Plan), Testing Process, Attitude Towards Testing (Common People Issues), Test Methodologies/Approaches, People Challenges in Software Testing, Raising Management Awareness for Testing, Skills Required by Tester,	**12**

	Testing throughout the software life cycle, Software development models, Test levels, Test types, the targets of testing, Maintenance testing	
III	**Unit Testing: Boundary Value Testing:** Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary Value Testing, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing, **Equivalence Class Testing:** Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations. **Decision Table–Based Testing:** Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations, **Path Testing:** Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations, **Data Flow Testing:** Define/Use Testing, Slice-Based Testing, Program Slicing Tools.	**12**
IV	**Software Verification and Validation:** Introduction, Verification, Verification Workbench, Methods of Verification, Types of reviews on the basis od Stage Phase, Entities involved in verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities. **V-test Model:** Introduction, V-model for software, Testing during Proposal stage, Testing during requirement stage, Testing during test planning phase, Testing during design phase, Testing during coding, VV Model, Critical Roles and Responsibilities.	**12**
V	**Levels of Testing:** Introduction, Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, Critical Path First, Sub System Testing, System Testing, Testing Stages. **Special Tests:** Introduction, GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing, Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing, Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph, Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Software Testing and Continuous Quality Improvement	William E. Lewis	CRC Press	Third	2016
2	Software Testing: Principles, Techniques and Tools	M. G. Limaye	TMH		2017
3.	Foundations of Software Testing	Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black	Cengage Learning	3rd	
4.	Software Testing: A Craftsman's Approach	Paul C. Jorgenson	CRC Press	4th	2017

B. Sc. (Information Technology)		Semester – VI	
Course Name: Security in Computing		**Course Code: USIT602**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Information Security Overview** : The Importance of Information Protection, The Evolution of Information Security, Justifying Security Investment, Security Methodology, How to Build a Security Program, The Impossible Job, The Weakest Link, Strategy and Tactics, Business Processes vs. Technical Controls. **Risk Analysis**: Threat Definition, Types of Attacks, Risk Analysis. **Secure Design Principles**: The CIA Triad and Other Models, Defense Models, Zones of Trust, Best Practices for Network Defense.	**12**
II	**Authentication and Authorization**: Authentication, Authorization **Encryption**: A Brief History of Encryption, Symmetric-Key Cryptography, Public Key Cryptography, Public Key Infrastructure. **Storage Security**: Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices. **Database Security**: General Database Security Concepts, Understanding Database Security Layers, Understanding Database-Level Security, Using Application Security, Database Backup and Recovery, Keeping Your Servers Up to Date, Database Auditing and Monitoring.	**12**
III	**Secure Network Design**: Introduction to Secure Network Design, Performance, Availability, Security. **Network Device Security**: Switch and Router Basics, Network Hardening. **Firewalls**: Overview, The Evolution of Firewalls, Core Firewall Functions, Additional Firewall Capabilities, Firewall Design. **Wireless Network Security**: Radio Frequency Security Basics, Data-Link Layer Wireless Security Features, Flaws, and Threats, Wireless Vulnerabilities and Mitigations, Wireless Network Hardening Practices and Recommendations, Wireless Intrusion Detection and Prevention, Wireless Network Positioning and Secure Gateways.	**12**
IV	**Intrusion Detection and Prevention Systems**: IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM). **Voice over IP (VoIP) and PBX Security**: Background, VoIP Components, VoIP Vulnerabilities and Countermeasures, PBX, TEM: Telecom Expense Management. **Operating System Security Models**: Operating System Models, Classic Security Models, Reference Monitor, Trustworthy Computing, International Standards for Operating System Security.	**12**

V	**Virtual Machines and Cloud Computing**: Virtual Machines, Cloud Computing. **Secure Application Design**: Secure Development Lifecycle, Application Security Practices, Web Application Security, Client Application Security, Remote Administration Security. **Physical Security**: Classification of Assets, Physical Vulnerability Assessment, Choosing Site Location for Security, Securing Assets: Locks and Entry Controls, Physical Intrusion Detection.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	The Complete Reference: Information Security	Mark Rhodes-Ousley	McGraw-Hill	2nd	2013
2.	Essential Cybersecurity Science	Josiah Dykstra	O'Reilly	Fifth	2017
3.	Principles of Computer Security: CompTIA Security+ and Beyond	Wm.Arthur Conklin, Greg White	McGraw Hill	Second	2010

B. Sc. (Information Technology)		Semester – VI	
Course Name: Business Intelligence		**Course Code: USIT603**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Business intelligence:** Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence **Decision support systems:** Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system	**12**
II	**Mathematical models for decision making:** Structure of mathematical models, Development of a model, Classes of models **Data mining:** Definition of data mining, Representation of input data , Data mining process, Analysis methodologies **Data preparation**: Data validation, Data transformation, Data reduction	**12**
III	**Classification**: Classification problems, Evaluation of classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines **Clustering:** Clustering methods, Partition methods, Hierarchical methods, Evaluation of clustering models	**12**
IV	**Business intelligence applications:** **Marketing models**: Relational marketing, Sales force management, **Logistic and production models**: Supply chain optimization, Optimization models for logistics planning, Revenue management systems. **Data envelopment analysis**: Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices	**12**
V	**Knowledge Management:** Introduction to Knowledge Management, Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management **Artificial Intelligence and Expert Systems:** Concepts and Definitions of Artificial Intelligence, Artificial Intelligence Versus Natural Intelligence, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, Development of Expert Systems	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Business Intelligence: Data Mining and Optimization for Decision Making	Carlo Vercellis	Wiley	First	2009
2.	Decision support and Business Intelligence Systems	Efraim Turban, Ramesh Sharda, Dursun Delen	Pearson	Ninth	2011
3.	Fundamental of Business Intelligence	Grossmann W, Rinderle-Ma	Springer	First	2015

B. Sc. (Information Technology)		Semester – VI	
Course Name: Principles of Geographic Information Systems		**Course Code: USIT604 (Elective I)**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**A Gentle Introduction to GIS** **The nature of GIS:** Some fundamental observations, Defining GIS, GISystems, GIScience and GIApplications, Spatial data and Geoinformation. **The real world and representations of it:** Models and modelling, Maps, Databases, Spatial databases and spatial analysis **Geographic Information and Spatial Database** **Models and Representations of the real world** **Geographic Phenomena:** Defining geographic phenomena, types of geographic phenomena, Geographic fields, Geographic objects, Boundaries **Computer Representations of Geographic Information:** Regular tessellations, irregular tessellations, Vector representations, Topology and Spatial relationships, Scale and Resolution, Representation of Geographic fields, Representation of Geographic objects **Organizing and Managing Spatial Data** **The Temporal Dimension**	**12**
II	**Data Management and Processing Systems** **Hardware and Software Trends** **Geographic Information Systems:** GIS Software, GIS Architecture and functionality, Spatial Data Infrastructure (SDI) **Stages of Spatial Data handling:** Spatial data handling and preparation, Spatial Data Storage and maintenance, Spatial Query and Analysis, Spatial Data Presentation. **Database management Systems:** Reasons for using a DBMS, Alternatives for data management, The relational data model, Querying the relational database. **GIS and Spatial Databases:** Linking GIS and DBMS, Spatial database functionality.	**12**
III	**Spatial Referencing and Positioning** **Spatial Referencing:** Reference surfaces for mapping, Coordinate Systems, Map Projections, Coordinate Transformations	**12**

	Satellite-based Positioning: Absolute positioning, Errors in absolute positioning, Relative positioning, Network positioning, code versus phase measurements, Positioning technology **Data Entry and Preparation** **Spatial Data Input:** Direct spatial data capture, Indirect spatial data captiure, Obtaining spatial data elsewhere **Data Quality:** Accuracy and Positioning, Positional accuracy, Attribute accuracy, Temporal accuracy, Lineage, Completeness, Logical consistency **Data Preparation:** Data checks and repairs, Combining data from multiple sources **Point Data Transformation:** Interpolating discrete data, Interpolating continuous data	
IV	**Spatial Data Analysis** **Classification of analytical GIS Capabilities** **Retrieval, classification and measurement:** Measurement, Spatial selection queries, Classification **Overlay functions:** Vector overlay operators,Raster overlay operators **Neighbourhood functions:** Proximity computations, Computation of diffusion, Flow computation, Raster based surface analysis **Analysis:** Network analysis, interpolation, terrain modeling **GIS and Application models:** GPS, Open GIS Standards, GIS Applications and Advances **Error Propagation in spatial data processing:** How Errors propagate, Quantifying error propagation	**12**
V	**Data Visualization** **GIS and Maps, The Visualization Process** **Visualization Strategies: Present or explore?** **The cartographic toolbox:** What kind of data do I have?, How can I map my data? **How to map?:** How to map qualitative data, How to map quantitative data, How to map the terrain elevation, How to map time series **Map Cosmetics, Map Dissemination**	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Principles of Geographic Information Systems-An Introductory Text Book	Editors: Otto Huisman and Rolf A.	The International Institute of Geoinformation Science and Earth Observation	Fourth	2009

2.	Principles of Geographic Information Systems	P.A Burrough and R.A.McDonnell	Oxford University Press	Third	1999
3.	Fundamentals of Spatial Information Systems,	R.Laurini and D. Thompson,	Academic Press		1994
4.	Fundamentals of Geographic Information Systems	Michael N.Demers	Wiley Publications	Fourth	2009
5.	Introduction to Geographic Information Systems	Chang Kang-tsung (Karl),	McGrawHill	Any above 3rd Edition	2013 7th Edition
6.	GIS Fundamentals: A First Text on Geographic Information Systems	Paul Bolsatd	XanEdu Publishing Inc	5th Edition	

B. Sc. (Information Technology)		Semester – VI	
Course Name: Enterprise Networking		**Course Code: USIT605 (Elective II)**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**General Network Design:** Network Design Methodology, Architectures for the Enterprise, Borderless Networks Architecture, Collaboration and Video Architecture, Data Center and Virtualization Architecture, Design Lifecycle: Plan, Build, Manage Plan Phase Build Phase Manage Phase Prepare, Plan, Design, Implement, Operate, and Optimize Phases Prepare Phase Plan Phase Design Phase Implement Phase Operate Phase Optimize Phase Summary of PPDIOO Phases Project Deliverables Design Methodology Identifying Customer Design Requirements Characterizing the Existing Network Steps in Gathering Information Network Audit Tools Network Checklist Designing the Network Topology and Solutions Top-Down Approach Pilot and Prototype Tests Design Document **Network Design Models:** Hierarchical Network Models Benefits of the Hierarchical Model, Hierarchical Network Design, Core Layer, Distribution Layer, Access Layer, Hierarchical Model Examples, Hub-and-Spoke, Design Collapsed Core, Design Enterprise Architecture Model, Enterprise Campus Module, Enterprise Edge Area, E-Commerce Module, Internet Connectivity Module, VPN/Remote Access, Enterprise WAN, Service Provider Edge Module, Remote Modules, Enterprise Branch Module, Enterprise Data Center Module, Enterprise Teleworker Module, High Availability Network Services, Workstation-to-Router Redundancy and LAN, High Availability Protocols, ARP Explicit Configuration, RDP, RIP, HSRP, VRRP, GLBP, Server Redundancy, Route Redundancy, Load Balancing, Increasing Availability, Link Media Redundancy	**12**
II	**Enterprise LAN Design:** LAN Media, Ethernet Design Rules, 100Mbps Fast Ethernet Design Rules, Gigabit Ethernet Design Rules, 1000BASE-LX Long-Wavelength Gigabit Ethernet, 1000BASE-SX Short-Wavelength Gigabit Ethernet, 1000BASE-CX Gigabit Ethernet over Coaxial Cable, 1000BASE-T Gigabit Ethernet over UTP 86, 10 Gigabit Ethernet Design Rules, 10GE Media Types, EtherChannel, Comparison of Campus Media LAN Hardware, Repeaters, Hubs, Bridges, Switches, Routers, Layer 3 Switches, Campus LAN Design and Best Practices Best Practices for Hierarchical Layers, Access Layer Best Practices, Distribution Layer Best Practices, Core Layer Best Practices, STP Design Considerations, STP Toolkit, PortFast,	**12**

	UplinkFast, BackboneFast, Loop Guard, Root Guard, BPDU Guard, BPDU Filter, VLAN and Trunk Considerations, Unidirectional Link Detection (UDLD) Protocol, Large-Building LANs, Enterprise Campus LANs, Edge Distribution, Medium-Size LANs, Small and Remote Site LANs, Server Farm Module, Server Connectivity Options, Enterprise Data Center Infrastructure, Campus LAN QoS Considerations, Multicast Traffic Considerations, CGMP, IGMP Snooping. **Data Center Design:** Enterprise DC Architecture, Data Center Foundation Components, Data Center Topology Components, Data Center Network Programmability, SDN, Controllers, APIs, ACI, Challenges in the DC, Data Center Facility Aspects, Data Center Space, Data Center Power, Data Center Cooling, Data Center Heat, Data Center Cabling, Enterprise DC Infrastructure, Data Center Storage, Data Center Reference Architecture, Defining the DC Access Layer, Defining the DC Aggregation Layer, Defining the DC Core Layer, Security in the DC, Fabric Extenders, Virtualization Overview, Challenges, Defining Virtualization and Benefits, Virtualization Risks, Types of Virtualization, Virtualization Technologies, VSS, VRF, vPC, Device Contexts, Server Virtualization, Server Scaling, Virtual Switching, Network Virtualization Design Considerations, Access Control, Path Isolation, Services Edge, Data Center Interconnect, DCI Use Cases, DCI Transport Options, DCI L2 Considerations, Load Balancing in the DC, Application Load Balancing, Network Load Balancing.	
III	**Wireless LAN Design:** Wireless LAN Technologies, WLAN Standards, ISM and UNII Frequencies, Summary of WLAN Standards, Service Set Identifier, WLAN Layer 2 Access Method, WLAN Security, Unauthorized Access, WLAN Security Design Approach, IEEE 802.1X-2001 Port-Based Authentication, Dynamic WEP Keys and LEAP, Controlling WLAN Access to Servers, WLAN Authentication, Authentication Options, WLAN Controller Components, WLC Interface Types, AP Controller Equipment Scaling, Roaming and Mobility Groups, Intracontroller Roaming, Layer 2 Intercontroller Roaming, Layer 3 Intercontroller Roaming, Mobility Groups, WLAN Design, Controller Redundancy Design: Deterministic vs. Dynamic, N+1 WLC Redundancy, N+N WLC Redundancy, N+N+1 WLC Redundancy, Radio Management and Radio Groups, RF Groups, RF Site Survey, Using EoIP Tunnels for Guest Services, Wireless Mesh for Outdoor Wireless, Mesh Design Recommendations, Campus Design Considerations, Power over Ethernet (PoE), Wireless and Quality of Service (QoS), Branch Design Considerations, Local MAC, REAP, Hybrid REAP, Branch Office Controller Options. **WAN Technologies and the Enterprise Edge:** WAN and Enterprise Edge Overview, Definition of WAN, WAN Edge Module, Enterprise	**12**

	Edge Modules, WAN Transport Technologies, ISDN, ISDN BRI Service, ISDN PRI Service, Digital Subscriber Line, Cable, Wireless, Frame Relay, Time-Division Multiplexing, Metro Ethernet, SONET/SDH, Multiprotocol Label Switching (MPLS), Dark Fiber, Dense Wavelength-Division Multiplexing, Ordering WAN Technology and Contracts, WAN and Edge Design Methodologies, Response Time, Throughput, Reliability, Bandwidth Considerations, WAN Link Categories, Optimizing Bandwidth Using QoS, Queuing, Traffic Shaping and Policing, Classification, Congestion Management, Priority Queuing, Custom Queuing, Weighted Fair Queuing, Class-Based Weighted Fair Queuing, Low-Latency Queuing, Traffic Shaping and Policing, Link Efficiency, Window Size, DMZ Connectivity, Segmenting DMZs, DMZ Services, Internet Connectivity, Centralized Internet (Branch) vs. Direct Internet (Branch), High Availability for the Internet Edge, VPN Network Design. **WAN Design** Traditional WAN Technologies Hub-and-Spoke Topology Full-Mesh Topology Partial-Mesh Topology Point-to-Point Topology Remote Site Connectivity Enterprise VPN vs. Service Provider VPN Enterprise Managed VPN: IPsec IPsec Direct Encapsulation Generic Routing Encapsulation IPsec DMVPN IPsec Virtual Tunnel Interface Design GETVPN Service Provider–Managed Offerings ,Metro Ethernet Service Provider VPNs: L2 vs. L3 ,Virtual Private Wire Services VPWS L2 VPN Considerations ,Virtual Private LAN Services VPLS L2 VPN Considerations ,MPLS, MPLS Layer 3 Design Overview MPLS L3 VPN Considerations ,VPN Benefits WAN Backup Design WAN Backup over the Internet Enterprise WAN Architecture Cisco Enterprise MAN/WAN Enterprise WAN/MAN Architecture Comparison ,Enterprise WAN Components Comparing Hardware and Software Enterprise Branch Architecture Branch Design Branch Connectivity Redundancy for Branches Single WAN Carrier vs. Dual WAN Carriers Single MPLS Carrier Site ,Dual MPLS Carriers Hybrid WAN: L3 VPN with IPsec VPN ,Internet for Branches Flat Layer 2 vs. Collapsed Core ,Enterprise Branch Profiles Small Branch Design Medium Branch Design Large Branch Design Enterprise Teleworker Design ,ISRs for Teleworkers	
IV	Internet Protocol Version 4 Design,IPv4 Header ToS IPv4 Fragmentation IPv4 Addressing ,IPv4 Address Classes Class A Addresses Class B Addresses ,Class C Addresses Class D Addresses Class E Addresses ,IPv4 Address Types IPv4 Private Addresses NAT ,IPv4 Address Subnets Mask Nomenclature IP Address Subnet Design Example Determining the Network Portion of an IP Address Variable-Length Subnet Masks, Loopback Addresses IP Telephony Networks ,IPv4 Addressing Design Goal of IPv4 Address Design , Plan for Future Use of IPv4 Addresses , Performing Route Summarization , Plan for a	**12**

	Hierarchical IP Address Network , Private and Public IP Address and NAT Guidelines , Steps for Creating an IPv4 Address Plan Case Study: IP Address Subnet Allocation , Address Assignment and Name Resolution , Recommended Practices of IP Address Assignment , BOOTP DHCP DNS , Internet Protocol Version 6 Design, IPv6 Header IPv6 Address Representation IPv4-Compatible IPv6 Addresses IPv6 Prefix Representation IPv6 Address Scope Types and Address Allocations IPv6 Address Allocations IPv6 Unicast Address Global Unicast Addresses Link-Local Addresses , Unique Local IPv6 Address Global Aggregatable IPv6 Address , IPv4-Compatible IPv6 Address IPv6 Anycast Addresses , IPv6 Multicast Addresses IPv6 Mechanisms ICMPv6 , IPv6 Neighbor Discovery Protocol IPv6 Name Resolution , Path MTU Discovery IPv6 Address-Assignment Strategies , Manual Configuration SLAAC of Link-Local Address , SLAAC of Globally Unique IPv6 Address DHCPv6 , DHCPv6 Lite IPv6 Security IPv6 Routing Protocols RIPng OSPFv3 , BGP4 Multiprotocol Extensions (MP-BGP) for IPv6 , IPv6 Addressing Design , Planning for Addressing with IPv6 , Route Summarization with IPv6 IPv6 Private Addressing IPv6 for the Enterprise IPv6 Address Allocation , Partly Linked IPv4 Address into IPv6, Whole IPv4 Address Linked into IPv6 IPv6 Addresses Allocated Per Location and/or Type , IPv4-to-IPv6 Transition Mechanisms and Deployment Models , Dual-Stack Mechanism IPv6 over IPv4 Tunnels , Protocol Translation Mechanisms IPv6 Deployment Models , Dual-Stack Model Hybrid Model Service Block Model ,IPv6 Deployment Model Comparison IPv6 Comparison with IPv4 ,OSPF, BGP, Route Manipulation, and IP Multicast,OSPFv2 OSPFv2 Metric OSPFv2 Adjacencies and Hello Timers , OSPFv2 Areas OSPF Area Design Considerations OSPF Router Types OSPF DRs LSA Types Autonomous System External Path Types OSPF Stub Area Types Stub Areas Totally Stubby Areas , NSSAs Virtual Links OSPFv2 Router Authentication , OSPFv2 Summary OSPFv3 OSPFv3 Changes from OSPFv2, OSPFv3 Areas and Router Types OSPFv3 LSAs OSPFv3 Summary BGP BGP Neighbors eBGP iBGP Route Reflectors Confederations BGP Administrative Distance , BGP Attributes, Weight, and the BGP Decision Process BGP Path Attributes Next-Hop Attribute Local Preference Attribute Origin Attribute Autonomous System Path Attribute MED Attribute Community Attribute Atomic Aggregate and Aggregator Attributes Weight BGP Decision Process , BGP Summary , Route Manipulation PBR Route Summarization Route Redistribution Default Metric OSPF Redistribution Route Filtering Transit Traffic Routing Protocols on the Hierarchical Network Infrastructure IP Multicast Review , Multicast Addresses Layer 3 to Layer 2 Mapping IGMP , IGMPv1 IGMPv2 IGMPv3 CGMP IGMP Snooping , Sparse Versus Dense Multicast Multicast Source and Shared	

	Trees PIM PIM-SM PIM DR Auto-RP PIMv2 Bootstrap Router , DVMRP IPv6 Multicast Addresses	
V	Managing Security Network Security Overview Security Legislation Security Threats Reconnaissance and Port Scanning Vulnerability Scanners Unauthorized Access Security Risks Targets Loss of Availability Integrity Violations and Confidentiality Breaches , Security Policy and Process Security Policy Defined , Basic Approach of a Security Policy Purpose of Security Policies, Security Policy Components Risk Assessment , Risk Index Continuous Security Integrating Security Mechanisms into Network Design Trust and Identity Management , Trust Domains of Trust Identity Passwords Tokens Certificates , Network Access Control Secure Services Encryption Fundamentals Encryption Keys VPN Protocols , Transmission Confidentiality Data Integrity Threat Defense , Physical Security Infrastructure Protection Security Management Solutions Security Solution Network Security Platforms , Trust and Identity Technologies Firewall Fundamentals , Types of Firewalls Next-Gen Firewalls NAT Placement , Firewall Guidelines Firewall ACLs , Identity and Access Control Deployments Detecting and Mitigating Threats IPS/IDS Fundamentals IPS/IDS Guidelines , Threat Detection and Mitigation Technologies , Threat-Detection and Threat-Mitigation Solutions , FirePOWER IPS Security Management Applications , Security Platform Solutions Security Management Network Integrating Security into Network Devices IOS Security , ISR G2 Security Hardware Options Securing the Enterprise , Implementing Security in the Campus Implementing Security in the Data Center Implementing Security in the Enterprise Edge Network Management Protocols, Simple Network Management Protocol SNMP Components , MIB SNMP Message Versions SNMPv1 SNMPv2 SNMPv3 , Other Network Management Technologies RMON , RMON2 NetFlow Compared to RMON and SNMP , CDP LLDP Syslog	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	CCDA200-310Official Cert Guide	ANTHONY BRUNO, CCIE No. 2738 STEVE JORDAN, CCIE No. 11293	**Cisco Press**		
2.	Network Warrior	Gary A Donabue	**O Reilly**	2nd	2011

B. Sc. (Information Technology)		Semester – VI	
Course Name: IT Services Management		Course Code: USIT606 (Elective I)	
Periods per week (1 Period is 50 minutes),		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2½	75
	Internal	--	25

Unit	Details	Lectures
I	**IT Service Management:** Introduction, What is service management? What are services? Business Process, Principles of Service management: Specialisation and Coordination, The agency principle, Encapsulation, Principles of systems, The service Life Cycle, Functions and processes across the life cycle. **Service Strategy Principles:** Value creation, Service Assets, Service Provider Service Structures, Service Strategy Principles. **Service Strategy:** Define the market, Develop the offerings, Develop Strategic Assets, Prepare for execution. **Challenges, Critical Success factors and risks:** Complexity, Coordination and Control, Preserving value, Effectiveness in measurement, Risks.	12
II	**Service Design:** Fundamentals, **Service Design Principles:** Goals, Balanced Design, Identifying Service requirements, identifying and documenting business requirements and drivers, Design activities, Design aspects, Subsequent design activities, Design constraints, Service oriented architecture, Business Service Management, Service Design Models **Service Design Processes:** Service Catalogue Management, Service Level Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security Management, Supplier Management **Challenges, Critical Success factors and risks:** Challenges, Risks	12
III	**Service Transition:** Fundamentals, **Service Transition Principles:** Principles Supporting Service Transition, Policies for Service Transition **Service Transition Processes:** Transition planning and support, Change Management, Service Asses Configuration Management, Service and Deployment Management, Service Validation and Testing, Evaluation, Knowledge Management. **Challenges, Critical Success factors and risks:** Challenges, Critical Success factors, Risks, Service Transition under difficult Conditions.	12
IV	**Service Operation:** Fundamentals, **Service Operation Principles:** Functions, groups, teams, departments and divisions, Achieving balance in service operations, Providing service, Operation staff involvement in service design and service transition, Operational Health, Communication, Documentation	12

	Service Operation Processes: Event Management, Incident Management, Request fulfilment, Problem Management, Access Management, Operational activities of processes covered in other lifecycle phases. **Challenges, Critical Success factors and risks:** Challenges, Critical Success factors, Risks	
V	**Continual Service Improvement(CSI) Principles:** CSI Approach, CSI and organizational change, Ownership, CSI register, External and Internal drivers, Service level management, Knowledge management, The Deming cycle, Service Measurement, IT governance, Frameworks, models, standards and quality Systems, CSI inputs and outputs. **CSI Process:** The seven step improvement process. **CSI Methods nad Techniques:** Methods and techniques, Assessments, benchmarking, Service Measurement, Metrics, Return on Investment, Service reporting, CSI and other service management processes, **Organising for CSI:** Organisational development, Functions, roles, Customer Engagement, Responsibility model - RACI, Competence and training. **Technology considerations:** Tools to support CSI activities. **Implementing CSI:** Critical Considerations for implementing CSI, The start, Governance, CSI and organisational change, Communication Strategy and Plan	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	ITIL v3 Foundation Complete Certification Kit				2009
2.	ITIL v3 Service Strategy		OGC/TSO		
3.	ITIL v3 Service Transition		OGC/TSO		
4.	ITIL v3 Service Operation		OGC/TSO		
5.	ITIL Continual Service Improvement		TSO	2011	2011

B. Sc. (Information Technology)		Semester – VI	
Course Name: Cyber Laws		**Course Code: USIT607 (Elective I)**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**75**
	Internal	**--**	**25**

Unit	Details	Lectures
I	**Power of Arrest Without Warrant Under the IT Act, 2000:** A Critique, Crimes of this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce? Forgetting the Line Between Cognizable and Non-Cognizable Offences, Necessity of Arrest without Warrant from Any Place, Public or Otherwise, Check and Balances Against Arbitrary Arrests, Arrest for "About to Commit" an Offence Under the IT Act: A Tribute to Draco, Arrest, But NO Punishment! **Cyber Crime and Criminal Justice: Penalties, Adjudication and Appeals Under the IT Act, 2000:** Concept of "Cyber Crime " and the IT Act , 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment and E-mail Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals Under IT Act , 2000, Network Service Providers, Jurisdiction and Cyber Crime, Nature of Cyber Criminality, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on Cyber Crime.	**12**
II	**Contracts in the Infotech World:** Contracts in the Infotech World, Click-Wrap and Shrink-Wrap Contract: Status under the Indian Contract Act, 1872, Contract Formation Under the Indian Contract Act, 1872, Contract Formation on the Internet, Terms and Conditions of Contracts. **Jurisdiction in the Cyber World:** Questioning the Jurisdiction and Validity of the Present Law of Jurisdiction, Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and the Information Technology Act,2000, Foreign Judgements in India, Place of Cause of Action in Contractual and IPR Disputes, Exclusion Clauses in Contracts, Abuse of Exclusion Clauses, Objection of Lack of Jurisdiction, Misuse of the Law of Jurisdiction, Legal Principles on Jurisdiction in the United State of America, Jurisdiction Disputes w.r.t. the Internet in the United State of America.	**12**
III	**Battling Cyber Squatters and Copyright Protection in the Cyber World:** Concept of Domain Name and Reply to Cyber Squatters, Meta-Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright, Copyright Terms and Respect for Foreign Works, Copyright	**12**

	Infringement, Remedies and Offences, Copyright Protection of Content on the Internet; Copyright Notice, Disclaimer and Acknowledgement, Downloading for Viewing Content on the Internet, Hyper-Linking and Framing, Liability of ISPs for Copyright Violation in the Cyber World: Legal Developments in the US, Napster and its Cousins: A Revolution on the Internet but a Crisis for Copyright Owners, Computer Software Piracy.	
IV	**E-Commerce Taxation: Real Problems in the Virtual World:** A Tug of War on the Concept of 'Permanent Establishment', Finding the PE in Cross Border E-Commerce, The United Nations Model Tax Treaty, The Law of Double Taxation Avoidance Agreements and Taxable Jurisdiction Over Non-Residents, Under the Income Tax Act, 1961, Tax Agents of Non-Residents under the Income Tax Act,1961 and the Relevance to E-Commerce, Source versus Residence and Classification between Business Income and Royalty, The Impact of the Internet on Customer Duties, Taxation Policies in India: At a Glance. **Digital Signature, Certifying Authorities and E-Governance:** Digital Signatures, Digital Signature Certificate, Certifying Authorities and Liability in the Event of Digital Signature Compromise, E-Governance in India: A Warning to Babudom!	**12**
V	**The Indian Evidence Act of 1872 v. Information Technology Act, 2000:** Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages, Other Amendments in the Indian Evidence Act by the IT Act, Amendments to the Bankers Books Evidence Act, 1891 and Reserve Bank of India Act, 1934. **Protection of Cyber Consumers in India:** Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India. Amendments in Indian IT Act 2000	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Cyber Law Simplified	Vivek Sood	TMH Education		2001
2.	Cybersecurity Law	Jeff Kosseff	Wiley		2017

B. Sc. (Information Technology)		Semester – VI	
Course Name: Project Implementation		Course Code: USIT6P1	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	-

The details are given in Appendix – I

B. Sc. (Information Technology)		Semester – VI	
Course Name: Security in Computing Practical		Course Code: USIT6P2	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	-

Practical No	Details
1	**Configure Routers**
a	OSPF MD5 authentication.
b	NTP.
c	to log messages to the syslog server.
d	to support SSH connections.
2	**Configure AAA Authentication**
a	Configure a local user account on Router and configure authenticate on the console and vty lines using local AAA
b	Verify local AAA authentication from the Router console and the PC-A client
3	**Configuring Extended ACLs**
a	**Configure, Apply and Verify an Extended Numbered ACL**
4	**Configure IP ACLs to Mitigate Attacks and IPV6 ACLs**
a	Verify connectivity among devices before firewall configuration.
b	Use ACLs to ensure remote access to the routers is available only from management station PC-C.
c	Configure ACLs on to mitigate attacks.
d	Configuring IPv6 ACLs
5	**Configuring a Zone-Based Policy Firewall**
6	Configure IOS Intrusion Prevention System (IPS) Using the CLI
a	Enable IOS IPS.
b	Modify an IPS signature.
7	**Layer 2 Security**
a	Assign the Central switch as the root bridge.
b	Secure spanning-tree parameters to prevent STP manipulation attacks.
c	Enable port security to prevent CAM table overflow attacks.
8	**Layer 2 VLAN Security**
9	**Configure and Verify a Site-to-Site IPsec VPN Using CLI**

10	**Configuring ASA Basic Settings and Firewall Using CLI**
a	Configure basic ASA settings and interface security levels using CLI
b	Configure routing, address translation, and inspection policy using CLI
c	Configure DHCP, AAA, and SSH
d	Configure a DMZ, Static NAT, and ACLs

B. Sc. (Information Technology)		Semester – VI	
Course Name: Business Intelligence Practical		Course Code: USIT6P3	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	-

Practical No	Details
1	Import the legacy data from different sources such as (Excel , SqlServer, Oracle etc.) and load in the target system. (You can download sample database such as Adventureworks, Northwind, foodmart etc.)
2	Perform the Extraction Transformation and Loading (ETL) process to construct the database in the Sqlserver.
3	a. Create the Data staging area for the selected database. b. Create the cube with suitable dimension and fact tables based on ROLAP, MOLAP and HOLAP model.
4	a.Create the ETL map and setup the schedule for execution. b. Execute the MDX queries to extract the data from the datawarehouse.
5	a. Import the datawarehouse data in Microsoft Excel and create the Pivot table and Pivot Chart. b. Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart to perform data analysis.
6	Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the data warehouse data.
7	Perform the data classification using classification algorithm.
8	Perform the data clustering using clustering algorithm.
9	Perform the Linear regression on the given data warehouse data.
10	Perform the logistic regression on the given data warehouse data.

The BI tools such as Tableau / Power BI / BIRT / R / Excel or any other can be used.

B. Sc. (Information Technology)		Semester – VI	
Course Name: Principles of Geographical Information System Practical		**Course Code: USIT6P4 (Elective II)**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**-**

Practical No	Details
0	Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector and Raster data, Maps.
1	Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics
2	Exploring and Managing Raster data: Adding raster layers, raster styling and analysis, raster mosaicking and clipping
3	Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading OpenStreetMap Data
4	Working with attributes, terrain Data
5	Working with Projections and WMS Data
6	Georeferencing Topo Sheets and Scanned Maps Georeferencing Aerial Imagery Digitizing Map Data
7	Managing Data Tables and Saptial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries
8	Advanced GIS Operations 1: Nearest Neighbor Analysis, Sampling Raster Data using Points or Polygons, Interpolating Point Data
9	Advance GIS Operations 2: Batch Processing using Processing Framework Automating Complex Workflows using Processing Modeler Automating Map Creation with Print Composer Atlas
10	Validating Map data

B. Sc. (Information Technology)		Semester – VI	
Course Name: Advanced Networking Practical		**Course Code: USIT6P5 (Elective II)**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**-**

Practical No	Details
1	**Configuring OSPF – I**
a	Single-Area OSPF Link Costs and Interface Priorities
b	Multi-Area OSPF with Stub Areas and Authentication
2	**Configuring OSPF – II**
a	OSPF Virtual Links and Area Summarization
b	OSPF over Frame Relay
3	**Redistribution and Administrative Distances**
a	Redistribution Between RIP and OSPF
b	Manipulating Administrative Distances
4	**BGP**
a	Configuring BGP with Default Routing
b	Using the AS_PATH Attribute
c	BGP Route Reflectors and Route Filters
5	**IPv6**
a	Configuring OSPF for IPv6
b	Configuring 6to4 Tunnels
6	**VLANs and EtherChannel**
a	Static VLANS, VLAN Trunking, and VTP Domains and Modes
b	Configuring EtherChannel
7	**Spanning Tree Protocol**
a	Spanning Tree Protocol (STP) Default Behavior
b	Modifying Default Spanning Tree Behavior
8	**VLAN and Spanning Tree**
a	Per-VLAN Spanning Tree Behavior
b	Multiple Spanning Tree

9	**Internal VLAN Routing**
a	Inter-VLAN Routing with an External Router
b	Inter-VLAN Routing with an Internal Route Processor
10	**Configure NAT Services**

B. Sc. (Information Technology)		Semester – VI	
Course Name: Advanced Mobile Programming Practical		Course Code: USIT6P6	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	--

Practical No	Details
1	**Introduction to Android, Introduction to Android Studio IDE, Application Fundamentals:** Creating a Project, Android Components, Activities, Services, Content Providers, Broadcast Receivers, Interface overview, Creating Android Virtual device, USB debugging mode, Android Application Overview. Simple "Hello World" program.
2	**Programming Resources** Android Resources: (Color, Theme, String, Drawable, Dimension, Image),
3	**Programming Activities and fragments** Activity Life Cycle, Activity methods, Multiple Activities, Life Cycle of fragments and multiple fragments.
4	**Programs related to different Layouts** Coordinate, Linear, Relative, Table, Absolute, Frame, List View, Grid View.
5	**Programming UI elements** AppBar, Fragments, UI Components
6	**Programming menus, dialog, dialog fragments**
7	**Programs on Intents, Events, Listeners and Adapters** The Android Intent Class, Using Events and Event Listeners
8	**Programs on Services, notification and broadcast receivers**
9	**Database Programming with SQLite**
10	**Programming threads, handles and asynchronized programs**
11	**Programming Media API and Telephone API**
12	**Programming Security and permissions**
13	**Programming Network Communications and Services (JSON)**

APPENDIX – 1

Project Dissertation Semester V and Project Implementation Semester VI

Chapter 1 to 4 should be submitted in Semester V in spiral binding. These chapter have also to be included in Semester VI report. Semester VI report has to be hard bound with golden embossing. Students will be evaluated based on the dissertation in semester V and dissertation and viva voce in Semester VI.

I. OBJECTIVES

- Describe the Systems Development Life Cycle (SDLC).
- Evaluate systems requirements.
- Complete a problem definition.
- Evaluate a problem definition.
- Determine how to collect information to determine requirements.
- Perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and Operational feasibility for the project.
- Work on data collection methods for fact finding.
- Construct and evaluate data flow diagrams.
- Construct and evaluate data dictionaries.
- Evaluate methods of process description to include structured English, decision tables and decision trees.
- Evaluate alternative tools for the analysis process.
- Create and evaluate such alternative graphical tools as systems flow charts and state transition diagrams.
- Decide the S/W requirement specifications and H/W requirement specifications.
- Plan the systems design phase of the SDLC.
- Distinguish between logical and physical design requirements.
- Design and evaluate system outputs.
- Design and evaluate systems inputs.
- Design and evaluate validity checks for input data.

- Design and evaluate user interfaces for input.
- Design and evaluate file structures to include the use of indexes.
- Estimate storage requirements.
- Explain the various file update processes based on the standard file organizations.
- Decide various data structures.
- Construct and evaluate entity-relationship (ER) diagrams for RDBMS related projects.
- Perform normalization for the unnormalized tables for RDBMS related projects
- Decide the various processing systems to include distributed, client/server, online and others.
- Perform project cost estimates using various techniques.
- Schedule projects using both GANTT and PERT charts.
- Perform coding for the project.
- Documentation requirements and prepare and evaluate systems documentation.
- Perform various systems testing techniques/strategies to include the phases of testing.
- Systems implementation and its key problems.
- Generate various reports.
- Be able to prepare and evaluate a final report.
- Brief the maintenance procedures and the role of configuration management in operations.
- To decide the future scope and further enhancement of the system.
- Plan for several appendices to be placed in support with the project report documentation.
- Decide the various processing systems to include distributed, client/server, online and others.
- Perform project cost estimates using various techniques.
- Schedule projects using both GANTT and PERT charts.
- Perform coding for the project.
- Documentation requirements and prepare and evaluate systems documentation.
- Perform various systems testing techniques/strategies to include the phases of testing.
- Systems implementation and its key problems.
- Generate various reports.
- Be able to prepare and evaluate a final report.
- Brief the maintenance procedures and the role of configuration management in operations.
- To decide the future scope and further enhancement of the system.
- Plan for several appendices to be placed in support with the project report documentation.

- Work effectively as an individual or as a team member to produce correct, efficient, well-organized and documented programs in a reasonable time.
- Recognize problems that are amenable to computer solutions, and knowledge of the tool necessary for solving such problems.
- Develop of the ability to assess the implications of work performed.
- Get good exposure and command in one or more application areas and on the software
- Develop quality software using the software engineering principles
- Develop of the ability to communicate effectively.

II. Type of the Project

The majority of the students are expected to work on a real-life project preferably in some industry/ Research and Development Laboratories/Educational Institution/Software Company. Students are encouraged to work in the areas listed below. However, it is ***not mandatory*** for a student to work on a real-life project. The student can formulate a project problem with the help of her/his Guide and submit the project proposal of the same. **Approval of the project proposal is mandatory**. If approved, the student can commence working on it, and complete it. Use the latest versions of the software packages for the development of the project.

III. SOFTWARE AND BROAD AREAS OF APPLICATION

FRONT END / GUI Tools	.Net Technologies,Java
DBMS/BACK END	Oracle, SQL Plus, MY SQL, SQL Server,
LANGUAGES	C, C++, Java, VC++, C#, R,Python
SCRIPTING LANGUAGES	PHP,JSP, SHELL Scripts (Unix), TcL/TK,
.NET Platform	F#,C#. Net, Visual C#. Net, ASP.Net
MIDDLE WARE (COMPONENT) TECHNOLOGIES	COM/DCOM, Active-X, EJB
UNIX INTERNALS	Device Drivers, RPC, Threads, Socket programming
NETWORK/WIRELESS TECHNOLOGIES	-

REALTIME OPERATING SYSTEM/ EMBEDDED SKILLS	LINUX, Raspberry Pi, Arduino, 8051
APPLICATION AREAS	Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking-Communication Software development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming.

IV. Introduction

The project report should be documented with scientific approach to the solution of the problem that the students have sought to address. The project report should be prepared in order to solve the problem in a methodical and professional manner, making due references to appropriate techniques, technologies and professional standards. The student should start the documentation process from the first phase of software development so that one can easily identify the issues to be focused upon in the ultimate project report. The student should also include the details from the project diary, in which they will record the progress of their project throughout the course. The project report should contain enough details to enable examiners to evaluate the work. The important points should be highlighted in the body of the report, with details often referred to appendices.

1.1 PROJECT REPORT:

Title Page

Original Copy of the Approved Proforma of the Project Proposal

Certificate of Authenticated work

Role and Responsibility Form

Abstract

Acknowledgement

Table of Contents

Table of Figures

CHAPTER 1: INTRODUCTION

1.1 Background

1.2 Objectives

1.3 Purpose, Scope, and Applicability

1.3.1 Purpose

1.3.2 Scope

1.3.3 Applicability

1.4 Achievements

1.5 Organisation of Report

CHAPTER 2: SURVEY OF TECHNOLOGIES

CHAPTER 3: REQUIREMENTS AND ANALYSIS

3.1 Problem Definition

3.2 Requirements Specification

3.3 Planning and Scheduling

3.4 Software and Hardware Requirements

3.5 Preliminary Product Description

3.6 Conceptual Models

CHAPTER 4: SYSTEM DESIGN

4.1 Basic Modules

4.2 Data Design

4.2.1 Schema Design

4.2.2 Data Integrity and Constraints

4.3 Procedural Design

4.3.1 Logic Diagrams

4.3.2 Data Structures

4.3.3 Algorithms Design

4.4 User interface design

4.5 Security Issues

4.6 Test Cases Design

The documentation should use tools like star UML, Visuo for windows, Rational Rose for design as part of Software Project Management Practical Course. The documentation should be spiral bound for semester V and the entire documentation should be hard bound during semester VI.

CHAPTER 5: IMPLEMENTATION AND TESTING

5.1 Implementation Approaches

5.2 Coding Details and Code Efficiency

5.2.1 Code Efficiency

5.3 Testing Approach

5.3.1 Unit Testing

5.3.2 Integrated Testing

5.3.3 Beta Testing

5.4 Modifications and Improvements

5.5 Test Cases

CHAPTER 6: RESULTS AND DISCUSSION

6.1 Test Reports

6.2 User Documentation

CHAPTER 7: CONCLUSIONS

7.1 Conclusion

7.1.1 Significance of the System

7.2 Limitations of the System

7.3 Future Scope of the Project

REFERENCES

GLOSSARY

APPENDIX A

APPENDIX B

V. EXPLANATION OF CONTENTS

Title Page

Sample format of Title page is given in Appendix 1 of this block. Students should follow the given format.

Original Copy of the Approved Proforma of the Project Proposal

Sample Proforma of Project Proposal is given in Appendix 2 of this block. Students should follow the given format.

Certificate of Authenticated work

Sample format of Certificate of Authenticated work is given in Appendix 3 of this block. Students should follow the given format.

Role and Responsibility Form

Sample format for Role and Responsibility Form is given in Appendix 4 of this block.
Students should follow the given format.

Abstract

This should be one/two short paragraphs (100-150 words total), summarising the project work. It is important that this is not just a re-statement of the original project outline. A suggested flow is background, project aims and main achievements. From the abstract, a reader should be able to ascertain if the project is of interest to them and, it should present results of which they may wish to know more details.

Acknowledgements

This should express student's gratitude to those who have helped in the preparation of project.

Table of Contents: The table of contents gives the readers a view of the detailed structure of the report. The students would need to provide section and subsection headings with associated pages. The formatting details of these sections and subsections are given below.

Table of Figures: List of all Figures, Tables, Graphs, Charts etc. along with their page numbers in a table of figures.

Chapter 1: Introduction

The introduction has several parts as given below:

Background: A description of the background and context of the project and its relation to work already done in the area. Summarise existing work in the area concerned with the project work.

Objectives: Concise statement of the aims and objectives of the project. Define exactly what is going to be done in the project; the objectives should be about 30 /40 words.
Purpose, Scope and Applicability: The description of Purpose, Scope, and Applicability are given below:

• Purpose: Description of the topic of the project that answers questions on why this project is being done. How the project could improve the system its significance and theoretical framework.
• Scope: A brief overview of the methodology, assumptions and limitations. The students should answer the question: What are the main issues being covered in the project? What are the main functions of the project?
• Applicability: The student should explain the direct and indirect applications of their work. Briefly discuss how this project will serve the computer world and people.
Achievements: Explain what knowledge the student achieved after the completion of the work. What contributions has the project made to the chosen area? Goals achieved - describes the degree to which the findings support the original objectives laid out by the project. The goals may be partially or fully achieved, or exceeded.

Organisation of Report: Summarising the remaining chapters of the project report, in effect, giving the reader an overview of what is to come in the project report.

Chapter 2: Survey of Technologies

In this chapter Survey of Technologies should demonstrate the students awareness and understanding of Available Technologies related to the topic of the project. The student should give the detail of all the related technologies that are necessary to complete the project. The should describe the technologies available in the chosen area and present a comparative study of all those Available Technologies. Explain why the student selected the one technology for the completion of the objectives of the project.

Chapter 3: Requirements and Analysis

Problem Definition: Define the problem on which the students are working in the project.

Provide details of the overall problem and then divide the problem in to sub-problems. Define each sub-problem clearly.

Requirements Specification: In this phase the student should define the requirements of the system, independent of how these requirements will be accomplished. The Requirements Specification describes the things in the system and the actions that can be done on these things. Identify the operation and problems of the existing system.

Planning and Scheduling: Planning and scheduling is a complicated part of software development. Planning, for our purposes, can be thought of as determining all the small tasks that must be carried out in order to accomplish the goal. Planning also takes into account, rules, known as constraints, which, control when certain tasks can or cannot happen. Scheduling can be thought of as determining whether adequate resources are available to carry out the plan. The student should show the Gantt chart and Program Evaluation Review Technique (PERT).

Software and Hardware Requirements: Define the details of all the software and hardware needed for the development and implementation of the project.

• Hardware Requirement: In this section, the equipment, graphics card, numeric co-processor, mouse, disk capacity, RAM capacity etc. necessary to run the software must be noted.

• Software Requirements: In this section, the operating system, the compiler, testing tools, linker, and the libraries etc. necessary to compile, link and install the software must be listed.

Preliminary Product Description: Identify the requirements and objectives of the new system. Define the functions and operation of the application/system the students are developing as project.

Conceptual Models: The student should understand the problem domain and produce a model of the system, which describes operations that can be performed on the system, and the allowable sequences of those operations. Conceptual Models could consist of complete Data Flow Diagrams, ER diagrams, Object-oriented diagrams, System Flowcharts etc.

Chapter 4: System Design

Describes desired features and operations in detail, including screen layouts, business rules, process diagrams, pseudocode and other documentation.

Basic Modules: The students should follow the divide and conquer theory, so divide the overall problem into more manageable parts and develop each part or module separately. When all modules are ready, the student should integrate all the modules into one system. In this phase, the student should briefly describe all the modules and the functionality of these modules.

Data Design: Data design will consist of how data is organised, managed and manipulated.

• Schema Design: Define the structure and explanation of schemas used in the project.

• Data Integrity and Constraints: Define and explain all the validity checks and constraints provided to maintain data integrity.

Procedural Design: Procedural design is a systematic way for developing algorithms or procedurals.

• Logic Diagrams: Define the systematical flow of procedure that improves its comprehension and helps the programmer during implementation. e.g., Control Flow Chart, Process Diagrams etc.

• Data Structures: Create and define the data structure used in procedures.

• Algorithms Design: With proper explanations of input data, output data, logic of processes, design and explain the working of algorithms.

User Interface Design: Define user, task, environment analysis and how to map those requirements in order to develop a "User Interface". Describe the external and internal components and the architecture of user interface. Show some rough pictorial views of the user interface and its components.

Security Issues: Discuss Real-time considerations and Security issues related to the project and explain how the student intends avoiding those security problems. What are the security policy plans and architecture?

Test Cases Design: Define test cases, which will provide easy detection of errors and mistakes with in a minimum period of time and with the least effort. Explain the different conditions in which the students wish to ensure the correct working of the project.

Chapter 5: Implementation and Testing

Implementation Approaches: Define the plan of implementation, and the standards the students have used in the implementation.

Coding Details and Code Efficiency: Students not need include full source code, instead, include only the important codes (algorithms, applets code, forms code etc). The program code should contain comments needed for explaining the work a piece of code does. Comments may be needed to explain why it does it, or, why it does a particular way.

The student can explain the function of the code with a shot of the output screen of that program code.

• Code Efficiency: The student should explain how the code is efficient and how the students have handled code optimisation.

Testing Approach: Testing should be according to the scheme presented in the system design chapter and should follow some suitable model – e.g., category partition, state machine-based. Both functional testing and user-acceptance testing are appropriate. Explain the approach of testing.

• Unit Testing: Unit testing deals with testing a unit or module as a whole. This would test the interaction of many functions but, do confine the test within one module.

• Integrated Testing: Brings all the modules together into a special testing environment, then checks for errors, bugs and interoperability. It deals with tests for the entire application. Application limits and features are tested here.

Modifications and Improvements: Once the students finish the testing they are bound to be faced with bugs, errors and they will need to modify your source code to improve the system. Define what modification are implemented in the system and how it improved the system.

Chapter 6: Results and Discussion

Test Reports: Explain the test results and reports based on the test cases, which should show that the project is capable of facing any problematic situation and that it works fine in different conditions. Take the different sample inputs and show the outputs.

User Documentation: Define the working of the software; explain its different functions, components with screen shots. The user document should provide all the details of the product in such a way that any user reading the manual, is able to understand the working and functionality of the document.

Chapter 7: Conclusions

Conclusion: The conclusions can be summarised in a fairly short chapter (2 or 3 pages). This chapter brings together many of the points that would have made in the other chapters.

Limitations of the System: Explain the limitations encountered during the testing of the project that the students were not able to modify. List the criticisms accepted during the demonstrations of the project.

Future Scope of the Project describes two things: firstly, new areas of investigation prompted by developments in this project, and secondly, parts of the current work that was not completed due to time constraints and/or problems encountered.

REFERENCES

It is very important that the students acknowledge the work of others that they have used or adapted in their own work, or that provides the essential background or context to the project. The use of references is the standard way to do this. Please follow the given standard for the references for books, journals, and online material. The citation is mandatory in both the reports.

E.g:

Linhares, A., & Brum, P. (2007). Understanding our understanding of strategic scenarios: What role do chunks play? *Cognitive Science*, *31*(6), 989-1007. https://doi.org/doi:10.1080/03640210701703725

Lipson, Charles (2011). Cite right : A quick guide to citation styles; MLA, APA, Chicago, the sciences, professions, and more (2nd ed.). Chicago [u.a.]: University of Chicago Press. p. 187. ISBN 9780226484648.

Elaine Ritchie, J Knite. (2001). *Artificial Intelligence, Chapter 2 , p.p 23 - 44.* Tata McGrawHill.

GLOSSARY

If you the students any acronyms, abbreviations, symbols, or uncommon terms in the project report then their meaning should be explained where they first occur. If they go on to use any of them extensively then it is helpful to list them in this section and define the meaning.

APPENDICES

These may be provided to include further details of results, mathematical derivations, certain illustrative parts of the program code (e.g., class interfaces), user documentation etc.

In particular, if there are technical details of the work done that might be useful to others who wish to build on this work, but that are not sufficiently important to the project as a whole to justify being discussed in the main body of the project, then they should be included as appendices.

VI. SUMMARY

Project development usually involves an engineering approach to the design and development of a software system that fulfils a practical need. Projects also often form an important focus for discussion at interviews with future employers as they provide a detailed example of what the students are capable of achieving. In this course the students can choose your project topic from the lists given in Unit 4: Category-wise Problem Definition.

VII. FURTHER READINGS

1. Modern Systems Analysis and Design; Jeffrey A. Hoffer, Joey F. George, Joseph,S. Valacich; Pearson Education; Third Edition; 2002.
2. ISO/IEC 12207: Software Life Cycle Process
(http://www.software.org/quagmire/descriptions/iso-iec12207.asp).
3. IEEE 1063: Software User Documentation (http://ieeexplore.ieee.org).
4. ISO/IEC: 18019: Guidelines for the Design and Preparation of User Documentation for Application Software.
5. http://www.sce.carleton.ca/squall.
6. http://en.tldp.org/HOWTO/Software-Release-Practice-HOWTO/documentation.html.
7. http://www.sei.cmu.edu/cmm/

PROFORMA FOR THE APPROVAL PROJECT PROPOSAL

(Note: All entries of the proforma of approval should be filled up with appropriate and complete information. Incomplete proforma of approval in any respect will be summarily rejected.)

PNR **No.: ……** Roll no**: _____**

1. Name of the Student
   _____
2. Title of the Project
   _____
3. Name of the Guide

   _____
4. Teaching experience of the Guide _____
5. Is this your first submission? Yes ☐ No ☐

Signature of the Student Signature of the Guide

Date: …… Date: …….

Signature of the Coordinator

Date: ……

(All the text in the report should be in times new roman)

TITLE OF THE PROJECT (NOT EXCEEDING 2 LINES, 24 BOLD, ALL CAPS)

A Project Report (12 Bold)
Submitted in partial fulfillment of the
Requirements for the award of the Degree of (size-12)

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)(14 BOLD, CAPS)

By(12 Bold)

Name of The Student (size-15, title case)
Seat Number (size-15)

Under the esteemed guidance of (13 bold)
Mr./Mrs. Name of The Guide (15 bold, title case)
Designation (14 Bold, title case)

COLLEGE LOGO

DEPARTMENT OF INFORMATION TECHNOLOGY(12 BOLD, CAPS)
COLLEGE NAME (14 BOLD, CAPS)
(Affiliated to University of Mumbai) (12, Title case, bold, italic)
CITY, PIN CODE(12 bold, CAPS)
MAHARASHTRA (12 bold, CAPS)
YEAR (12 bold)

COLLEGE NAME (14 BOLD, CAPS)
(Affiliated to University of Mumbai) (13, bold, italic)
CITY-MAHARASHTRA-PINCODE(13 bold, CAPS)

DEPARTMENT OF INFORMATION TECHNOLOGY (14 BOLD, CAPS)

College Logo

CERTIFICATE (14 BOLD, CAPS, underlined, centered)

This is to certify that the project entitled, **"Title of The Project "**, is bonafied work of **NAME OF THE STUDENT** bearing Seat.No: (**NUMBER**) submitted in partial fulfillment of the requirements for the award of degree of BACHELOR OF SCIENCE in INFORMATION TECHNOLOGY from University of Mumbai. (12, times new roman, justified)

Internal Guide (12 bold) **Coordinator**

(Don't write names of lecturers or HOD)

External Examiner

Date: **College Seal**

COMPANY CERTIFICATE (if applicable)

(Project Abstract page format)

Abstract (20bold, caps, centered)

Content (12, justified)

Note: Entire document should be with 1.5 line spacing and all paragraphs should start with 1 tab space.

ACKNOWLEDGEMENT

(20, BOLD, ALL CAPS, CENTERED)

The acknowledgement should be in times new roman, 12 font with 1.5 line spacing, justified.

(Declaration page format)

DECLARATION (20 bold, centered, allcaps)

Content (12, justified)

I here by declare that the project entitled, "**Title of the Project**" done at **place where the project is done**, has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university.

The project is done in partial fulfillment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as final semester project as part of our curriculum.

Name and Signature of the Student

TABLE OF CONTENTS (20bold, caps, centered)

Should be generated automatically using word processing software.

Chapter 1: Introduction 01(no bold)
1.1 Background 02(no bold)
1.2 Objectives ….
1.3 Purpose and Scope ….
1.2.1Purpose ….
1.2.2Scope
……
……

Chapter 2: System Analysis
2.1 Existing System
2.2 Proposed System
2.3 Requirement Analysis
2.4 Hardware Requirements
2.5 Software Requirements
2.6 Justification of selection of Technology

Chapter 3: System Design
3.1 Module Division
3.2 Data Dictionary
3.3 ER Diagrams
3.4 DFD/UML Diagrams

Chapter 4: Implementation and Testing

4.1 Code (Place Core segments)
4.2 Testing Approach
4.2.1Unit Testing (Test cases and Test Results)
4.2.2 Integration System (Test cases and Test Results)

Chapter 5: Results and Discussions (Output Screens)
Chapter 6: Conclusion and Future Work
Chapter 7: References

List of Tables (20 bold, centered, Title Case)

Should be generated automatically using word processing software.

List of Figures (20 bold, centered, Title Case)

Should be generated automatically using word processing software.

(Project Introduction page format)

Chapter 1

Introduction (20 Bold, centered)

Content or text (12, justified)

Note: Introduction has to cover brief description of the project with minimum 4 pages.

Chapter 2

System Analysis (20 bold, Centered)

Subheadings are as shown below with following format (16 bold, CAPS)

2.1 Existing System (16 Bold)

2.1.1 ---------- (14 bold, title case)

2.1.1.1 ---------- (12 bold, title case)

2.2 Proposed System

2.3 Requirement Analysis

2.4 Hardware Requirements

2.5 Software Requirements

2.6 Justification of Platform – (how h/w & s/w satisfying the project)

Table 2.1: Caption

Chapter 3

System Design (20 bold, centered)

Subheadings are as shown below with following format (16 bold, CAPS)
Specify figures as Fig 11.1 – caption

3.1 Module Division
3.2 Data Dictionary
3.3 E-R Diagrams
3.4 Data Flow Diagrams / UML

Note: write brief description at the bottom of all diagrams

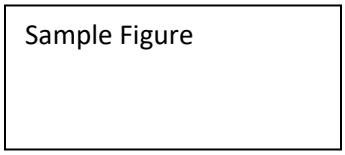

Fig. 3.1: Caption

Chapter 4

Implementation and Testing (20 bold, centered)

4.1 Code (Place Core segments)

Content includes description about coding phase in your project (Font-12)

(* don't include complete code-----just description)

4.2 Testing Approach

Subheadings are as shown below with following format (16 bold, CAPS)

4.2.1 Unit Testing

4.2.2 Integration Testing

Note:

- Explain about above testing methods
- Explain how the above techniques are applied in your project

Provide Test plans, test cases, etc relevant to your project

Chapter 5

Results and Discussions (20 bold, centered)

Note: Place Screen Shots and write the functionality of each screen at the bottom

Chapter 6

Conclusion and Future Work (20 bold, centered)

The conclusions can be summarized in a fairly short chapter around 300 words. Also include limitations of your system and future scope (12, justified)

Chapter 7

References (20 bold, centered)

Content (12, LEFT)

[1] Title of the book, Author

[2] Full URL of online references

[3] ----------

*** NOTE ABOUT PROJECT VIVA VOCE:**

Student may be asked to write code for problem during VIVA to demonstrate his coding capabilities and he/she may be asked to write any segment of coding used in the in the project. The project can be done in group of at most four students. However, the length and depth of the project should be justified for the projects done in group. A big project can be modularised and different modules can be assigned as separate project to different students.

Marks Distribution:

Semester V: 50 Marks

Documentation: 50 marks

Semester VI: 150 Marks

Documentation: 50 Marks:

Implementation and Viva Voce: 100 Marks

The plagiarism should be maintained as per the UGC guidelines.

University of Mumbai

AC 24-6-16
Item No. 4.81

Master of Commerce (M.Com) Programme
Two Year Integrated Programme - Four Semesters
Course Structure

Under Choice Based Credit, Grading and Semester *System*

To be implemented from Academic Year- 2016-2017 Progressively

Faculty of Commerce, University of Mumbai

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System
Course Structure

M.Com I

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Core Courses (CC)***		***1***	***Core Courses (CC)***	
1	Strategic Management	**06**	1	Research Methodology for Business	**06**
2	Economics for Business Decisions	**06**	2	Macro Economics concepts and Applications	**06**
3	Cost and Management Accounting	**06**	3	Corporate Finance	**06**
4	Business Ethics and Corporate Social Responsibility	**06**	4	E-Commerce	**06**
	Total Credits	**24**		**Total Credits**	**24**

M.Com II

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Elective Courses (EC)***		***1***	***Elective Courses (EC)***	
1,2 and 3	*Any one group of courses from the following list of the courses (Group – A/B/C/D/E)	**18**	1,2 and 3	**Any one group of courses from the following list of the courses (Group – A/B/C/D/E)	**18**
2	✓ ***Project Work***		***2***	✓ ***Project Work***	
4	Project Work - I	**06**	4	Project Work - II	**06**
	Total Credits	**24**		**Total Credits**	**24**

✓ ***Note:*** *Project work is considered as a special course involving application of knowledge in solving/ analyzing/ exploring a real life situation/ difficult problem. Project work would be of 06 credits. A project work may be undertaken in any area of Elective Courses*

1	**List of group of Elective Courses (EC) for Semester III (Any Three out of Five)*		*1*	*** List of group of Elective Courses (EC) for Semester IV (Any Three out of Five)*	
Group A: Advanced Accounting, Corporate Accounting and Financial Management					
1	Advanced Financial Accounting	**06**	1	Advanced Auditing	**06**
2	Corporate Financial Accounting	**06**	2	Indirect Tax	**06**
3	(Skill based) : Financial Management	**06**	3	International Financial Reporting Standards	**06**
4	Direct Tax	**06**	4	Personal Financial Planning	**06**
5	Financial Services	**06**	5	Financial Journalism	**06**
Group B: Business Studies (Management)					
1	Human Resource Management	**06**	1	Supply chain management and logistics	**06**
2	Rural Marketing	**06**	2	Advertising and sales Management	**06**
3	Entrepreneurial Management	**06**	3	Retail Management	**06**
4	Marketing Strategies and practices	**06**	4	Tourism Management	**06**
5	Organizational Behaviour	**06**	5	Management of Business Relations	**06**
Group C : Banking & Finance					
1	Banking Law and Practices	**06**	1	Cooperative Banking System	**06**
2	(Skill based) Legal framework of banking	**06**	2	Financial Institutions and Markets	**06**
3	Commercial Bank Management	**06**	3	Accounting and Auditing of Banking	**06**
4	Investment Management Analysis	**06**	4	International Finance	**06**
5	Financial Risk Management	**06**	5	Financial Services	**06**
Group D : E-Commerce					
1	Database Management System	**06**	1	E-Commerce Security and Law	**06**
2	Internet & Web-Designing (skill based)	**06**	2	Advance technology for E-Commerce	**06**
3	Network Infrastructure and Payment System	**06**	3	Management Information System	**06**
4	Logistic & supply chain Management in E-Commerce	**06**	4	Digital Marketing	**06**
5	Business Models in E-Commerce & ICT Applications	**06**	5	International Business, Law and Taxation	**06**

1	**List of group of Elective Courses (EC) for Semester III (Any Three out of Five)*		*1*	*** List of group of Elective Courses (EC) for Semester IV (Any Three out of Five)*	
Group E : Business Economics					
1	Economics of Growth and Development	**06**	1	Urban Economics	**06**
2	Applied Econometrics	**06**	2	Entrepreneurship and family business	**06**
3	Agriculture Economics	**06**	3	Indian Financial system	**06**
4	Monetary Economics	**06**	4	International Economics	**06**
5	Industrial Economics	**06**	5	Economics of Services	**06**
Note: Group selected in Semester III will continue in Semester IV					

University of Mumbai

Revised Syllabus
and
Question Paper Pattern
of Courses
of
Master of Commerce (M.Com)
Programme
at
Two Year
Semester I and II

Under Choice Based Credit, Grading and Semester System

(To be implemented from Academic Year- 2016-2017)

Faculty of Commerce, University of Mumbai

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

M.Com I

(To be implemented from Academic Year- 2016-2017)

No. of Courses	Semester I	Credits	No. of Courses	Semester II	Credits
1	***Core Courses (CC)***		***1***	***Core Courses (CC)***	
1	Strategic Management	**06**	1	Research Methodology for Business	**06**
2	Economics for Business Decisions	**06**	2	Macro Economics concepts and Applications	**06**
3	Cost and Management Accounting	**06**	3	Corporate Finance	**06**
4	Business Ethics and Corporate Social Responsibility	**06**	4	E-Commerce	**06**
	Total Credits	**24**		**Total Credits**	**24**

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester I

No. of Courses	Semester I	Credits
1	***Core Courses (CC)***	
1	Strategic Management	**06**
2	Economics for Business Decisions	**06**
3	Cost and Management Accounting	**06**
4	Business Ethics and Corporate Social Responsibility	**06**
	Total Credits	**24**

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester I
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

1. Strategic Management

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Strategic Management	15
2	Strategy Formulation, Implementation and Evaluation	15
3	Business, Corporate and Global Strategies	15
4	Emerging Strategic Trends	15
	Total	**60**

Objectives

SN	Objectives
1	To enable the learners to understand new forms of Strategic Management concepts and their use in business
2	To provide information pertaining to Business, Corporate and Global Reforms
3	To develop learning and analytical skills of the learners to enable them to solve cases and to provide strategic solutions
4	To acquaint the learners with recent developments and trends in the business corporate world

SN	Modules/ Units
1	**Introduction to Strategic Management**
	• Concept of Strategic Management, Strategic Management Process, Vision, Mission and Goals, Benefits and Risks of Strategic Management. • Levels of Strategies: Corporate, Business and Operational Level Strategy • Functional Strategies: Human Resource Strategy, Marketing Strategy, Financial Strategy , Operational Strategy • Business Environment: Components of Environment- Micro and Macro and Environmental Scanning
2	**Strategy Formulation, Implementation and Evaluation**
	• Strategic Formulation: Stages and Importance, Formulation of Alternative Strategies: Mergers, Acquisitions, Takeovers, Joint Ventures, Diversification, Turnaround, Divestment and Liquidation. • Strategic Analysis and Choice: Issues and Structures, Corporate Portfolio Analysis- SWOT Analysis, BCG Matrix, GE Nine Cell Matrix, Hofer's Matrix, • ETOP- Environmental Threat and Opportunity Profile, Strategic Choice- Factors and Importance. • Strategic Implementation: Steps, Importance and Problems, Resource Allocation- Importance & Challenges • Strategic Evaluation and Control: Importance, Limitations and Techniques • Budgetary Control: Advantages, Limitations
3	**Business, Corporate and Global Strategies**
	• Corporate Restructuring Strategies: Concept, Need and Forms, Corporate Renewal Strategies: Concept, Internal and External factors and Causes. • Strategic Alliance: Concept, Types, Importance, Problems of Indian Strategic Alliances and International Businesses • Public Private Participation: Importance, Problems and Governing Strategies of PPP Model. • Information Technology Driven Strategies: Importance, Limitations and contribution of IT sector in Indian Business
4	**Emerging Strategic Trends**
	• Business Process Outsourcing and Knowledge Process Outsourcing in India: Concept and Strategies. Reasons for growing BPO and KPO businesses in India. • Reengineering Business Processes- Business Reengineering, Process Reengineering and Operational Reengineering • Disaster Management: Concept, Problems and Consequences of Disasters, Strategies for Managing and Preventing disasters and Cope up Strategies. • Start-up Business Strategies and Make in India Model: Process of business start ups and its Challenges, Growth Prospects and government initiatives in Make in India Model with reference to National manufacturing, Contribution of Make in India Policy in overcoming industrial sickness

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester I
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

2. Economics for Business Decisions

Modules at a Glance

SN	Modules	No. of Lectures
1	Basic Principles in Business Economics	15
2	Demand and Supply Analysis	15
3	Production Decisions and Cost Analysis	15
4	Market Structure Analysis	15
	Total	**60**

Objectives

SN	Objectives
1	This course is designed to equip the students with basic tools of economic theory and its practical applications
2	The course aims at familiarising the students with the understanding of the economic aspects of current affairs and thereby prepares them to analyse the market behaviour with economic way of thinking
3	In addition to providing an insight into application of economic principles in business decisions, it also intends to widen analytical ability of the students and to provide them a foundation for further study of economics
4	In order to make the study practical oriented, the paper requires discussion of some cases involving the use of concepts of business economics

SN	Modules/ Units
1	**Basic Principles in Business Economics**
	• Meaning and scope of Business Economics - twin principles of scarcity and efficiency; incremental and Marginal principle; profit maximisation principle; market economy and invisible hand; production possibility frontier; Opportunity cost - accounting profit and economic profit; market failure, externality, public goods and economic role of Government
2	**Demand and Supply Analysis**
	• Determinants of demand - market demand function - theory of attributes, snob appeal, band wagon and Veblen effect and demand function. Law of supply- elasticity of supply • Applications of elasticity of demand and supply to economic issues: Paradox of bumper harvest- tax on price and quantity - minimum floor and maximum ceilings: minimum wages controversy and Administered price control • The theory of consumer choice - Consumer preference and budget constraint - equilibrium position of tangency with the help of Indifference curve analysis- effect of changes in price and income on consumer equilibrium
3	**Production decisions and Cost analysis**
	• Production function - short run and long run - Law of variable proportion, returns to scale, scale economies, scope economies- least cost factor combination for a given output- Expansion path and Multiproduct firm- cost reduction through experience - learning curve • Economic analysis of Cost: Classification of costs, short run and long run cost functions.
4	**Market structure analysis**
	• Difference between perfectly and imperfectly competitive markets -Perfect competition and Monopoly as limiting cases of market imperfections - Sources of market power - profit maximisation of simple and discriminating monopolist- methods of measuring monopoly power - Public policy towards monopoly power • Different forms of imperfect competition - Monopolistic competition and Oligopoly - Strategic decision making in oligopoly markets- collusive and non-collusive oligopoly- colliding oligopoly : rivalry among few, price war and kinked demand curve- collusive oligopoly models of price leadership and cartel - basic concepts of game theory - Using Game theory to analyse strategic decisions - application of model of prisoner's dilemma in market decisions

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester I
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

3. Cost and Management Accounting

Modules at a Glance

SN	Modules	No. of Lectures
1	Marginal Costing, Absorption Costing and Management Decisions	15
2	Standard Costing	15
3	Budgetary Control	15
4	Operating Costing	15
	Total	**60**

Objectives

SN	Objectives
1	To enhance the abilities of learners to develop the concept of Cost and management accounting and its significance in the business
2	To enable the learners to understand, develop and apply the techniques of costing in the decision making in the business corporates
3	To enable the learners in understanding, developing, preparing and presenting the financial report in the business corporates

SN	Modules/ Units
1	**Marginal Costing, Absorption Costing and Management Decisions**
	• Meaning of Absorption Costing - Distinction between Absorption Costing and Marginal Costing - Problems on Breakeven Analysis - Cost Volume Profit Analysis - Breakeven Charts - Contribution Margin and Various Decision Making Problems • Managerial Decisions through Cost Accounting such as Pricing Accepting Special Offer - Profit Planning - Make or Buy Decisions - Determining Key Factors - Determining Sales Mix - Determining Optimum Activity Level - Performance Evaluation - Alternative Methods of Production, Cost Reduction & Cost Control
2	**Standard Costing**
	• Standard Costing as an Instrument of Cost Control and Cost Reduction - Fixation of Standards - Theory and Problems based on Analysis of Variances of Materials, Labour Overheads and sales including Sub-variances
3	**Budgetary Control**
	• Budget and Budgetary Control - Zero Based Budget - Performance Budgets - Functional Budgets Leading to the Preparation of Master Budgets - Capital Expenditure Budget - Fixed and Flexible Budgets - Preparation of Different Types of Budgets
4	**Operating Costing**
	• Meaning of Operating Costing - Determination of Per Unit Cost - Collection of Costing Data - Practical Problems based on Costing of Hospital, Hotel and Goods & Passenger Transport

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester I
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

4. Business Ethics and Corporate Social Responsibility

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Business Ethics	15
2	Indian Ethical Practices and Corporate Governance	15
3	Introduction to Corporate Social Responsibility	15
4	Areas of CSR and CSR Policy	15
	Total	**60**

Objectives

SN	Objectives
1	To familiarize the learners with the concept and relevance of Business Ethics in the modern era
2	To enable learners to understand the scope and complexity of Corporate Social responsibility in the global and Indian context

SN	Modules/ Units
1	**Introduction to Business Ethics**
	• Business Ethics – Concept, Characteristics, Importance and Need for business ethics. Indian Ethos, Ethics and Values, Work Ethos, • Sources of Ethics, Concept of Corporate Ethics, code of Ethics-Guidelines for developing code of ethics, Ethics Management Programme, Ethics Committee. • Various approaches to Business Ethics - Theories of Ethics- Friedman's Economic theory, Kant's Deontological theory, Mill & Bentham's Utilitarianism theory • Gandhian Approach in Management and Trusteeship, Importance and relevance of trusteeship principle in Modern Business, Gandhi's Doctrine of Satya and Ahimsa, • Emergence of new values in Indian Industries after economic reforms of 1991
2	**Indian Ethical Practices and Corporate Governance**
	• Ethics in Marketing and Advertising, Human Resources Management, Finance and Accounting, Production, Information Technology, Copyrights and Patents • Corporate Governance: Concept, Importance, Evolution of Corporate Governance, Principles of Corporate Governance, • Regulatory Framework of Corporate Governance in India, SEBI Guidelines and clause 49, Audit Committee, Role of Independent Directors, Protection of Stake Holders, Changing roles of corporate Boards. • Elements of Good Corporate Governance, Failure of Corporate Governance and its consequences
3	**Introduction to Corporate Social Responsibility**
	• Corporate Social Responsibility: Concept, Scope & Relevance and Importance of CSR in Contemporary Society. • Corporate philanthropy, Models for Implementation of CSR, Drivers of CSR, Prestigious awards for CSR in India. • CSR and Indian Corporations- Legal Provisions and Specification on CSR, A Score Card, Future of CSR in India. • Role of NGO's and International Agencies in CSR, Integrating CSR into Business
4	**Areas of CSR and CSR Policy**
	• CSR towards Stakeholders-- Shareholders, Creditors and Financial Institutions, Government, Consumers, Employees and Workers, Local Community and Society. • CSR and environmental concerns. • Designing CSR Policy- Factors influencing CSR Policy, Role of HR Professionals in CSR • Global Recognitions of CSR- ISO- 14000-SA 8000 – AA 1000 – Codes formulated by UN Global Compact – UNDP, Global Reporting Initiative; major codes on CSR. • CSR and Sustainable Development • CSR through Triple Bottom Line in Business

Master of Commerce (M.Com) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2016-2017)

Semester II

No. of Courses	Semester II	Credits
1	***Core Courses (CC)***	
1	Research Methodology for Business	**06**
2	Macro Economics concepts and Applications	**06**
3	Corporate Finance	**06**
4	E-Commerce	**06**
	Total Credits	**24**

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester II
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

1. Research Methodology for Business

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Research	15
2	Research Process	15
3	Data Processing and Statistical Analysis	15
4	Research Reporting and Modern Practices in Research	15
	Total	**60**

Objectives

SN	Objectives
1	To enhance the abilities of learners to undertake research in business & social sciences
2	To enable the learners to understand, develop and apply the fundamental skills in formulating research problems
3	To enable the learners in understanding and developing the most appropriate methodology for their research
4	To make the learners familiar with the basic statistical tools and techniques applicable for research

SN	Modules/ Units
1	**Introduction to Research**
	• Features and Importance of research in business, Objectives and Types of research- Basic, Applied, Descriptive, Analytical and Empirical Research. • Formulation of research problem, Research Design, significance of Review of Literature • Hypothesis: Formulation, Sources, Importance and Types • Sampling: Significance, Methods, Factors determining sample size
2	**Research Process**
	• Stages in Research process • Data Collection: Primary data: Observation, Experimentation, Interview, Schedules, Survey, • Limitations of Primary data • Secondary data: Sources and Limitations, • Factors affecting the choice of method of data collection. • Questionnaire: Types, Steps in Questionnaire Designing, Essentials of a good questionnaire
3	**Data Processing and Statistical Analysis**
	• Data Processing: Significance in Research, Stages in Data Processing: Editing, Coding, Classification, Tabulation, Graphic Presentation • Statistical Analysis: Tools and Techniques, Measures of Central Tendency, Measures of Dispersion, Correlation Analysis and Regression Analysis. • Testing of Hypotheses – ▪ Parametric Test-t test, f test, z test ▪ Non-Parametric Test -Chi square test, ANOVA, Factor Analysis • Interpretation of data: significance and Precautions in data interpretation
4	**Research Reporting and Modern Practices in Research**
	• Research Report Writing: Importance, Essentials, Structure/ layout, Types • References and Citation Methods: ▪ APA (American Psychological Association) ▪ CMS (Chicago Manual Style) ▪ MLA (Modern Language Association) • Footnotes and Bibliography • Modern Practices: Ethical Norms in Research, Plagiarism, Role of Computers in Research

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester II
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

2. Macro Economics Concepts and Applications

Modules at a Glance

SN	Modules	No. of Lectures
1	Aggregate Income and its Dimensions	15
2	Keynesian concepts of Aggregate Demand (ADF), Aggregate Supply (ASF)	15
3	Economic Policy Implications in the IS-LM framework	15
4	International Aspects of Macroeconomic Policy	15
	Total	**60**

Objectives

SN	Objectives
1	The heavily application-oriented nature of macroeconomics course is introduced in order to enable the learners to grasp fully the theoretical rationale behind policies at the country as well as corporate level
2	This course the learners to receive a firm grounding on the basic macroeconomic concepts that strengthen analysis of crucial economic policies
3	Learners are expected to regularly read suggested current readings and related articles in the dailies and journals are analysed class rooms

SN	Modules/ Units
1	**Aggregate Income and its Dimensions**
	• Aggregate Income and its dimensions: National income aggregates - and measurement; - GNP, GDP, NDP, Real and nominal income concepts, measures of inflation and price indices - GDP deflator, - Nominal and real interest rates- PPP income and HDI
2	**Keynesian concepts of Aggregate Demand (ADF), Aggregate Supply (ASF)**
	• Keynesian concepts of Aggregate Demand (ADF), Aggregate Supply (ASF), Interaction of ADF and ASF and determination of real income; Inflationary gap • Policy trade- off between Inflation and unemployment – Phillips' curve – short run and long run
3	**Economic Policy Implications in the IS-LM framework**
	• The IS-LM model: Equilibrium in goods and money market; Monetary and real influences on IS-LM curves, Economic fluctuations and Stabilisation policies in IS-LM framework - Transmission mechanism and the crowding out effect; composition of output and policy mix, IS-LM in India
4	**International Aspects of Macroeconomic Policy**
	• International aspects of Macroeconomic policy: Balance of payments disequilibrium of an open economy - corrective policy measures -Expenditure changing policies and expenditure switching policies BOP adjustments through monetary and fiscal policies -The Mundell-Fleming model - Devaluation, revaluation as expenditure switching policies - effectiveness of devaluation and J - curve effect

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester II
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

3. Corporate Finance

Modules at a Glance

SN	Modules	No. of Lectures
1	Scope and Objectives of Financial Management	15
2	Time Value of Money	15
3	Financial Analysis - Application of Ratio Analysis in Financial Decision Making	15
4	Financial Decisions	15
	Total	**60**

Objectives

SN	Objectives
1	To enhance the abilities of learners to develop the objectives of Financial Management
2	To enable the learners to understand, develop and apply the techniques of investment in the financial decision making in the business corporates
3	To enhance the abilities of learners to analyse the financial statements

SN	Modules/ Units
1	**Scope and Objectives of Financial Management**
	• Introduction, Meaning, Importance, Scope, Objectives, Profit v/s Value Maximization
2	**Time Value of Money**
	• Concept, Present Value, Annuity, Techniques of Discounting, Techniques of Compounding, Bond Valuation and YTM
3	**Financial Analysis - Application of Ratio Analysis in Financial Decision Making**
	Management Analysis • Profitability Ratios: Gross Profit Ratio, Operating Profit Ratio, Return on Capital Employed • Efficiency Ratios: Sales to Capital Employed, Sales to Fixed Assets, Profit to Fixed Assets, Stock Turnover Ratio, Debtors Turnover Ratio, Creditors Turnover Ratio • Liquidity Ratios: Current Ratio, Quick Ratio • Stability Ratio: Capital Gearing Ratio, Interest Coverage Ratio • Investor's Analysis • Earnings per Share, P/E Ratio, Dividend Yield
4	**Financial Decisions**
	• Cost of Capital - Introduction, Definition of Cost of Capital, Measurement of Cost of Capital, WACC, Marginal Cost of Capital • Capital Structure Decisions - Meaning, Choice of Capital Structure, Importance, Optimal Capital Structure, EBIT-EPS Analysis, Cost of Capital, Capital Structure and Market Price of Share, Capital Structure Theories, Dividend Policy - Pay Out Ratio • Business Risk and Financial Risk - Introduction, Debt v/s Equity Financing, Types of Leverage, Investment Objective/Criteria for Individuals/Non-business Purpose

Revised Syllabus of Courses of
Master of Commerce (M.Com) Programme at Semester II
(To be implemented from Academic Year- 2016-2017)

Core Courses (CC)

4. E-Commerce

Modules at a Glance

SN	Modules	No. of Lectures
1	Introduction to Electronic Commerce –Evolution and Models	15
2	World Wide Web and E-enterprise	15
3	E-marketing and Electronic Payment System	15
4	Legal and Regulatory Environment and Security issues of E-commerce	15
	Total	**60**

Objectives

SN	Objectives
1	To provide an analytical framework to understand the emerging world of e-commerce
2	To make the learners familiar with current challenges and issues in e-commerce
3	To develop the understanding of the learners towards various business models
4	To enable to understand the Web- based Commerce and equip the learners to assess e-commerce requirements of a business
5	To develop understanding of learners relating to Legal and Regulatory Environment and Security issues of E-commerce

SN	Modules/ Units
1	**Introduction to Electronic Commerce –Evolution and Models**
	• Evolution of E-Commerce-Introduction, History/Evolution of Electronic Commerce, Roadmap of E-Commerce in India, Main activities, Functions and Scope of E-Commerce. • Benefits and Challenges of E-Commerce, E-Commerce Business Strategies for Marketing, Sales and Promotions. • Business Models of E-Commerce- Characteristics of Business to Business(B2B), Business to Consumers (B2C), Business to Government (B2G) • Concepts of other models of E-commerce. • Business to Consumer E-Commerce process, Business to Business E-Commerce-Need and Importance, alternative models of B2B E-Commerce. • E-Commerce Sales Product Life Cycle (ESLC) Model
2	**World Wide Web and E-enterprise**
	• World Wide Web-Reasons for building own website, Benefits of Website, Registering a Domain Name, Role of web site in B2C E-commerce; push and pull approaches; Web site design principles. • EDI and paperless trading; Pros & Cons of EDI; Related new technologies use in E-commerce. • Applications of E-commerce and E-enterprise - Applications to Customer Relationship Management- Types of E-CRM, Functional Components of E-CRM. • Managing the E-enterprise- Introduction, Managing the • E-enterprise, Comparison between Conventional and • E-organisation, Organisation of Business in an E-enterprise, Benefits and Limitations of E- enterprise
3	**E-marketing and Electronic Payment System**
	• E-Marketing- Scope and Techniques of E-Marketing, Traditional web promotion; Web counters; Web advertisements, Role of Social media. • E-Commerce Customer Strategies for Purchasing and support activities, Planning for Electronic Commerce and its initiates, The pros and cons of online shopping, Justify an Internet business. • Electronic Payment System-Characteristics of E-payment system, SET Protocol for credit card payment, prepaid e-payment service, post-paid E-payment system, Types of payment systems. • Operational, credit and legal risks of E-payment system, Risk management options for E-payment systems, Set standards / principles for E-payment

SN	Modules/ Units
4	**Legal and Regulatory Environment and Security issues of E-commerce**
	• Introduction to Cyber Laws-World Scenario, Cyber-crime& Laws in India and their limitations, Hacking, Web Vandals, E-mail Abuse, Software Piracy and Patents. • Taxation Issues, Protection of Cyber Consumers in India and CPA 1986, Importance of Electronic Records as Evidence. • Security Issues in E-Commerce- Risk management approach to Ecommerce Security - Types and sources of threats, Protecting electronic commerce assets and intellectual property. • Security Tools, Client server network security, Electronic signature, Encryption and concepts of public and private key infrastructure

Reference Books

Reference Books
Strategic Management
• *Strategic Management, A Dynamic Perspective -Concepts and Cases – Mason A. Carpenter, Wm. Gerard Sanders, Prashant Salwan, Published by Dorling Kindersley (India) Pvt Ltd, Licensees of Pearson Education in south Asia* • *Strategic Management and Competitive Advantage-Concepts- Jay B. Barney, William S. Hesterly, Published by PHI Learning Private Limited, New Delhi* • *Globalization, Liberalization and Strategic Management - V. P. Michael* • *Business Policy and Strategic Management – Sukul Lomash and P.K Mishra, Vikas Publishing House Pvt. Ltd, New Delhi* • *Strategic Management – Fred R. David, Published by Prentice Hall International* • *Business Policy and Strategic Management – Dr Azhar Kazmi, Published by Tata McGraw Hill Publications* • *Business Policy and Strategic Management- Jauch Lawrence R & William Glueck Published by Tata McGraw Hill* • *Public Enterprise Management and Privatisation – Laxmi Narain Published by S.Chand & Company Ltd, New Delhi* • *Business Organisation – Rajendra P. Maheshwari, J.P. Mahajan, Published by International Book House Pvt Ltd* • *Disasters and Development- Cuny Fred C, Published by Oxford University Press, Oxford* • *At Risks Natural Hazards, People's Vulnerability and Disasters- Wisner Ben P. Blaikie, T Cannon and I.davis, Published by Wiltshire Routledge* • *Mergers, Acquisitions and Corporate Restructuring – Strategies and Practices- Rabi Narayan Kar, Published by International Book House Pvt Ltd, Mumbai* • *Strategic Management- Awareness and Change, John. L. Thompson, Internal Thomson Business Press* • *Gaining and Sustaining Competitive Advantage, Jay B. barney, Eastern economy Edition, PHI Learning Pvt Ltd, New Delhi* • *Strategic Management by Prof N.H. Mullick, Enkay Publishing House New Delhi* • *Public Sector Perspective, by Dr M.Veerappa Moily* • *The Impact of Private sector participation in Infrastructure- Lights, shadows and the Road ahead by Andres, Luis, Guasch, luis, J. Thomas, Haven & Foster, World Bank, Washington*

Reference Books

Economics for Business Decisions

- *Salvatore, D.: Managerial Economics in a global economy (Thomson South Western Singapore, 2001)*
- *Frank Robert.H, Bernanke. Ben S., Principles of Economics (Tata McGraw Hill (ed.3)*
- *Gregory Mankiw., Principles of Economics, Thomson South western (2002 reprint)*
- *Samuelson & Nordhas.: Economics (Tata McGraw Hills, New Delhi, 2002)*
- *Hirchey .M., Managerial Economics, Thomson South western (2003)*
- *Mehta, P.L.: Managerial Economics – Analysis, Problem and Cases (S. Chand & Sons, N. Delhi, 2000)*
- *Koutsyiannis, A., Modern Microeconomics, Macmillan Press Ltd (1998 Reprint).*
- *Varian, Micro-Economic Analysis (ed. 3), Norton, 1992.*
- *Dean, Joel: Managerial Economics (Prentice Hall of India, N. Delhi, 2002)*
- *Gupta, G.S.: Managerial Economics (Tata McGraw Hill, N. Delhi, 1997)*
- *Sen Anindya, Micro -Economics: Theory and Applications, Oxford University Press, New Delhi, 1999.*
- *Economic and Political Weekly*
- *Indian Economic Review*
- *Financial Dailies*

Cost and Management Accounting

-

Business Ethics and Corporate Social Responsibility

- *Sharma J.P ' Corporate Governance, business ethics and CSR, Ane Books Pvt Ltd, New Delhi*
- *Sharma J.P. Corporate Governance and Social Responsibility of business, Ane Books Pvt ltd, New Delhi*
- *S.K.Bhatia, Business Ethics and Corporate Governance*
- *William Shaw, Business Ethics, Wordsworth Publishing Company, International Thomson Publishing Company.*
- *Corporate Crimes and Financial Frauds, Dr. Sumit Sharma, New Delhi India*
- *R.C. Sekhar, Ethical choices in Business, Sage Publications, New Delhi*
- *Business Ethics, Andrew Crane and Dirk Matten, Oxford University Press.*
- *Business Ethics, Text and Cases, C.S.V. Murthy, Himalaya Publication House.*
- *Mallin, Christine A. Corporate Governance (Indian Edition) Oxford University press. New Delhi*
- *Blow field ,Michael and Alan Murray, Corporate Responsibility, Oxford University Press,*
- *Philip Kotler and Nancy Lee, CSR : doing the most good for Company and your cause , Wiley 2005*
- *Beeslory, Michel and Evens, CSR , Taylor and Francis, 1978*
- *Subhabrata Bobby Banerjee, CSR: the good, the bad and the ugly. Edward Elgar Publishing 2007*
- *Joseph A. Petrick and John F. Quinn, Management Ethics- Integrity at work , Sage Publication , 1997*
- *Francesco Perrini, Stefano and AntanioTencati, Developing CSR- A European Perspective , Edward Elgar.*
- *William B. Werther, Jr. David Chandler, Strategic Corporate Social Responsibility, stakeholders' a global environment, Sage Publication, 2009.*
- *Ellington. J. (1998), Cannibals with forks: The triple bottom line of 21st Century business, New Society Publishers.*
- *Crane, A. Et al., (2008), The Oxford handbook of Corporate Social Responsibility, New York: Oxford University Press Inc.*

Reference Books

Reference Books
Research Methodology for Business
• *Research Methodology – Text and Cases with SPSS Applications, by Dr S.L. Gupta and Hitesh Gupta, International Book House Pvt Ltd* • *Business Research Methodology by T N Srivastava and Shailaja Rego, Tata Mcgraw Hill Education Private Limited, New Delhi* • *Methodology of Research in Social Sciences, by O.R. Krishnaswami, Himalaya Publishing House* • *Research Methodology by Dr Vijay Upagude and Dr Arvind Shende* • *Business Statistics by Dr S. K Khandelwal, International Book House Pvt Ltd* • *Quantitative Techniques by Dr S. K Khandelwal, International Book House Pvt Ltd* • *SPSS 17.0 for Researchers by Dr S.L Gupta and Hitesh Gupta, 2nd edition, Dr S. K Khandelwal, International Book House Pvt Ltd* • *Foundations of Social Research and Econometrics Techniques by S.C. Srivastava, Himalaya publishing House* • *Statistical Analysis with Business and Economics Applications, Hold Rinehart & Wrintston, 2nd Edition, New York* • *Business Research Methods, Clover, Vernon T and Balsely, Howard L, Colombus O. Grid, Inc* • *Business Research Methods, Emary C.Willima, Richard D. Irwin In. Homewood* • *Research Methods in Economics and Business by R. Gerber and P.J. Verdoom, The Macmillan Company, New York* • *Research and Methodology in Accounting and Financial Management, J.K Courtis* • *Statistics for Management and Economics, by Menden Hall and Veracity, Reinmuth J.E* • *Panneerselvam, R., Research Methodology, Prentice Hall of India, New Delhi, 2004.* • *Kothari CR, Research Methodology- Methods and Techniques, New Wiley Ltd., 2009*
Macro Economics concepts and Applications
• *Dornbusch. R, Fisher.S., Macroeconomics, Tata McGraw-Hill 9th edition* • *D'Souza Errol., Macroeconomics, Pearson Education 2008* • *Gupta G.S., Macroeconomics Theory and Applications, Tata McGraw-Hill, New Delhi 2001* • *Dwivedi D.N., Macroeconomics theory and policy, Tata McGraw-Hill, New Delhi 2001* • *Economic and Political Weekly* • *Indian Economic Review* • *Financial Dailies*
Corporate Finance

Reference Books
E-Commerce

- *Laudon, Kenneth C. and Carol Guercio Traver (2002) E-commerce: business, technology, society. (New Delhi : Pearson Educatin).*
- *Awad, Elias M. (2007), Electronic Commerce: From Vision to Fulfillment (NewDelhi : Pearson Education).*
- *Kalakota, Ravi and Marcia Robinson (2001). Business 2.0: Roadmap for Success (newDelhi : Pearson Education).*
- *Smith, P.R. and Dave Chaffey (2005), eMarketing eXcellence; The Heart of eBusiness (UK : Elsevier Ltd.)*
- *Vivek Sood Cyber Laws Simplified-TMH (2001)*
- *Vakul Sharma Handbook of cyber Laws-Macmillan (2002)*
- *Sundeep Oberol e Security and you-TMH (2001)*
- *Greenstein & Feinman Electronic Commerce-Security, Risk Mgt and Control-TMH (2000)*
- *Adam Nabll R. (Editor) Electronic Commerce: Technical Business and Legal Issues.*
- *Diwan, Prag and Sharma Electronic Commerce-a Manager's Guide to EBusiness*
- *Bharat Bhasker, Electronic Commerce – Frame work technologies and Applications, 3rd Edition- Tata McGrawHill Publications, 2008.*
- *Kamlesh K.Bajaj and Debjani Nag, Ecommerce- the cutting edge of Business, Tata McGrawHill Publications, 2008*
- *Kalakota et al, Frontiers of Electronic Commerce, Addison Wesley, 2004*
- *E- Commerce Strategies, Technology and applications (David) Tata McGrawHill*
- *Introduction to E-commerce (jeffrey) Tata- Mcgrawhill*
- *E-Business and Commerce- Strategic Thinking and Practice (Brahm) biztantra*
- *Web Technology : Ramesh Bangia*
- *HTML – The complete Reference :*
- *Gary Schneider, Electronic Commerce, Thomson Publishing.*
- *Pandey, Srivastava and Shukla, E-Commerce and its Application, S. Chand*
- *P.T. Joseph, Electronic Commerce – An Indian Perspective, P.H.I*
- *Turban, King, Viehland& Lee, Electronic Commerce- A Managerial Perspective, Pearson.*
- *IJECS International journal of Electronic Ecommerce StudiesISSN 2073-9729http://ijecs.academic-publication.org/*
- *Electronic Commerce Research and Applications ISSN: 1567-4223Editor-in-Chief: Robert Kauffman(http://www.journals.elsevier.com/electronic-commerce-research-and-applications)*
- *Journal of Electronic Commerce Research (JECR) ISSN: 1526-6133 (Online) 1938-9027 (Print) (http://web.csulb.edu/journals/jecr/a_j.htm)*

Scheme of Examination:

The performance of the learners will be evaluated in two components. One component will be the Internal Assessment component carrying 40% marks and the second component will be the Semester End Examination component carrying 60% marks.

Internal Assessment:

The Internal Assessment will consist of one class test of 40 marks for each course excluding projects. The question paper pattern will be shown as below:

Question Paper Pattern

(Internal Assessment)

Maximum Marks: 40 marks

Questions to be set: 03

Duration: 1½ hours

Question No	Particular	Marks
Q-1	Objective Questions Students to answer 10 sub questions out of 15 sub questions. *(*Multiple choice/ True or False/ Match the columns/ Fill in the blanks)* ***OR*** Objective Questions A) Sub Questions to be asked 08 and to be answered any 05 B) Sub Questions to be asked 08 and to be answered any 05 *(*Multiple choice/ True or False/ Match the columns/ Fill in the blanks)*	10 Marks
Q-2	Concept based short questions Students to answer 5 sub questions out of 8 sub questions.	10 Marks
Q-3	Practical problems or short questions Students to answer 02 sub questions out of 03 sub questions	20 Marks

Question Paper Pattern

(Practical Courses)

Maximum Marks: 60

Questions to be set: 04

Duration: 2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Practical Question	15 Marks
	OR	
Q-1	Practical Question	15 Marks
Q-2	Practical Question	15 Marks
	OR	
Q-2	Practical Question	15 Marks
Q-3	Practical Question	15 Marks
	OR	
Q-3	Practical Question	15 Marks
Q-4	Objective Question *(Multiple Choice/ True or False/ Fill in the Blanks/ Match the Columns/ Short Questions.)*	15 Marks
	OR	
Q-4	Short Notes *(Any three out of five)*	15 Marks

Note:

Full length question of 15 marks may be divided into two sub questions of 08 and 07 marks.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 60

Questions to be set: 04

Duration: 2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Full length Question	15 Marks
	OR	
Q-1	Full length Question	15 Marks
Q-2	Full length Question	15 Marks
	OR	
Q-2	Full length Question	15 Marks
Q-3	Full length Question	15 Marks
	OR	
Q-3	Full length Question	15 Marks
Q-4	Objective Question *(Multiple Choice/ True or False/ Fill in the Blanks/ Match the Columns/ Short Questions.)*	15 Marks
	OR	
Q-4	Short Notes *(Any three out of five)*	15 Marks

Note:

Full length question of 15 marks may be divided into two sub questions of 08 and 07 marks.

Sr. No	Particular
01	**Standard of Passing** The learner to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment & Semester End Examination. The learner shall obtain minimum of 40% marks (i.e. 16 out of 40) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 24 out of 60) separately, to pass the course and minimum of Grade E in the project component, wherever applicable to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment & Semester End Examination together.
02	**Allowed to Keep Terms (ATKT)** 1) A learner shall be allowed to keep term for Semester II irrespective of number of courses of failure in the semester I. 2) A learner shall be allowed to keep term for Semester III if he/she passes each of the semester I and Semester II OR a learner fails in not more than two courses of Semester I and not more than two courses of Semester II.

UNIVERSITY OF MUMBAI

Revised Syllabus for the
M.Sc. SemI/II/III/IV
Program: M.Sc.
Course : Bioanalytical Sciences

(Credit Based Semester and Grading System with effect from the academic year 2014–2015)

Preamble:

Indian Pharmaceutical industry:

Indian Pharmaceutical industry has long proved its mite both at national and international arena. With the WTO regime just rising in the horizon our pharma companies are in for a great boom especially in manufacturing and marketing generics which would be out of patent regime during 2005 to 2007. The market for these molecules is expected to be around 100 billion dollars. Even if our companies make a share of 01 % percent, substantial revenue is in the offering. Coupled with this they can strive to have few new molecules up their scheme

Ayurveda, Siddha and Unani (ASU) Medicines - Our rich heritage:

The Indian sub-continent houses one of the world's richest flora & fauna and has one of the world's oldest medicinal systems - Ayurveda. Ayurveda (Ayur - life; Veda - knowledge) is an encyclopedia of the Indian medicinal system, which has a history of over 3000 years. It reflects the law of nature, inherent to life of all living beings. Along with Ayurveda other systems of medicine like the folk medicines, Unani and Siddha are also being practiced in the subcontinent. Ayurveda, Unani and Siddha (ASU) medicines are quit popular among the Indians, and have been followed for over several hundred years.

Department of Indian Systems of Medicine and Homeopathy, Government of India recognizes Ayurveda, Siddha and Unani as standard systems of medicine. Having given the recognition and since these medicines are gaining the trust of people the world over, the Government is trying to implement regulatory guidelines to ensure consistent quality of efficacy & quality. Therefore, standardization of herbal medicines is the need of the hour. This will help not only lead to better acceptance of medicines of Indian systems by the people but will also help to bring these systems on par with the modern medicines where modern scientific principles and techniques are employed to ensure quality and efficacy of the drug formulations.

Inadequacy of Trained personnel:

Major hurdle faced by the R&D centers at various Pharma laboratories is the lack of adequately trained and GLP oriented personnel. This forms a major set back when the application of sophisticated technology especially in the bio analytical field is concerned. The lacunae become more evident when dealing with newer dosage forms and peptide based drugs.

Indian ASU formulations are already in great demand. There is, however, a dire need for standardization techniques based on modern instrumental procedures and principles. A major hurdle in achieving this is the lack of adequate expertise among the manufacturers of ASU drugs. The same inadequacy is seen even among the national laboratories and other Testing and research centers.

This lacunae needs to addressed very diligently and the proposed programme is a step in this direction. Bioanalytical evaluations are interdisciplinary programmes and require highly skilled personnel with strong background of Bio-analytical techniques. There is no programme available today for such a training to generate such expertise in analysts. Though industry uses sophisticated instruments in QC and drug development, there is a dire need of technical personnel with an overall expertise in various bioanalytical techniques including biological techniques to be able to take up R&D in newer formulations and standardization of ASU formulations to come up with meaningful evaluations.

Objectives of the Course

- Develop trained manpower in the field of Bio-analytical Sciences with specific emphasis for exploitation of ASU system of medicine as well as its need for changing trends of modern pharmaceutical Industries
- Amalgamate traditional analytical chemical techniques with modern genomic and proteomic technologies of manufacturing and analysis
- Introduce the powerful tools of informatics in routine use at manufacturing, QC and research.
- Exposure to National & International regulatory affairs with reference to drugs

M.Sc. Bioanalytical Sciences: SYLLABUS IN BRIEF

M.Sc. Semester - I

Paper	Code	Lectures	Credits	Code	Practical	Credits
Different Medicinal Systems, Pharmacognosy & Extraction Techniques	PSBN101	60	4	PSBNP101	60	2
GLP, Drug Act and Quality Management	PSBN102	60	4	PSBNP102	60	2
Chromatography and Spectroscopy-I	PSBN103	60	4	PSBNP103	60	2
Proteomics, Bioinformatics & Environmental Issues	PSBN104	60	4	PSBNP104	60	2
TOTAL		**240**	**16**		**240**	**8**
TOTAL CREDITS			**24**			

M.Sc. Semester - II

Paper	Code	Lectures	Credits	Code	Practical	Credits
Indian Pharmaceutical Industry, Phytochemistry & Extraction Techniques	PSBN101	60	4	PSBNP101	60	2
IPR and Patenting, Stability Studies and Packaging	PSBN102	60	4	PSBNP102	60	2
Chromatography and Spectroscopy-I	PSBN103	60	4	PSBNP103	60	2
New Drug Development, Immunoassays, Pharmacokinetics, Laboratory Safety Measures	PSBN104	60	4	PSBNP104	60	2
TOTAL		**240**	**16**		**240**	**8**
TOTAL CREDITS			**24**			

M.Sc. Semester –III

Note: Industrial Training will be for 8-12 weeks and may be spread out in Semester III and IV for a total of 4 credits.

Paper	Code	Lectures	Credits	Code	Practical	Credits
Basic Microbiology, Genomics, CE and Toxicology-I	PSBN301	60	4	PSBNP301	60	2
MS applications, Metabolite studies, Thermal Analysis and Tracer Techniques-I	PSBN302	60	4	PSBNP302	60	2
Standardization of ASU drugs, Statistics & GMP-I	PSBN303	60	4	PSBNP303	60	2
BA/ BE Studies, GCP and Method Validation-I	PSBN304	60	4	PSBNP304	60	2
TOTAL		**240**	**16**		**240**	**8**
TOTAL CREDITS			**24**			

M.Sc. Semester –IV

Note: Industrial Training will be for 8-12 weeks and may be spread out in Semester III and IV for a total of 4 credits.

Paper	Code	Lectures	Credits	Code	Practical	Credits
Basic Microbiology, Genomics, CE and Toxicology-II	PSBN401	60	4	PSBNP401	60	2
MS applications, Metabolite studies, Thermal AGenomics, CE and Toxicolognalysis and Tracer Techniques-II	PSBN402	60	4	PSBNP402	60	2#
Standardization of ASU drugs, Statistics & GMP-II	PSBN403	60	4	PSBNP403	60	2
BA/ BE Studies, GCP and Method Validation-II	PSBN404	60	4	PSBNP404	60	2
TOTAL		**240**	**16**		**240**	**8**
TOTAL CREDITS			**24**			

Distribution of Topics

M.Sc. Semester I

PSBN101-Different Medicinal Systems, Pharmacognosy & Extraction Techniques

101.1	Indian systems of Medicine (ASU) – Ayurveda, Siddha & Unani	(15)
101.2	Modern Medicine	(15)
101.3	Pharmacognosy	(15)
101.4	Principle of extraction and Isolation of analytes	(15)

PSBN102- GLP, Drug Act and Quality Management

102.1	Good Laboratory Practice (GLP)	(15)
102.2	Pharmacopeial standards and Testing Procedure	(15)
102.3	Drug Act & Regulations	(15)
102.4	Quality Control (QC) and Quality Assurance (QA)	(15)

PSBN103-Chromatography & Spectroscopy-I

103.1	Theory of Chromatographic separation and TLC	(15)
103.2	HPLC – 1	(15)
103.3	GC – I	(15)
103.4	Spectroscopy – I	(15)

PSBN104-Proteomics, Bioinformatics & Environmental Issues

104.1	OMICS	(15)
104.2	Electrophoresis	(15)
104.3	Bioinformatics	(15)
104.4	Environmental Issues of Bioanalytical laboratory	(15)

Distribution of Topics

M.Sc. Semester II

PSBN201-Indian Pharmaceutical Industry, Phytochemistry & Extraction Techniques

201.1	R and D in Pharma industry and Recent trends in Indian Pharmaceutical industry	(15)
201.2	Solid Phase Extraction (SPE)	(15)
201.3	Phytochemistry	(15)
201.4	Super Critical Fluid Extraction (SCFE) and SCFC (Super Critical Fluid Chromatography)	(15)

PSBN202- IPR and Patenting, Stability Studies and Packaging

202.1	IPR and Patenting- I	(15)
202.2	Stability Studies	(15)
202.3	IPR and Patenting -2	(15)
202.4	Packaging in Pharma industry	(15)

PSBN203- Chromatography & Spectroscopy-II

203.1	HPTLC	(15)
203.2	HPLC – 2	(15)
203.3	GC – II	(15)
203.4	Spectroscopy – II	(15)

PSBN204- New Drug Development, Immunoassays, Pharmacokinetics, Laboratory Safety Measures

204.1	NCE and its development into a New Drug and Enzymes	(15)
204.2	Immunoassay & ELISA	(15)
204.3	Basic Pharmacokinetics, pharmacodynamics and Drug properties	(15)
204.4	Laboratory Safety measures w.r.t handling of chemicals and biological materials	(15)

Distribution of Topics

M.Sc. Semester III

PSBN 301- Basic Microbiology, Genomics, CE and Toxicology-I

301.1	Basic Microbiology and Its application in Pharmaceuticals	(15)
301.2	Genomics	(15)
301.3	Basic and Regulatory Toxicology	(15)
301.4	Regulatory Microbiology and its application in Pharmaceutical and food industry	(15)

PSBN302- MS applications, Metabolite studies, Thermal Analysis and Tracer Techniques-I

302.1	MS basics	(15)
302.2	Hyphenation	(15)
302.3	Thermal Analysis	(15)
302.4	Analytical Methods	(15)

PSBN303- Standardization of ASU drugs, Statistics & GMP-I

303.1	Standardization of ASU drugs	(15)
303.2	General Statistical Methods	(15)
303.3	Concepts of Biostatistics	(15)
303.4	Good Manufacturing Practice	(15)

PSBN304- BA/ BE Studies, GCP and Method Validation-I

304.1	Ethical Issues in Clinical Trials	(15)
304.2	Good Clinical Practice (GCP) – 1	(15)
304.3	Bioavailability (BA) & Bioequivalence (BE) studies – 1	(15)
304.4	Analytical Method Validation	(15)

Distribution of Topics

M.Sc. Semester IV

PSBN401- Basic Microbiology, Genomics, CE and Toxicology-II

401.1	Bioassays in Pharmaceutical Evaluation	(15)
401.2	Polymerase Chain Reaction(PCR) & DNA fingerprinting	(15)
401.3	Automation and Analysis	(15)
401.4	Capillary Electrophoresis	(15)

PSBN402 MS applications, Metabolite studies, Thermal Analysis and Tracer Techniques-II

402.1	Applications of Quantitative Analysis	(15)
402.2	Applications of Qualitative Analysis	(15)
402.3	LC/MS/MS	(15)
402.4	Tracer Techniques in Bioanalytical assays	(15)

PSBN403- Standardization of ASU drugs, Statistics & GMP-II

403.1	Regulatory Aspects of ASU drugs	(15)
403.2	Environmental Safety in Bioanalytical laboratory	(15)
403.3	Electronic Data Management	(15)
403.4	Regulatory Issues	(15)

PSBN404- BA/ BE Studies, GCP and Method Validation-II

404.1	Therapeutic drug monitoring and Pharmacovigilance	(15)
404.2	Good Clinical Practice (GCP) – 2	(15)
404.3	Bioavailability (BA) & Bioequivalence (BE) studies – 2	(15)
404.4	QC and QA of ASU drugs	(15)

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

60 Lectures / paper/semester
SEMESTER I -Theory
PSBN101-Different Medicinal Systems, Pharmacognosy & Extraction Techniques
(Lecture allotment includes periods for Seminars and Discussions)

Module No.	Topics
101.1	Title: Indian systems of Medicine (ASU) – Ayurveda, Siddha & Unani (15) Subtopics: 1. Principles and practice 2. Types of Drug Formulation 3. Methods of Manufacture – Raw Material To Finished Product 4. Types of Drug 5. Excipients in various dosage form
101.2	Title: Modern Medicine (15) Subtopics: 1. Principles and practice 2. API and concept of its formulation into a dosage form 3. Different types Drug Formulations 4. Excipients in various dosage forms 5. Disease Management (Comparison of ASU and Modern Drugs) a. Diabetes b. Tuberculosis c. Hypertension d. Hepatitis e. Malaria f. Dengue g. Influenza
101.3	Title: Pharmacognosy (15) Subtopics: 1. Introduction, Plants and their medicinal uses example of one plant to be given 2. Concepts of ethanobotany, ethno medicines and pharmacology 3. Phytogeographical regions to be explained with respect to endemism and hot spots (explain only concepts) 4. Herbaria evaluation to include Plant collection, Authentication, storage and drying techniques. 5. Raw material evaluation to include Microbial load, Raw material characterization, proximate evaluation, photomicrography 6. Concepts of GAP and GHP for medicinal plants(only introduction)
101.4	Title: Principle of extraction and Isolation of analytes (15) Subtopics: 1. Introduction 2. Physico-chemical properties of drugs and solvents 3. Concept of partition & Partition Coefficient

	4. Solvent properties 5. Selection of solvent 6. Extraction efficiency 7. Introduction to classical methods of extraction 8. Introduction to modern methods of extraction- advantages & disadvantages - Include LLE (Soxhlet) and LME 9. Applications of extraction 10. Microwave assisted extraction its advantages and disadvantages 11. Ionization and its effect on the extraction of drugs 12. The 'First law of drug metabolism' 13. Matrix components & analyte isolation 14. Concentration of extracts 15. Isolations of fractions 16. Purification of isolate

PSBNP 101

- Liquid – liquid extraction of a modern drug from plasma and formulations (e.g. Diclofenac sodium, Glimiperide, Aceclofenac, Metformin etc.)

- Microscopic evaluation of sections and powders with adulteration and formulation comparision of the following medicinal plants;

1) Emblica officinalis – (Amla - dried fruit)
2) Vitex nigundo - Leaves
3) Asteracantha Longifolia – Whole plant
4) Calotropis gigantea – Leaves
5) Phyllanthus amarus – Whole plant

Calculation in terms of percent occurrence of key anatomical characteristics in the powder to be recorded.

- Individual student must report findings of ANY THREE from the above list but in each institution evaluation on all the listed plants must be carried out.

- Separation of plant pigments using paper chromatography

- Determination of sugars by descending paper chromatography.

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
SEMESTER I -Theory
PSBN102- GLP, Drug Act and Quality Management
(Lecture allotment includes periods for Seminars and Discussions)

102.1	Title: Good Laboratory Practice (GLP) (15) Subtopics: 1. What is GLP? 2. Practicing GLP 3. Guidelines to GLP 4. Documentation of Laboratory work 5. Preparation of SOPs

	6. Calibration records 7. significance of validation in GLP 8. Transfer of methods 9. Documentation of results
102.2	Title: Pharmacopeial standards and Testing Procedure (15) Subtopics: 1. Introduction to WHO guidelines 2. Introduction to Pharmacopoeias IP, BP, USP(JP, EP, AP where ever applicable) 3. Specified test in Monographs w.r.t liquid formulation (injectible) and solid dosage form (USP, EP, BP, IP) 4. Include AP, Indian HP and AFI (wherever applicable)
102.3	Title: Drug Act & Regulations (15) Subtopics: 1. Indian Drugs and Cosmetics Act w.r.t Schedule Y,M,H. Include Schedule A, S (introduction) 2.Introduction to foreign guidelines w.r.t US, EU, Australia & Japan 3. Introduction to CFR 21 part 11
102.4	Title: Quality Control (QC) and Quality Assurance (QA) (15) Subtopics: 1. Introduction 2. What is QC? What is QA? 3. Requirements for implementing QC & QA 4. QC & QA concepts in ASU drugs 5. Standardizing an Analytical method a. Preliminary requirements of a discriminatory quantitaion b. Detection of the analyte of interest c. Separation of analyte form the matrix components d. Sample preparation for quantitation 6. Factors for standardization a. Solid-phase extraction b. Extraction sequence c. Liquid/liquid extraction d. Quantification 7. Support work & documentation 8. Validation 9. Audit requirements ,audits and audit reports 10. Personnel Responsibility in QA

PSBNP 102

- Students must submit a Field Note Book of their field excursion including Presentation of the field visit
- Research Paper Review
- Carry out dissolution test, disintegration, hardness and friability on any one tablet preparation

- Modification by using Sodium dodecyl sulphate buffer and other buffer system (for water soluble and water insoluble drug). And With one modification that student should carry out tablet preparation with the help of IR Punch and then study all the test w.r.t. different parameters.

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
SEMESTER I –Theory
PSBN103-Chromatography & Spectroscopy-I
(Lecture allotment includes periods for Seminars and Discussions)

103.1	Title: Theory of Chromatographic separation and TLC (15) Subtopics: 1. Principles of chromatographic separation 2. Introduction to chromatographic separation techniques 3. Principles and Practice of TLC 4. Uses of TLC 5. Some recommended solvents systems Detection of compounds on TLC plates
103.2	Title: HPLC – 1 (15) Subtopics: 1. Principles and Instrumentation 2. The chromatographic process 3. The chromatogram 4. Separation mode 5. Column chemistry 6. System parameters 7. Reverse-phase HPLC 8. Introduction to various HPLC techniques; a. Ion-pair HPLC b. Ion-exchange HPLC c. Normal-phase HPLC d. Affinity Chromatography e. Gel permeation Chromatography 9. Recent advances (Fast LC, online extractions, add on pumps, online derivatization, multi dimensional LC)
103.3	Title: GC – I (15) Subtopics: 1. Principles and Instrumentation 2. Factors that affect the chromatographic separation (Temperature, Type of column etc.) 3. GC techniques 4. Types of columns and their application 5. Selection of liquid stationary phases (Packed and capillary columns) 6. GC hardware a. Introduction to flow and pressure controllers

	b. Injection techniques- on column injection, large volume injection, split -splitless, PTV and various auto injectors- gas sampling as well as liquid sampling c. Column Oven- temperature programming, (High /cryogenic oven temperature)
103.4	Title: Spectroscopy – I (15) Subtopics: 1. Introduction to atomic and molecular Spectroscopy 2. UV ,Visible and fluorescence i. Principles & Instrumentation ii. Applications 3. Nephalometry i. Principles & Instrumentation ii. Applications 4. Turbidometry i. Principles & Instrumentation ii. Applications 5. IR i. Principles & Instrumentation ii. Applications 6. Basic concepts of NMR spectroscopy

PSBNP 103

- Gas Chromatograhic separation of solvent mixtures (e.g. Menthol & Ethanol, Toluene & Methanol etc.)
- HPLC separation of herbal raw material from its formulation (e.g. Asteracantha longifolia from LUKOL / SPEMAN, Phyllanthus amarus from LIV 52, Tribulus terrestris from Ghokshuradi guggul etc.)
- HPLC separation of a modern drug from plasma and its formulations (e.g. Diclofenac sodium, Glimiperide, Aceclofenac, Metformin etc.)
- HPLC separation of modern drugs from their combination formulation (e.g. Diclofenac Sodium &Paracetamol, Metformin &Glimiperide etc.)
- Determination of Caffeine from a given sample by
  i) UV spectrophotometry
  ii)HPLC
- IR analysis of a modern drug (e.g. Diclofenac Sodium, etc.)
- Derivatisation in GC

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
SEMESTER I -Theory
PSBN104-Proteomics, Bioinformatics & Environmental Issues
(Lecture allotment includes periods for Seminars and Discussions)

104.1	Title: OMICS (15)

	Subtopics: 1. Introduction to Omics: a. Genomics b. Metabolomics c. Lipidomics d. Proteomics 2. Significance of proteome 3. Overview of proteomics a. Methods for cell disruption/protein extraction b. Protein purification/ Fractionation c. Protein identification and characterization 4. Modification of proteins (invitro/invivo) a. Post translational b. Chemical
104.2	Title: Electrophoresis (15) Subtopics: 1. Basic Protein Chemistry 2. Principles of electrophoretic separation 3. Equipment and process 4. Agarose gel electrophoresis 5. PAGE – Native & SDS, 2DGE, Extensions of Electrophoresis-Immunoelectrophoresis/pulsefield 6. Standardization of electrophoretic technique 7. Detection techniques 8. Applications of electrophoresis
104.3	Title: Bioinformatics (15) Subtopics: 1. What is bioinformatics? 2. Databases and Search Tools 3. Applications of bioinformatics a. Genomics b. Proteomics c. Drug discovery (Docking software) 4. Using various libraries & tools w.r.t structure/ literature to drug development/ proteins 5. Introduction to Chemi-informatics
104.4	Title: Environmental Issues of Bioanalytical laboratory (15) Laboratory Waste: Management, control and Regulatory issues 1. Introduction to types and sources of Laboratory waste 2. Chemical & Biological materials: Hazards and Handling 3. Hazard Controls & Information (*Workplace Hazardous Materials Information System {WHMIS} as example)* 4. Introduction to :

	• Chemical Storage and Segregation • Chemical Laboratory Emergency Response • Equipment Safety • Laboratory Inspections • Transportation and Receiving of Hazardous Materials 5. Regulations of Pollution Control Board for Laboratories.

PSBNP 104

- Separation of human serum / plasma proteins / egg white using PAGE((Protein molecular weight determination kit may be used)
- Evaluate the given data of protein and nucleic acid sequence using a global database with appropriate search engine / software (e.g. BIOEDIT). Prepare a report stating the steps involved and a brief analysis of the findings.
- Evaluate the given data of peptide sequence using a global database with appropriate search engine / software (e.g. BIOEDIT). Prepare a report stating the steps involved and a brief analysis on the functional annotation of the peptide.
- Bioinformatics : Clustal W. omega, BLAST A, Blast O, Fasta, Alignment, Prosite, SCOP, Rasmol, CATH, Identification of Protein,
- Separation of proteins using 2D gel electrophoresis
- Calculation of Ka, Ke, t ½, Cmax and Tmax from the given data (2 expts.)
- Protein profiling of plant seed by SDS-PAGE

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
60 Lectures / paper/semester
SEMESTER II-theory
PSBN201-Indian Pharmaceutical Industry, Phytochemistry & Extraction Techniques
(Lecture allotment includes periods for Seminars and Discussions)

201.1	Title: R and D in Pharma industry and Recent trends in Indian Pharmaceutical industry (15) Subtopics: 1. Historical background with emphasis on Post 1947 period 2. Market trends and activities 3. Govt. initiatives and the public sector in Pharmaceutical Industry 4. The role of Drug Pricing policy in India and its impact on the Indian Pharmaceutical Industry 5. Role of Analytical chemist in Pharmaceutical Industry 6. R&D strategies of Indian Pharma 7. Pharma R&D 8. Bulk Drug manufacturing & its R&D 9. Varied Dosage forms and its R&D
201.2	Title: Solid Phase Extraction (SPE) (15)

	Subtopics: 1. Introduction 2. General properties of bonded silica sorbents 3. Sorbent/analyte interactions 4. Sample pretreatment of different biological matrices 5. Developing SPE methods 6. Example of an SPE method (introduction of SPME) 7. Disc cartridges 8. 96-Well Format (e.g. Porvair Microsep TM system) 9. Direct injection of plasma 10. Other new developments
201.3	Title: Phytochemistry (15) Subtopics: 1) Natural drug substances from plants (primary and secondary metabolites) 2) Broad classification of secondary metabolites a. Nitrogenous b. Non nitrogenous c. Isoprenoids 3) Secondary drug metabolite production with special reference with integrated pathway 4) Key Factors affecting synthesis of secondary metabolites 5) Choice of solvent for extraction of phytoconstituents 6) Extraction Techniques of Crude plant material w.r.t 1)maceration(Types- Kwatha and Swarasa) 2)percolation 3)steam distillation
201.4	Title: Super Critical Fluid Extraction (SCFE) and SCFC (Super Critical Fluid Chromatography) (15) Subtopics: 1. The concept of SCFE & SCFC 2. Instrumentation of SCFE & SCFC 3. Factors affecting SCFE & SCFC 4. Benefits of SCFE & SCFC 5. Application of SCFE for natural products and Application of SCFC 6. Conclusions and future perspectives

PSBNP 201

- SPE of a modern drug from formulation (e.g. Atorvastatin, Diclofenac sodium, Sibutramine etc.
- SPE of a modern drug from plasma (e.g. Atorvastatin, Diclofenac sodium, Sibutramine etc.)
- Prepare specific reagents and conduct qualitative test for the presence of alkaloids, tannins, lignans, steroids and glycosides using TLC. Compare the results using standards (if available).
- Preparation of Herbarium of following medicinal plants;
  1) Asteracanthalongifolia
  2) Trigonellafoenum
  3) Clitoriaternatea
  4) Coriandrumsativum
  5) Achyranthusaspera
  6) Scopariadulcis
  7) Amaranthusspinosa
  8) Phyllanthusamarus
  9) Calotroprisgigantea
  10) Vitexnigundo

  Individual student must **submit** herbaria of ANY THREE from the above list but in each institution herbarium of all the listed plants must be prepared.
- Preparation of calibration graphs for Li, Na, and K by flame Photometry using their solutions of appropriate concentrations and studying interference of
  i) K in Na estimation
  OR
  ii) Na in Li estimation
  OR
  iii) Li in K estimation
- Determination of percentage purity of CaCO3/MgCO3 by
  i) Titrimetry
  ii) Complexometry
  iii) IE chromatography
- Comparison of classical and modern method of extraction of phytoconstituent of medicinal plants
- Effect of drying on phytoconstituents.(Terpenes, alkaloids, tannins
- Phytochemical variation within a species using HPLC/HPTLC

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
SEMESTER II-theory
PSBN202- IPR and Patenting, Stability Studies and Packaging
(Lecture allotment includes periods for Seminars and Discussions)

202.1	Title: IPR and Patenting- I (15) Subtopics: 1. Concept of IPR - Understanding the meaning of IPR & its significance in knowledge based economy. 2. Types of IPR - Patents, Trade Marks & Service Marks, Design Registration, Trade Secrets, Geographical indications, Protection of New Plant Varieties, Copyright. 3. Global Harmonization - Impact of IPR on global trade and the need for harmonization, WTO and its role in a global harmonization, TRIPS and introduction to the articles in TRIPs document as well as

	the flexibilities provided by TRIPS. 4. International Agreements related to IPR & patents - Paris Convention, PCT.
202.2	Title: Stability Studies (15) Subtopics: 1. Factors that influence stability of drug formulations 2. Types of Stability chambers and their design considerations 3. Stability issues of ASU raw materials and finished products 4. Guidelines on Stability evaluations 5. Approaches to stability studies of ASU formulations
202.3	Title: IPR and Patenting -2 (15) Subtopics: 1. Indian Patent Act - a. Criteria to be fulfilled for Patentability - new/novel, non-obvious/inventive step, useful/capable of industrial application. b. Non-patentable subject matter - what is not patentable. c. Concept of Mailbox and EMR and how it has helped India in its transition to full TRIPS compliance. d. Role of patentee and patent offices in patent management including lab documentation, confidentiality agreements, pre- and post-grant opposition, servicing of patents. e. Provisional Patents, Divisional Patents & Patents of Addition. 2. IPR as a strategic tool - a. Concepts of piracy, reverse engineering and knowledge worker. b. Benefits of creating and/or owning patents and other IPR. c. How India has leveraged the flexibilities provided by TRIPS to safeguard the industry and prevent ever-greening of patents. 3. IP clearance – Precautions before launching of product anywhere in the world - a. Concepts of Freedom to operate (FTO) search and analysis for patents, Exclusivity and SPC status check b. Other IPR checks like trademarks, copyrights (for printed data on leaflets, packages etc.), Putting IPR related disclaimers while advertising product list or selling products.
202.4	Title: Packaging in Pharma industry (15) Subtopics: 1. Introduction to Packaging 2. Fundamentals of Distribution 3. Packaging Forms & their Significance 4. Packaging Materials (covering basic mfg process, applications and significance) 5. Paper, Paper Board and CFB Glass,metals, Basic Polymer based materials, Polymer based composite materials 6. Ancillary Mats 7. Package Material Testing 8. Compatibility & Migration Studies 9. Accelerated Shelf Life Testing - Theory and Problems. 10. GMP 11. Packaging Validation 12. Packaging Laws and regulatory compliance

PSBNP 202

- Students must submit a Report of the Industrial Visits including Presentation of the industrial visit.
- Patent Claim Drafting
- Accelerated stability studies of various formulations or drugs with respect to Temperature (b) Effect of buffers / pH dependent (2 – 4 Expts.)
- Test for degradation of compounds using TLC for any two drugs.
- Stability testing of solution and solid dosage forms for photo degradation.(2 experiments).
- Effect of hydrogen peroxide, hydrochloric acid and sodium hydroxide solutions on the stability of drugs in solution at elevated temperatures and room temperature. (2 experiments).
- Stability studies of drugs in dosage forms at 25oC, 60% RH and 40oC, 75% RH and at different Pressure

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
SEMESTER II-theory
PSBN203- Chromatography & Spectroscopy-II
(Lecture allotment includes periods for Seminars and Discussions)

203.1	Title: HPTLC (15) Subtopics: 1. Principles and Instrumentation 2. HPTLC vs TLC 3. Densitometry & quantitaion in HPTLC 4. HPTLC in fingerprinting & QC 5. Troubleshooting 6. Applications of HPTLC
203.2	Title: HPLC – 2 (15) Subtopics: 1. Chiral HPLC 2. Column switching in HPLC 3. Gradient reverse-phase HPLC 4. Column conditions 5. automation in HPLC 6. HPLC detectors d. Introduction e. Principles of detection f. Universal and Specific a. Detectors g. Detector response h. Sensitivity considerations i. Selectivity 7. Manual and Electronic data Processing 8. Troubleshooting

	9. Applications of HPLC
203.3	Title: GC – II (15) Subtopics: 1. Universal and specific Detectors in GC (FID, TCD, ECD, FPD and NPD) 2. Derivatisation for GC 3. GC strategy for analysis involving biological matrices 4. Troubleshooting 5. Applications
203.4	Title: Spectroscopy – II (15) Subtopics: 1. Theory and applications of ; i. Circular Dichroism (CD) ii. Optical Rotary Dispersion (ORD) 2. Emission spectroscopy 3. Principles, instrumentation and applications of i. Flame photometry ii. Atomic Emission Spectroscopy 4. AAS i. Principles & Instrumentation ii. Applications 5. ICP i. Principles & Instrumentation ii. Applications 6. X – ray diffraction i. Principles & Instrumentation ii. Applications

PSBNP 203

- HPTLC separation of a modern drug from plasma and its formulations (e.g. Diclofenac sodium, Glimiperide, Aceclofenac, Metformin etc.)
- HPTLC fingerprinting of Herbal raw material (e.g. Asteracanthalongifolia, Ricinus cummunis, Calotropisgigantia)
- HPTLC detection of herbal raw material from its formulations (e.g. Asteracantha longifolia from LUKOL / SPEMAN, Vitexnigundo from PANCHGUN TAILA, Glycerrizhaglabra from ANU TAILA)
- Gas Chromatographic separation of solutes from their matrix (e.g. Diclofenac sodium from its formulation, Methanol from plasma etc.)
- Determination of Caffeine from a given sample by
  i) HPTLC

  ii) HPLC

  iii) UV

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES
SEMESTER II-theory
PSBN204- New Drug Development, Immunoassays, Pharmacokinetics, Laboratory Safety Measures
(Lecture allotment includes periods for Seminars and Discussions)

204.1	Title: NCE and its development into a New Drug and Enzymes (15) 1. What is NCE? 2. Stages in the development of NCE 3. Preclinical studies on NCE 4. Enzyme as Therapeutics agents, as diagnostics, as catalyst in processes as drug target
204.2	Title: Immunoassay & ELISA (15) Subtopics: 1. Introduction 2. Definitions 3. Theory 4. Requirements for immunoassay 5. Practical aspects 6. Data handling 7. Advantages of immunoassay 8. Principles and instrumentation in ELISA 9. Applications of ELISA 10. Types of Detection systems

204.3	Title: Basic Pharmacokinetics, pharmacodynamics and Drug properties (15) Subtopics: 1. Basic concepts of Pharmacokinetcs & pharmacodynamics 2. Different pharmacokinetic & pharmacodynamics parameters and their meanings 3. Basic techniques of evaluating Pharmacokinetic & pharmacodynamics parameters 4. Basic types of models in pharmacokinetics & pharmacodynamics 5. General classification of Drugs and their formulations 6. Drug – Route of entry, Absorption and Distribution with examples 7. Concepts of Drug Metabolism & elimination with examples 8. Adverse Drug reactions(ADRs) 9. Serious Adverse Events(SAEs)
204.4	Title: Laboratory Safety Measures w.r.t handling of chemicals and biological materials (15) Subtopics: 1. General Precautions ,labels and signage's 2. Material handling and disposal 3. Material Safety Data Sheets(MSDS) and SOP (Standard Operating Procedure) 4. Personal safety & Clothing 5. Levels of safety 6. Fire safety and fire fighting 7. Working in Biosafety Cabinets and hoods

PSBNP 204

- Immunoassay of HEPALISA in serum.
- Immunoassay for HCG in urine
- Immunoassay of T3 and T4 by RIA/IRMA
- Calculation of different Pharmacokinetic parameters like Ka, Ke, t½, C max, Tmax and AUC from the given blood data.

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES SEMESTER III-theory PSBN301- Basic Microbiology, Genomics, Capillary Electrophoresis and Toxicology – I (Lecture allotment includes periods for Seminars and Discussions)	
301.1	Title: Basic Microbiology and its application in pharmaceuticals (15) Subtopics: 1. Microbes & Their environment, Significance and scope of Microbiology, Biodiversity and types of Microorganisms, Visualization of Microorganisms : staining and Simple and compound microscopy, Electron Microscopy 2. Growth of Microorganisms, methods to study growth of microorganisms, preservation of microorganisms, maintenance media, etc 3. Sources of antimicrobial agents: plants and microorganisms, therapeutic Antimicrobial Agents e.g. Erythromycin, Amphotericin B, Cephalosporins and their commercial production, Antimicrobial Drug Resistance and Drug Discovery
301.2	Title: Genomics (15) Subtopics: 1. Nucleic Acid chemistry 2. Principles of DNA sequencing 3. DNA & RNA probes 4. Concepts of Gene manipulation (introduction only) 5. Restriction enzymes & their uses 6. Vectors & their uses 7. Producing Transgenic organisms 8. Hybridoma technology 9. cDNA production & applications 10. . Gene libraries & applications
301.3	Title: Basic and Regulatory Toxicology (15) Subtopics: 1. Introduction, scope and types of toxicological studies. 2. Toxicants, their route of entry, distribution 3. Metabolism & elimination of toxicants 4. Concept of LD50, ED50 Title: Regulatory Toxicology 5. Types of toxicity studies 6. Design considerations. 7. Evaluation of results 8. Extrapolation to man. 9. OECD Guidelines on Toxicological studies 10. Schedule Y and its interpretation.

301.4	Title: Regulatory Microbiology and its application in pharmaceutical and food industry (15) Subtopics: (New Addition) 1. Asepsis, Sterilization and Disinfection, concept of Death curve of microbial population, Aseptic filling in pharmaceutical industry, Classification Clean rooms / Clean areas, QA and QC in Microbiology Laboratory 2. Important Microbes for Food & Drug Industry, Pathogenic Organisms in Food & Pharma Industry 3. Sources of contamination, Microbial Contamination in ASU preparations 4. Regulatory Microbiological testing in pharmaceuticals 5. Microbiological Assays for pharmaceutical products

PSBNP 301

- Plant DNA extraction and separation using agarose Gel.
- DNA fingerprint (Genomic DNA isolation kit may be used) of two bacterial strains e.g. Resistant and wild strains of E. coli)
- Gram staining of bacteria and mounting of filamentous and non-filamentous fungi *(Staphylococcus aureus, E. coli, Candida albicans, Penicilliumsps, Lactobacillus sps etc.)*
- Sterility testing (Microbial load) of drug formulations (According to IP 2013)
- CCl4 liver dysfunction in rats and evaluation using liver function tests (An experimental comparison using suitable groups of controls, natural recovery and treatment with known hepatoprotectants to be carried out)
- LD 50 evaluation using a suitable model (e.g. *Daphnia* / rice weevil)
- Isolation & screening of industrially important microorganisms
- Sterility testing of laminar airflow bench top.
- Strain improvement by mutation (by UV radiation & Chemical mutagens)
- Central streak with Bacillus species isolated from soil

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER III-theory

PSBN302- MS Applications, Metabolite Studies, Thermal Analysis and Tracer Techniques - I
(Lecture allotment includes periods for Seminars and Discussions)

302.1	Title: MS basics (15) Subtopics: 1.MS 2. MS/MS, TQ/Ion Trap 3. Components: Inlets, Ion sources, Analyzers, Detectors, Vacuum System, etc Introduction

302.2	Title: Hyphenation (15) Subtopics: 1. LC/MS and LC/MS/MS 2. GC/MS and GC/MS/MS 3. Scan events in TQ and other tandem systems and hybrid systems 4. ICP/MS and its applications in pharmaceuticals and food 5. Recent advances in the field of mass spectrometry
302.3	Title: Thermal analysis (15) Subtopics: 1. Principles of Thermal Analysis 2. Instrumentation Requirements 3. Applications of Thermal Analysis 4. Thermal analysis of Bhasma preparations 5.Thermal Analysis Techniques
302.4	Title: Analytical Methods (15) Subtopics: 1. Method development and applications 2. Sample preparation 3. Headspace GC and GC-MS

PSBNP 302

- LC/MS quantitation of a modern drug (e.g. Diclofenac Sodium, Ezetimibe etc.)
- GC/MS separation of plant essential oil (Demonstration)
- LC/MS/MS qunatitation of a modern drug from plasma (e.g. Diclofenac Sodium)
- LC/MS/MS quantitation of meatbilite of a modern drug from plasma (eg. Mycopenolic acid, metabolite of Mycophenolatemofitil)
- Mass Fingerprinting of peptides using a suitable sample.

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER III-theory

PSBN303- Standardization of ASU Drugs, Statistics and GMP - I

(Lecture allotment includes periods for Seminars and Discussions)

303.1	Title: Standardization of ASU drugs (15) Subtopics: 1. Need of standardization of Ayurvedic drugs

	2. What does standardization involve? 3. Bioanalytical tools for standardization 4. Clinical studies in Standardization 5. Approaches to standardization; 6. Raw materials 7. In-process materials 8. Finished products 9. Developing standardized QC methods 10. Shelf life studies on finished products
303.2	Title: General Statistical Methods (15) Subtopics: 1. Basic concepts of sample statistics 2. Concept of sample size and power 3. Concept of ramdomisation and sampling techniques 4. Concept of significance and confidence limits 5. Introduction to Various statistical tests - parametric and non parametric 6. Use of Statistical Packages for Data evaluation 7.Concept of random sampling and sampling techniques 8. Concept of level of significance, power of test and confidence limits 9.Concept of sample size 10.Application of normal distribution
303.3	Title: Concepts of Biostatistics (15) Subtopics: 1. Statistical approach to biological samples 2. Variations in biological samples & their statistical treatment 3. Introduction to Data collection techniques 4. Design of experiments with eg. Block designs, Latin square 5. COV and ANOVA 6. Student's t test and F test 7. Regression analysis with application to Std Graph 8. Non parametric tests with examples 9. Statistical Guidance from regulatory agencies 10. . Student's T test, chi square test, Z test and F test 11.Single sample and two sample Non parametric tests with examples 12.Use of statistical packages for data analysis (SPSS software)
303.4	Title: Good Manufacturing Practice (15) Subtopics: 1. What is GMP? 2. Requirements of GMP implementation 3. Documentation of GMP practices 4. Regulatory certification of GMP 5. GMP in production of ASU drugs 6. Harmonization of SOP of manufacture 7. Audit for GMP compliances

PSBNP 303

- The project should involve industrial training of 8 to 12 weeks period. Data evaluation must involve application of biostatistics

- Problem based on Biostatistics

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER III-theory

PSBN304- BA/BE Studies, GCP and Method Validation - I

(Lecture allotment includes periods for Seminars and Discussions)

304.1	Title: Ethical Issues in Clinical Trials (15) Subtopics: 1. Origin of Ethical Issues 2. Dealing with Ethical issues 3. Ensuring compliance to ethical issues 4. Ethical Committees & their set up 5. Regulatory powers of ethical committees 6. Ethical issues in animal studies 7.Compliance to ethical guidelines 8.Dealing with Ethical issues (subject compensation and subject rights) 9. Compliance to current ethical guidelines
304.2	Title: Good Clinical Practice (GCP) – 1 (15) Subtopics: 1. What is GCP? 2. Origin of GCP 3. Earlier Guidelines for GCP 4. Requirements of GCP compliance
304.3	Title: Bioavailability (BA) & Bioequivalence (BE) studies – 1 (15) Subtopics: 1. What is BA? 2. Parameters to evaluate BA of a drug 3. Factors that influence BA of a drug 4. Evaluating BA of a drug 5. Estimating BA parameters of a drug 6. What is BE? 7. Parameters to evaluate BE of a drug 8. Factors that influence BE of a drug 9. Evaluating BE of a drug 10. Estimating BE parameters of a drug

304.4	Title: Analytical Method Validation (15) Subtopics: 1. Strategies for Method development 2. What and Why of method validation 3. Regulatory requirements of validation 4. IQ, OQ and PQ of analytical instruments 5. Use of Reference standards 6. Issues of Method transfer 7. Intra and inter lab – Validation 8. Sampling 9. Calibration of glassware and instruments, concepts of Good weighing Practice 10. Use of Reference standards and working standards 11. format of Certificate of Analysis

PSBNP 304

- Determination of iron from a given sample / sample solution by
  i) Redox titration
  ii)Colorimetry
  iii)Atomic Absorption Spectroscopy

- Study of matrix effect on IR spectra using solution IR technique and quantitate the solutefrom a given sample. Identify solute from a given solution using IR library and carry out quantitative assay.

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER IV-theory

PSBN401- Basic Microbiology, Genomics, Capillary Electrophoresis and Toxicology – I
(Lecture allotment includes periods for Seminars and Discussions)

401.1	Title: Bio assays in Pharmaceutical evaluation (15) Subtopics: 1. General idea about bio assay systems used in pharmaceutical evaluations 2. In vitro assays and in vivo assays 3. Ethical issues of using animal assay systems 4. Alternatives to animal assays – one or two examples
401.2	Title: Polymerase Chain Reaction (PCR) & DNA Fingerprinting (15) Subtopics: 1. Types of PCR & its applications 2. DNA amplification w.r.t its applications 3. DNA fingerprinting and applications 4. Use of genomic techniques in diagnostics

401.3	Title: Automation and analysis (15) Subtopics: 1. Automation and its advantages in sample preparation 2. Automation in bioanalysis 3. Advanced automated liquid handling systems 4. Robotic Workstations 5. High throughput Screening
401.4	Title: Capillary Electrophoresis (15) Subtopics: 1. Introduction 2. How capillary electrophoresis works 3. Why capillary electrophoresis works 4. CE hardware Use in bioanalysis

PSBNP 401

- CE separation of a modern drug from plasma and its formulation (e.g. DFS)
- CE separation of peptides (e.g. erythropoietin as per E.P.)
- CE separation of N. Acids
- PCR (PCR Kit may be used) for Plant DNA and RFLP (RFLP kit may be used) (e.g. *Phyllanthus*sps.)
- DNA sequencing using sample from a suitable organism

  OR
- Identification of Genetically Modified Organism (GMO identification kit may be used)
- Blue white screening of mutated organism
- Serum levels of drug attained by agar cup method
- Zone of inhibition assay for penicillin (using spiked plasma and formulation)
- Zone of exhibition assay for Vitamin B12

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER IV-theory

PSBN402- MS Applications, Metabolite Studies, Thermal Analysis and Tracer Techniques - I
(Lecture allotment includes periods for Seminars and Discussions)

402.1	Title: Applications of Quantitative Analysis (15) 1.SM quantitation for e.g.

	2. Macromolecule quantitation for e.g
402.2	Title: Applications of Qualitative Analysis (15) Subtopics: 1. Technique of generating drug metabolites 2. Metabolite Identification 3. Impurity profiling
402.3	Title: LC/MS/MS (15) Subtopics: 1. Impurity profile in drugs and drug products 2. Proteomics 3. Pesticides, pesticide residues in food
402.4	Title: Tracer techniques in Bioanalytical assays (15) Subtopics: 1. Concept of Radioactivity & Half life 2. ∝ , β, γ emitters and their biological applications 3. Using tracers in assays 4. Detectors and counters 5. Concept of autoradiography 6. Radio labeled probes and their uses

PSBNP 402

- The project should involve preparation of herbal formulations and standardization Student can work on one of the following formulation

1. Any oil based preparation or ayurvedictaila preparation
2. Any vatti(Ayurvedic) or Guliga(Siddha)
3. Awahela (semi-solid,jiggery/sugar syrup based formulation)
4. Any preparation from unani e.g. Saffoof, Jawarish, Majoon.

Students should involve any modern chromatographic techniques,microscopic evaluation, chemical and physical tests for QC of formulation prepared.

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER IV-theory

PSBN403- Standardization of ASU Drugs, Statistics and GMP - I
(Lecture allotment includes periods for Seminars and Discussions)

403.1	Title: Regulatory Aspects of ASU drugs (15) Subtopics: 1. National initiatives for regulation of ASU drugs 2. Schedule T and Schedule Y of Drugs and Cosmetics Act 3. International initiatives for regulation of ASU drugs with special reference to - WHO guidelines on traditional medicine - Approaches of US and EU to ASU drug regulation 4. Provisions of Drugs and Cosmetics Act applied to ASU (e.g. Schedule T and Y)
403.2	Title: Environmental Safety in Bioanalytical laboratory (15) Subtopics: • Strategies to reduce environmental impact of Bioanalytical laboratory • Standards of Laboratory Safety (Including Biosafety Levels) • Overview of guidelines for laboratories handing Radioactive substances • Introduction to ISO 14001 and OSHAS 18001. • Introduction to Environment Impact Assessment & Reporting • Biodiversity: Red Data Book, Endemic and endangered Medicinal Plant Species, Conservation and sustainable use of medicinal raw materials, Introduction to Wildlife Act of India & CITES • Carbon footprints and Carbon credits.
403.3	Title: Electronic Data Management (15) Subtopics: 1. Electronic Acquisition of data 2. Management of data in Computers 3. Electronic Data Validation and regulatory requirements 4. Electronic signatures & its regulation 5. Generating reports using computers 6. Regulatory requirements of Data evaluation
403.4	Title: Regulatory Issues (15) Subtopics: 1. OTC drugs 2. Cosmetics 3. Food supplements 4. Nutraceuticals w.r.t. FSSI regulations

PSBNP 403

- IR patterns of an Ayurvedic Bhasma preparation (e.g. calcium containing shanka bhasma – comparison with pure $CaCO_3$ and formulations like Calcium supplement tablets)
- AAS of a suitable Ayurvedic metal bhasma preparation (e.g Tamara bhasma) / Paracetamol

- Environment audit report
- Problem based on calculation of carbon credit and carbon footprint

DETAILED SYLLABUS FOR M. Sc. BIOANALYTICAL SCIENCES

SEMESTER IV-theory

PSBN404- BA/BE Studies, GCP and Method Validation - I

(Lecture allotment includes periods for Seminars and Discussions)

404.1	Title: Therapeutic drug monitoring and Pharmacovigilance (15) Subtopics: 1. Purpose of therapeutic Drug Monitoring 2. Bioanalytical techniques in TDM 3. Analytical and practical issues of TDM 4. Pharmacoeconomics of TDM 5. Significance and need for Pharmacovigilance 6. Indian scenario and the role of regulatory in Pharmacovigilance 7. Pharmacovigilance and safe use of medicines (with case studies)
404.2	Title: Good Clinical Practice (GCP) – 2 (15) Subtopics: 1. GCP guidelines of ICH 2. GCP guidelines of ICMR 3. Ensuring GCP 4. Documentation of GCP practice 5. Audit of GCP compliance
404.3	Title: Bioavailability (BA) & Bioequivalence (BE) studies – 2 (15) Subtopics: 1. Design of a BA study 2. Conduct of a BA study 3. Data collection and evaluation 4. Reporting a BA study 5. Regulatory requirements of BA 6. Design of a BE study 7. Conduct of a BE study 8. Regulatory requirements of BA and BE 9. Data record and evaluation 10. Estimating Pharmacokinetic parameters 11. Assessment of Bioequivalence 12. Regulatory requirements and their compliance in pharmacokinetics
404.4	Title: QC and QA of ASU drugs (15) Subtopics: 1. Herbal pharmacopoeia and Ayurvedic Formulary of India

	2. Approaches to Quality control of ASU formulations 3. Govt initiatives 4. Some Initiatives from manufacturers 5. QC of RM and In-process materials (some examples) 6. QC / OA for finished products (some examples) 7. Applications of Herbal pharmacopoeia and Ayurvedic Formulary of India 8. Recent advances in Quality control of ASU formulations 9. QC / OA for finished products (some examples like Taila, Vati, Churna, Sufoof, Jawarish, Majoon,etc.))

PSBNP 404

- BA & BE of a modern drug (Demonstration – witnessing an actual trial)
- Calculation of AUC and bioequivalence from the given data (2 expts.)
- Total viable count of herbal formulations/raw material
- Screening of pathogens from herbal formulation/raw material (*E.coli, S. aureus, Candida albicans*)

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University of Mumbai

No. UG/ 106 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges, the Head of the University Department and Directors of the recognized Institutions in Science & Technology Faculty is invited to the syllabus uploaded by Academic Authority Unit which was accepted by the Academic Council at its meeting held on 27th February, 2013 **vide** item No. 4.133 relating to the revised syllabus as per (CBSGS) for M.Sc. Information Technology (Sem. I & II).

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in Information & Technology at its meeting held on 25th July, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 **vide** item No.4.76 and that in accordance therewith, the revised syllabus as per the (CBCS) for the M.Sc. (I. T.) (Part – I) (Sem.-I & II) has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
11th September, 2019

(Dr. Ajay Deshmukh)
REGISTRAR

To

The Principals of the affiliated Colleges, the Head of the University Department and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.76/26/07/2019

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No. UG/ 106 -A of 2019-20 MUMBAI-400 032 11th September, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Information & Technology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)
REGISTRAR

Cover Page

AC 26/07/2019
Item No. 4.76

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	M.Sc in Information Technology Part I
2	Eligibility for Admission	B.Sc(IT), B.Sc(CS), B.E, BCA (Sem I & II) B.Sc(Phy), B.Sc(Maths), B.Sc(Stats) B.Sc(Electronics)
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	-
5	No. of Years / Semesters	Two Years - Four Semesters
6	Level	P.G. / ~~U.G.~~ / ~~Diploma~~ / ~~Certificate~~ (Strike out which is not applicable)
7	Pattern	~~Yearly~~ / Semester (Strike out which is not applicable)
8	Status	~~New~~ / Revised (Strike out which is not applicable)
9	To be implemented from Academic Year	From Academic Year 2019-2020

Date: 25/7/19

Signature :

Name of BOS Chairperson / ~~Dean~~ : Dr. (Mrs.) R. Srivaramangai

rsrimangai@udct.mu.ac.in

Rajan
(for R. G. Deshmukh)
25/7/19

Academic Council: 26/07/2019

Item No: 4.76

UNIVERSITY OF MUMBAI

Syllabus for M.Sc. Part I (Semester I and II)

Programme: M.Sc.

Subject: Information Technology

(Choice Based Credit System with effect from the academic year 2019 – 2020)

Semester – I		
Course Code	**Course Title**	**Credits**
PSIT101	Research in Computing	4
PSIT102	Data Science	4
PSIT103	Cloud Computing	4
PSIT104	Soft Computing Techniques	4
PSIT1P1	Research in Computing Practical	2
PSIT1P2	Data Science Practical	2
PSIT1P3	Cloud Computing Practical	2
PSIT1P4	Soft Computing Techniques Practical	2
	Total Credits	**24**

Semester – II		
Course Code	**Course Title**	**Credits**
PSIT201	Big Data Analytics	4
PSIT202	Modern Networking	4
PSIT203	Microservices Architecture	4
PSIT204	Image Processing	4
PSIT2P1	Big Data Analytics Practical	2
PSIT2P2	Modern Networking Practical	2
PSIT2P3	Microservices Architecture Practical	2
PSIT2P4	Image Processing Practical	2
	Total Credits	**24**

Program Specific Outcomes

PSO1: Ability to apply the knowledge of Information Technology with recent trends aligned with research and industry.

PSO2: Ability to apply IT in the field of Computational Research, Soft Computing, Big Data Analytics, Data Science, Image Processing, Artificial Intelligence, Networking and Cloud Computing.

PSO3: Ability to provide socially acceptable technical solutions in the domains of Information Security, Machine Learning, Internet of Things and Embedded System, Infrastructure Services as specializations.

PSO4: Ability to apply the knowledge of Intellectual Property Rights, Cyber Laws and Cyber Forensics and various standards in interest of National Security and Integrity along with IT Industry.

PSO5: Ability to write effective project reports, research publications and content development and to work in multidisciplinary environment in the context of changing technologies.

SEMESTER I

M. Sc (Information Technology)		Semester – I	
Course Name: Research in Computing		**Course Code: PSIT101**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To be able to conduct business research with an understanding of all the latest theories. • To develop the ability to explore research techniques used for solving any real world or innovate problem.

Pre requisites	Basic knowledge of statistical methods. Analytical and logical thinking.

Unit	Details	Lectures
I	**Introduction:** Role of Business Research, Information Systems and Knowledge Management, Theory Building, Organization ethics and Issues	**12**
II	**Beginning Stages of Research Process:** Problem definition, Qualitative research tools, Secondary data research	**12**
III	**Research Methods and Data Collection:** Survey research, communicating with respondents, Observation methods, Experimental research	**12**
IV	**Measurement Concepts, Sampling and Field work:** Levels of Scale measurement, attitude measurement, questionnaire design, sampling designs and procedures, determination of sample size	**12**
V	**Data Analysis and Presentation:** Editing and Coding, Basic Data Analysis, Univariate Statistical Analysis and Bivariate Statistical analysis and differences between two variables. Multivariate Statistical Analysis.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Business Research Methods	William G.Zikmund, B.J Babin, J.C. Carr,	Cengage	8e	2016

		Atanu Adhikari, M.Griffin			
2.	Business Analytics	Albright Winston	Cengage	5e	2015
3.	Research Methods for Business Students Fifth Edition	Mark Saunders			2011
4.	Multivariate Data Analysis	Hair	Pearson	7e	2014

M. Sc (Information Technology)		**Semester – I**	
Course Name: Research in Computing Practical		**Course Code: PSIT1P1**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	A learner will be able to: □ solve real world problems with scientific approach. □ develop analytical skills by applying scientific methods. □ recognize, understand and apply the language, theory and models of the field of business analytics □ foster an ability to critically analyze, synthesize and solve complex unstructured business problems □ understand and critically apply the concepts and methods of business analytics □ identify, model and solve decision problems in different settings □ interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity □ create viable solutions to decision making problems

M. Sc (Information Technology)		Semester – I	
Course Name: Data Science		**Course Code: PSIT102**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Develop in depth understanding of the key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling, and statistics. • Practice problem analysis and decision-making. • Gain practical, hands-on experience with statistics programming languages and big data tools through coursework and applied research experiences.

Pre requisites	Basic understanding of statistics

Unit	Details	Lectures
I	**Data Science Technology Stack:** Rapid Information Factory Ecosystem, Data Science Storage Tools, Data Lake, Data Vault, Data Warehouse Bus Matrix, Data Science Processing Tools ,Spark, Mesos, Akka , Cassandra, Kafka, Elastic Search, R ,Scala, Python, MQTT, The Future **Layered Framework:** Definition of Data Science Framework, Cross-Industry Standard Process for Data Mining (CRISP-DM), Homogeneous Ontology for Recursive Uniform Schema, The Top Layers of a Layered Framework, Layered Framework for High-Level Data Science and Engineering **Business Layer:** Business Layer, Engineering a Practical Business Layer **Utility Layer:** Basic Utility Design, Engineering a Practical Utility Layer	**12**
II	**Three Management Layers:** Operational Management Layer, Processing-Stream Definition and Management, Audit, Balance, and Control Layer, Balance, Control, Yoke Solution, Cause-and-Effect, Analysis System, Functional Layer, Data Science Process **Retrieve Superstep :** Data Lakes, Data Swamps, Training the Trainer Model, Understanding the Business Dynamics of the Data Lake, Actionable Business Knowledge from Data Lakes, Engineering a Practical Retrieve Superstep, Connecting to Other Data Sources,	**12**
III	**Assess Superstep:** Assess Superstep, Errors, Analysis of Data, Practical Actions, Engineering a Practical Assess Superstep,	**12**

IV	**Process Superstep :** Data Vault, Time-Person-Object-Location-Event Data Vault, Data Science Process, Data Science, **Transform Superstep :** Transform Superstep, Building a Data Warehouse, Transforming with Data Science, Hypothesis Testing, Overfitting and Underfitting, Precision-Recall, Cross-Validation Test.	**12**
V	**Transform Superstep:** Univariate Analysis, Bivariate Analysis, Multivariate Analysis, Linear Regression, Logistic Regression, Clustering Techniques, ANOVA, Principal Component Analysis (PCA), Decision Trees, Support Vector Machines, Networks, Clusters, and Grids, Data Mining, Pattern Recognition, Machine Learning, Bagging Data,Random Forests, Computer Vision (CV) , Natural Language Processing (NLP), Neural Networks, TensorFlow. **Organize and Report Supersteps :** Organize Superstep, Report Superstep, Graphics, Pictures, Showing the Difference	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Practical Data Science	Andreas François Vermeulen	APress		2018
2.	Principles of Data Science	Sinan Ozdemir	PACKT		2016
3.	Data Science from Scratch	Joel Grus	O'Reilly		2015
4.	Data Science from Scratch first Principle in python	Joel Grus	Shroff Publishers		2017
5.	Experimental Design in Data science with Least Resources	N C Das	Shroff Publishers		2018

M. Sc (Information Technology)		**Semester – I**	
Course Name: Data Science Practical		**Course Code: PSIT1P2**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Apply quantitative modeling and data analysis techniques to the solution of real world business problems, communicate findings, and effectively present results using data visualization techniques. • Recognize and analyze ethical issues in business related to intellectual property, data security, integrity, and privacy.

- Apply ethical practices in everyday business activities and make well-reasoned ethical business and data management decisions.
- Demonstrate knowledge of statistical data analysis techniques utilized in business decision making.
- Apply principles of Data Science to the analysis of business problems.
- Use data mining software to solve real-world problems.
- Employ cutting edge tools and technologies to analyze Big Data.
- Apply algorithms to build machine intelligence.
- Demonstrate use of team work, leadership skills, decision making and organization theory.

M. Sc (Information Technology)		Semester – I	
Course Name: Cloud Computing		**Course Code: PSIT103**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To learn how to use Cloud Services. • To implement Virtualization. • To implement Task Scheduling algorithms. • Apply Map-Reduce concept to applications. • To build Private Cloud. • Broadly educate to know the impact of engineering on legal and societal issues involved.

Unit	Details	Lectures
I	**Introduction to Cloud Computing:** Introduction, Historical developments, Building Cloud Computing Environments, **Principles of Parallel and Distributed Computing:** Eras of Computing, Parallel v/s distributed computing, Elements of Parallel Computing, Elements of distributed computing, Technologies for distributed computing. **Virtualization:** Introduction, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples. Logical Network Perimeter, Virtual Server, Cloud Storage Device, Cloud usage monitor, Resource replication, Ready-made environment.	**12**
II	**Cloud Computing Architecture:** Introduction, Fundamental concepts and models, Roles and boundaries, Cloud Characteristics, Cloud Delivery models, Cloud Deployment models, Economics of the cloud, Open challenges. **Fundamental Cloud Security:** Basics, Threat agents, Cloud security threats, additional considerations. **Industrial Platforms and New Developments:** Amazon Web Services, Google App Engine, Microsoft Azure.	**12**
III	**Specialized Cloud Mechanisms:** Automated Scaling listener, Load Balancer, SLA monitor, Pay-per-use monitor, Audit monitor, fail over system, Hypervisor, Resource Centre, Multidevice broker, State Management Database. **Cloud Management Mechanisms:** Remote administration system, Resource Management System, SLA Management System, Billing Management System, **Cloud Security Mechanisms:** Encryption, Hashing, Digital Signature, Public Key Infrastructure (PKI), Identity and Access Management (IAM), Single	**12**

	Sign-On (SSO), Cloud-Based Security Groups, Hardened Virtual Server Images	
IV	**Fundamental Cloud Architectures:** Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture. **Advanced Cloud Architectures:** Hypervisor Clustering Architecture, Load Balanced Virtual Server Instances Architecture, Non-Disruptive Service Relocation Architecture, Zero Downtime Architecture, Cloud Balancing Architecture, Resource Reservation Architecture, Dynamic Failure Detection and Recovery Architecture, Bare-Metal Provisioning Architecture, Rapid Provisioning Architecture, Storage Workload Management Architecture	**12**
V	**Cloud Delivery Model Considerations:** Cloud Delivery Models: The Cloud Provider Perspective, Cloud Delivery Models: The Cloud Consumer Perspective, **Cost Metrics and Pricing Models**: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations, **Service Quality Metrics and SLAs:** Service Quality Metrics, SLA Guidelines	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Mastering Cloud Computing Foundations and Applications Programming	Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi	Elsevier	-	2013
2.	Cloud Computing Concepts, Technology & Architecture	Thomas Erl, Zaigham Mahmood, and Ricardo Puttini	Prentice Hall	-	2013
3.	Distributed and Cloud Computing, From Parallel Processing to the Internet of Things	Kai Hwang, Jack Dongarra, Geoffrey Fox	MK Publishers	--	2012

M. Sc (Information Technology)		Semester – I	
Course Name: Cloud Computing Practical		**Course Code: PSIT1P3**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures. • Design different workflows according to requirements and apply map reduce programming model. • Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms. • Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds • Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application • Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

M. Sc (Information Technology)		Semester – I	
Course Name: Soft Computing Techniques		**Course Code: PSIT104**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Soft computing concepts like fuzzy logic, neural networks and genetic algorithm, where Artificial Intelligence is mother branch of all. • All these techniques will be more effective to solve the problem efficiently

Pre requisites	Basic concepts of Artificial Intelligence. Knowledge of Algorithms

Unit	Details	Lectures
I	Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Classification, Clustering, Bayesian Networks, Probabilistic reasoning, applications of soft computing.	**12**
II	Artificial Neural Network: Fundamental concept, Evolution of Neural Networks, Basic Models, McCulloh-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neurons, Backpropagation Network, Radial Basis Function, Time Delay Network, Functional Link Networks, Tree Neural Network. Associative Memory Networks: Training algorithm for pattern Association, Autoassociative memory network, hetroassociative memory network, bi-directional associative memory, Hopfield networks, iterative autoassociative memory networks, temporal associative memory networks.	**12**
III	UnSupervised Learning Networks: Fixed weight competitive nets, Kohonen self-organizing feature maps, learning vectors quantization, counter propogation networks, adaptive resonance theory networks. Special Networks: Simulated annealing, Boltzman machine, Gaussian Machine, Cauchy Machine, Probabilistic neural net, cascade correlation network, cognition network, neo-cognition network, cellular neural network, optical neural network Third Generation Neural Networks: Spiking Neural networks, convolutional neural networks, deep learning neural networks, extreme learning machine model.	**12**

IV	Introduction to Fuzzy Logic, Classical Sets and Fuzzy sets: Classical sets, Fuzzy sets. Classical Relations and Fuzzy Relations: Cartesian Product of relation, classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Membership Function: features of the membership functions, fuzzification, methods of membership value assignments. Defuzzification: Lambda-cuts for fuzzy sets, Lambda-cuts for fuzzy relations, Defuzzification methods. Fuzzy Arithmetic and Fuzzy measures: fuzzy arithmetic, fuzzy measures, measures of fuzziness, fuzzy integrals.	**12**
V	Fuzzy Rule base and Approximate reasoning: Fuzzy proportion, formation of rules, decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, Fuzzy logic control systems, control system design, architecture and operation of FLC system, FLC system models and applications of FLC System. Genetic Algorithm: Biological Background, Traditional optimization and search techniques, genetic algorithm and search space, genetic algorithm vs. traditional algorithms, basic terminologies, simple genetic algorithm, general genetic algorithm, operators in genetic algorithm, stopping condition for genetic algorithm flow, constraints in genetic algorithm, problem solving using genetic algorithm, the schema theorem, classification of genetic algorithm, Holland classifier systems, genetic programming, advantages and limitations and applications of genetic algorithm. Differential Evolution Algorithm, Hybrid soft computing techniques – neuro – fuzzy hybrid, genetic neuro-hybrid systems, genetic fuzzy hybrid and fuzzy genetic hybrid systems.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Artificial Intelligence and Soft Computing	Anandita Das Battacharya	SPD	3rd	2018
2.	Principles of Soft computing	S.N.Sivanandam S.N.Deepa	Wiley	3rd	2019
3.	Neuro-Fuzzy and Soft Computing	J.S.R.Jang, C.T.Sun and E.Mizutani	Prentice Hall of India		2004
4.	Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications	S.Rajasekaran, G. A. Vijayalakshami	Prentice Hall of India		2004
5.	Fuzzy Logic with Engineering Applications	Timothy J.Ross	McGraw-Hill		1997

6.	Genetic Algorithms: Search, Optimization and Machine Learning	Davis E.Goldberg	Addison Wesley		1989
7.	Introduction to AI and Expert System	Dan W. Patterson	Prentice Hall of India		2009

M. Sc (Information Technology)		**Semester – I**	
Course Name: Soft Computing Techniques Practical		**Course Code: PSIT1P4**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Identify and describe soft computing techniques and their roles in building intelligent machines • Recognize the feasibility of applying a soft computing methodology for a particular problem • Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems • Apply genetic algorithms to combinatorial optimization problems • Apply neural networks for classification and regression problems • Effectively use existing software tools to solve real problems using a soft computing approach • Evaluate and compare solutions by various soft computing approaches for a given problem.

SEMESTER II

M. Sc (Information Technology)		Semester – II	
Course Name: BigData Analytics		**Course Code: PSIT201**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To provide an overview of an exciting growing field of big data analytics. • To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce. • To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability. • To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Unit	Details	Lectures
I	Introduction to Big Data, Characteristics of Data, and Big Data Evolution of Big Data, Definition of Big Data, Challenges with big data, Why Big data? Data Warehouse environment, Traditional Business Intelligence versus Big Data. State of Practice in Analytics, Key roles for New Big Data Ecosystems, Examples of big Data Analytics. Big Data Analytics, Introduction to big data analytics, Classification of Analytics, Challenges of Big Data, Importance of Big Data, Big Data Technologies, Data Science, Responsibilities, Soft state eventual consistency. Data Analytics Life Cycle	**12**
II	Analytical Theory and Methods: Clustering and Associated Algorithms, Association Rules, Apriori Algorithm, Candidate Rules, Applications of Association Rules, Validation and Testing, Diagnostics, Regression, Linear Regression, Logistic Regression, Additional Regression Models.	**12**
III	Analytical Theory and Methods: Classification, Decision Trees, Naïve Bayes, Diagnostics of Classifiers, Additional Classification Methods, Time Series Analysis, Box Jenkins methodology, ARIMA Model, Additional methods. Text Analysis, Steps, Text Analysis Example, Collecting Raw Text, Representing Text, Term Frequency-Inverse Document Frequency (TFIDF), Categorizing Documents by Topics, Determining Sentiments	**12**
IV	Data Product, Building Data Products at Scale with Hadoop, Data Science Pipeline and Hadoop Ecosystem, Operating System for Big Data, Concepts, Hadoop Architecture, Working with Distributed file system, Working with Distributed Computation, Framework for Python and Hadoop Streaming, Hadoop Streaming, MapReduce with Python,	**12**

	Advanced MapReduce. In-Memory Computing with Spark, Spark Basics, Interactive Spark with PySpark, Writing Spark Applications,	
V	Distributed Analysis and Patterns, Computing with Keys, Design Patterns, Last-Mile Analytics, Data Mining and Warehousing, Structured Data Queries with Hive, HBase, Data Ingestion, Importing Relational data with Sqoop, Injesting stream data with flume. Analytics with higher level APIs, Pig, Spark's higher level APIs.	**12**

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Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Big Data and Analytics	Subhashini Chellappan Seema Acharya	Wiley	First	
2.	Data Analytics with Hadoop *An Introduction for Data Scientists*	*Benjamin Bengfort and Jenny Kim*	O'Reilly		2016
3.	Big Data and Hadoop	V.K Jain	Khanna Publishing	First	2018

M. Sc (Information Technology)		**Semester – II**	
Course Name: BigData Analytics Practical		**Course Code: PSIT2P1**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. • Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. • Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. • Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

M. Sc (Information Technology)		Semester – I	
Course Name: Modern Networking		**Course Code: PSIT202**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To understand the state-of-the-art in network protocols, architectures and applications. • Analyze existing network protocols and networks. • Develop new protocols in networking • To understand how networking research is done • To investigate novel ideas in the area of Networking via term-long research projects.

Pre requisites	Fundamentals of Networking

Unit	Details	Lectures
I	Modern Networking Elements of Modern Networking The Networking Ecosystem ,Example Network Architectures,Global Network Architecture,A Typical Network Hierarchy Ethernet Applications of Ethernet Standards Ethernet Data Rates Wi-Fi Applications of Wi-Fi,Standards Wi-Fi Data Rates 4G/5G Cellular First Generation Second Generation, Third Generation Fourth Generation Fifth Generation, Cloud Computing Cloud Computing Concepts The Benefits of Cloud Computing Cloud Networking Cloud Storage, Internet of Things Things on the Internet of Things, Evolution Layers of the Internet of Things, Network Convergence Unified Communications, Requirements and Technology Types of Network and Internet Traffic,Elastic Traffic,Inelastic Traffic, Real-Time Traffic Characteristics Demand: Big Data, Cloud Computing, and Mobile TrafficBig Data Cloud Computing,,Mobile Traffic, Requirements: QoS and QoE,,Quality of Service,Quality of Experience, Routing Characteristics, Packet Forwarding, Congestion Control ,Effects of Congestion,Congestion Control Techniques, SDN and NFV Software-Defined Networking,Network Functions Virtualization Modern Networking Elements	**12**
II	Software-Defined Networks SDN: Background and Motivation, Evolving Network Requirements Demand Is Increasing,Supply Is IncreasingTraffic Patterns Are More ComplexTraditional Network Architectures are Inadequate, The SDN Approach Requirements SDN Architecture Characteristics of Software-	**12**

	Defined Networking, SDN- and NFV-Related Standards Standards-Developing Organizations Industry Consortia Open Development Initiatives, SDN Data Plane and OpenFlow SDN Data Plane, Data Plane Functions Data Plane Protocols OpenFlow Logical Network Device Flow Table Structure Flow Table Pipeline, The Use of Multiple Tables Group Table OpenFlow Protocol, SDN Control Plane SDN Control Plane Architecture Control Plane Functions, Southbound Interface Northbound InterfaceRouting, ITU-T Model, OpenDaylight OpenDaylight Architecture OpenDaylight Helium, REST REST Constraints Example REST API, Cooperation and Coordination Among Controllers, Centralized Versus Distributed Controllers, High-Availability Clusters Federated SDN Networks, Border Gateway Protocol Routing and QoS Between Domains, Using BGP for QoS Management IETF SDNi OpenDaylight SNDi SDN Application Plane SDN Application Plane Architecture Northbound Interface Network Services Abstraction Layer Network Applications, User Interface, Network Services Abstraction Layer Abstractions in SDN, Frenetic Traffic Engineering PolicyCop Measurement and Monitoring Security OpenDaylight DDoS Application Data Center Networking, Big Data over SDN Cloud Networking over SDN Mobility and Wireless Information-Centric Networking CCNx, Use of an Abstraction Layer	
III	Virtualization, Network Functions Virtualization: Concepts and Architecture, Background and Motivation for NFV, Virtual Machines The Virtual Machine Monitor, Architectural Approaches Container Virtualization, NFV Concepts Simple Example of the Use of NFV, NFV Principles High-Level NFV Framework, NFV Benefits and Requirements NFV Benefits, NFV Requirements, NFV Reference Architecture NFV Management and Orchestration, Reference Points Implementation, NFV Functionality, NFV Infrastructure,Container Interface,Deployment of NFVI Containers,Logical Structure of NFVI Domains,ComputeDomain, Hypervisor Domain,Infrastructure Network Domain, Virtualized Network Functions, VNF Interfaces,VNFC to VNFC Communication,VNF Scaling, NFV Management and Orchestration, Virtualized Infrastructure Manager,Virtual Network Function Manager,NFV Orchestrator, Repositories, Element Management, OSS/BSS, NFV Use Cases Architectural Use Cases, Service-Oriented Use Cases, SDN and NFV Network Virtualization, Virtual LANs ,The Use of Virtual LANs,Defining VLANs, Communicating VLAN Membership,IEEE 802.1Q VLAN Standard, Nested VLANs, OpenFlow VLAN Support, Virtual Private Networks, IPsec VPNs,MPLS VPNs, Network Virtualization, Simplified Example, Network Virtualization Architecture, Benefits of Network Virtualization, OpenDaylight's Virtual Tenant Network, Software-Defined Infrastructure,Software-Defined Storage, SDI Architecture	**12**

IV	Defining and Supporting User Needs, Quality of Service, Background, QoS Architectural Framework, Data Plane, Control Plane, Management Plane, Integrated Services Architecture, ISA Approach ISA Components, ISA Services, Queuing Discipline, Differentiated Services, Services, DiffServ Field, DiffServ Configuration and Operation, Per-Hop Behavior, Default Forwarding PHB, Service Level Agreements, IP Performance Metrics, OpenFlow QoS Support, Queue Structures, Meters, QoE: User Quality of Experience, Why QoE?,Online Video Content Delivery, Service Failures Due to Inadequate QoE Considerations QoE-Related Standardization Projects, Definition of Quality of Experience, Definition of Quality, Definition of Experience Quality Formation Process, Definition of Quality of Experience, QoE Strategies in Practice, The QoE/QoS Layered Model Summarizing and Merging the ,QoE/QoS Layers, Factors Influencing QoE, Measurements of QoE, Subjective Assessment, Objective Assessment, End-User Device Analytics, Summarizing the QoE Measurement Methods, Applications of QoE Network Design Implications of QoS and QoE Classification of QoE/ QoS Mapping Models, Black-Box Media-Based QoS/QoE Mapping Models, Glass-Box Parameter-Based QoS/QoE Mapping Models,Gray-Box QoS/QoE Mapping Models, Tips for QoS/QoE Mapping Model Selection,IP-Oriented Parameter-Based QoS/QoE Mapping Models,Network Layer QoE/QoS Mapping Models for Video Services, Application Layer QoE/QoS Mapping Models for Video Services Actionable QoE over IP-Based Networks, The System-Oriented Actionable QoE Solution, The Service-Oriented Actionable QoE Solution, QoE Versus QoS Service Monitoring, QoS Monitoring Solutions, QoE Monitoring Solutions, QoE-Based Network and Service Management, QoE-Based Management of VoIP Calls, QoE-Based Host-Centric Vertical Handover, QoE-Based Network-Centric Vertical Handover	**12**
V	Modern Network Architecture: Clouds and Fog, Cloud Computing, Basic Concepts, Cloud Services, Software as a Service, Platform as a Service, Infrastructure as a Service, Other Cloud Services, XaaS, Cloud Deployment Models, Public Cloud Private Cloud Community Cloud, Hybrid Cloud, Cloud Architecture, NIST Cloud Computing Reference Architecture,ITU-T Cloud Computing Reference Architecture, SDN and NFV, Service Provider Perspective Private Cloud Perspective, ITU-T Cloud Computing Functional Reference Architecture, The Internet of Things: Components The IoT Era Begins, The Scope of the Internet of Things Components of IoT-Enabled Things, Sensors, Actuators, Microcontrollers, Transceivers, RFID, The Internet of Things: Architecture and Implementation, IoT Architecture,ITU-T IoT Reference Model, IoT World Forum Reference Model, IoT Implementation, IoTivity, Cisco IoT System, ioBridge, Security Security Requirements, SDN Security Threats to SDN, Software-Defined Security, NFV Security, Attack Surfaces, ETSI Security Perspective, Security Techniques, Cloud Security, Security Issues and Concerns, Cloud Security Risks and Countermeasures, Data Protection	**12**

	in the Cloud, Cloud Securityas a Service, Addressing Cloud Computer Security Concerns, IoT Security, The Patching Vulnerability, IoT Security and Privacy Requirements Defined by ITU-TAn IoT Security Framework, Conclusion	

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud	William Stallings	Addison-Wesley Professional		October 2015
2.	SDN and NFV Simplified A Visual Guide to Understanding Software Defined Networks and Network Function Virtualization	**Jim Doherty**	Pearson Education, Inc		
3.	Network Functions Virtualization (NFV) with a Touch of SDN	Rajendra Chayapathi Syed Farrukh Hassan	Addison-Wesley		
4.	CCIE and CCDE Evolving Technologies Study Guide	Brad dgeworth, Jason Gooley, Ramiro Garza Rios	Pearson Education, Inc		2019

M. Sc (Information Technology)		**Semester – II**	
Course Name: Modern Networking Practical		**Course Code: PSIT2P2**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Demonstrate in-depth knowledge in the area of Computer Networking. • To demonstrate scholarship of knowledge through performing in a group to identify, formulate and solve a problem related to Computer Networks • Prepare a technical document for the identified Networking System Conducting experiments to analyze the identified research work in building Computer Networks

M. Sc (Information Technology)		Semester – I	
Course Name: Microservice Architecture		**Course Code: PSIT203**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Gain a thorough understanding of the philosophy and architecture of Web applications using ASP.NET Core MVC; • Gain a practical understanding of.NET Core; • Acquire a working knowledge of Web application development using ASP.NET Core MVC 6 and Visual Studio • Persist data with XML Serialization and ADO.NET with SQL Server • Create HTTP services using ASP.NET Core Web API; • Deploy ASP.NET Core MVC applications to the Windows Azure cloud.

Unit	Details	Lectures
I	**Microservices:** Understanding Microservices, Adopting Microservices, The Microservices Way. **Microservices Value Proposition:** Deriving Business Value, defining a Goal-Oriented, Layered Approach, Applying the Goal-Oriented, Layered Approach. **Designing Microservice Systems:** The Systems Approach to Microservices, A Microservices Design Process, **Establishing a Foundation:** Goals and Principles, Platforms, Culture.	**12**
II	**Service Design:** Microservice Boundaries, API design for Microservices, Data and Microservices, Distributed Transactions and Sagas, Asynchronous Message-Passing and Microservices, dealing with Dependencies, **System Design and Operations:** Independent Deployability, More Servers, Docker and Microservices, Role of Service Discovery, Need for an API Gateway, Monitoring and Alerting. **Adopting Microservices in Practice:** Solution Architecture Guidance, Organizational Guidance, Culture Guidance, Tools and Process Guidance, Services Guidance.	**12**
III	**Building Microservices with ASP.NET Core:** Introduction, Installing .NET Core, Building a Console App, Building ASP.NET Core App. **Delivering Continuously:** Introduction to Docker, Continuous integration with Wercker, Continuous Integration with Circle CI, Deploying to Dicker Hub. **Building Microservice with ASP.NET Core:** Microservice, Team Service, API First Development, Test First Controller, Creating a CI pipeline, Integration Testing, Running the team service Docker Image. **Backing Services:**	**12**

	Microservices Ecosystems, Building the location Service, Enhancing Team Service.	
IV	**Creating Data Service:** Choosing a Data Store**,** Building a Postgres Repository, Databases are Backing Services, Integration Testing Real Repositories, Exercise the Data Service.**Event Sourcing and CQRS:** Event Sourcing, CQRS pattern, Event Sourcing and CQRS, Running the samples. **Building an ASP.NET Core Web Application:** ASP.NET Core Basics, Building Cloud-Native Web Applications. **Service Discovery:** Cloud Native Factors, Netflix Eureka, Discovering and Advertising ASP.NET Core Services. DNS and Platform Supported Discovery.	**12**
V	**Configuring Microservice Ecosystems:** Using Environment Variables with Docker, Using Spring Cloud Config Server, Configuring Microservices with etcd, **Securing Applications and Microservices:** Security in the Cloud, Securing ASP.NET Core Web Apps, Securing ASP.NET Core Microservices. **Building Real-Time Apps and Services:** Real-Time Applications Defined, Websockets in the Cloud, Using a Cloud Messaging Provider, Building the Proximity Monitor. **Putting It All Together:** Identifying and Fixing Anti-Patterns, Continuing the Debate over Composite Microservices, The Future.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Microservice Architecture: *Aligning Principles, Practices, and Culture*	Irakli Nadareishvili, Ronnie Mitra, Matt McLarty, and Mike Amundsen	O'Reilly	First	2016
2.	Building Microservices with ASP.NET Core	Kevin Hoffman	O'Reilly	First	2017
3.	Building Microservices: Designing Fine-Grained Systems	Sam Newman	O'Reilly	First	
4.	Production-ready Microservices	Susan J. Fowler	O'Reilly		2016

M. Sc (Information Technology)		Semester – II	
Course Name: Microservices Architecture Practical		**Course Code: PSIT2P3**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	Develop web applications using Model View Control. Create MVC Models and write code that implements business logic within Model methods, properties, and events. Create Views in an MVC application that display and edit data and interact with Models and Controllers. Boost your hire ability through innovative and independent learning. Gaining a thorough understanding of the philosophy and architecture of .NET Core Understanding packages, metapackages and frameworks Acquiring a working knowledge of the .NET programming model Implementing multi-threading effectively in .NET applications

M. Sc (Information Technology)		Semester – II	
Course Name: Image Processing		**Course Code: PSIT204**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Review the fundamental concepts of a digital image processing system. • Analyze images in the frequency domain using various transforms. • Evaluate the techniques for image enhancement and image restoration. • Categorize various compression techniques. • Interpret Image compression standards. • Interpret image segmentation and representation techniques.

Unit	Details	Lectures
I	**Introduction:** Digital Image Processing, Origins of Digital Image Processing, Applications and Examples of Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, **Digital Image Fundamentals:** Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships Between Pixels, Basic Mathematical Tools Used in Digital Image Processing, **Intensity Transformations and Spatial Filtering:** Basics, Basic Intensity Transformation Functions, Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing (Lowpass) Spatial Filters, Sharpening (Highpass) Spatial Filters, Highpass, Bandreject, and Bandpass Filters from Lowpass Filters, Combining Spatial Enhancement Methods, Using Fuzzy Techniques for Intensity Transformations and Spatial Filtering	**12**
II	**Filtering in the Frequency Domain:** Background, Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform of One Variable, Extensions to Functions of Two Variables, Properties of the 2-D DFT and IDFT, Basics of Filtering in the Frequency Domain, Image Smoothing Using Lowpass Frequency Domain Filters, Image Sharpening Using Highpass Filters, Selective Filtering, Fast Fourier Transform **Image Restoration and Reconstruction:** A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-----Spatial Filtering, Periodic Noise Reduction Using Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Image Reconstruction from Projections	**12**
III	**Wavelet and Other Image Transforms:** Preliminaries, Matrix-based Transforms, Correlation, Basis Functions in the Time-Frequency Plane, Basis	**12**

	Images, Fourier-Related Transforms, Walsh-Hadamard Transforms, Slant Transform, Haar Transform, Wavelet Transforms **Color Image Processing:** Color Fundamentals, Color Models, Pseudocolor Image Processing, Full-Color Image Processing, Color Transformations, Color Image Smoothing and Sharpening, Using Color in Image Segmentation, Noise in Color Images, Color Image Compression. **Image Compression and Watermarking:** Fundamentals, Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run-length Coding, Symbol-based Coding, 8 Bit-plane Coding, Block Transform Coding, Predictive Coding, Wavelet Coding, Digital Image Watermarking,	
IV	**Morphological Image Processing:** Preliminaries, Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transform, Morphological Algorithms, Morphological Reconstruction, Morphological Operations on Binary Images, Grayscale Morphology **Image Segmentation I: Edge Detection, Thresholding, and Region Detection:** Fundamentals, Thresholding, Segmentation by Region Growing and by Region Splitting and Merging, Region Segmentation Using Clustering and Superpixels, Region Segmentation Using Graph Cuts, Segmentation Using Morphological Watersheds, Use of Motion in Segmentation	**12**
V	**Image Segmentation II: Active Contours: Snakes and Level Sets:** Background, Image Segmentation Using Snakes, Segmentation Using Level Sets. **Feature Extraction:** Background, Boundary Preprocessing, Boundary Feature Descriptors, Region Feature Descriptors, Principal Components as Feature Descriptors, Whole-Image Features, Scale-Invariant Feature Transform (SIFT)	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Digital Image Processing	Gonzalez and Woods	Pearson/Prentice Hall	Fourth	2018
2.	Fundamentals of Digital Image Processing	A K. Jain	PHI		
3.	The Image Processing Handbook	J. C. Russ	CRC	Fifth	2010

M. Sc (Information Technology)		**Semester – II**	
Course Name: Image Processing Practical		**Course Code: PSIT2P4**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Understand the relevant aspects of digital image representation and their practical implications. • Have the ability to design pointwise intensity transformations to meet stated specifications. • Understand 2-D convolution, the 2-D DFT, and have the abitilty to design systems using these concepts. • Have a command of basic image restoration techniques. • Understand the role of alternative color spaces, and the design requirements leading to choices of color space. • Appreciate the utility of wavelet decompositions and their role in image processing systems. • Have an understanding of the underlying mechanisms of image compression, and the ability to design systems using standard algorithms to meet design specifications.

Evaluation Scheme

Internal Evaluation (40 Marks)

The internal assessment marks shall be awarded as follows:

1. **30 marks (Any one of the following):**
    a. **Written Test or**
    b. **SWAYAM (Advanced Course) of minimum 20 hours and certification exam completed or**
    c. **NPTEL (Advanced Course) of minimum 20 hours and certification exam completed or**
    d. **Valid International Certifications (Prometric, Pearson, Certiport, Coursera, Udemy and the like)**
    e. **One certification marks shall be awarded one course only. For four courses, the students will have to complete four certifications.**
2. **10 marks**
   The marks given out of 40 for publishing the research paper should be divided into four course and should awarded out of 10 in each of the four course.

i. **Suggested format of Question paper of 30 marks for the written test.**

Q1.	**Attempt *any two* of the following:**	**16**
a.		
b.		
c.		
d.		
Q2.	**Attempt *any two* of the following:**	**14**
a.		
b.		
c.		
d.		

ii. **10 marks from every course coming to a total of 40 marks, shall be awarded on publishing of research paper in UGC approved Journal with plagiarism less than 10%. The marks can be awarded as per the impact factor of the journal, quality of the paper, importance of the contents published, social value.**

External Examination: (60 marks)

	All questions are compulsory	
Q1	**(Based on Unit 1) Attempt *any two* of the following:**	**12**
a.		
b.		
c.		
d.		
Q2	**(Based on Unit 2) Attempt *any two* of the following:**	**12**
Q3	**(Based on Unit 3) Attempt *any two* of the following:**	**12**
Q4	**(Based on Unit 4) Attempt *any two* of the following:**	**12**
Q5	**(Based on Unit 5) Attempt *any two* of the following:**	**12**

Practical Evaluation (50 marks)

A Certified copy journal is essential to appear for the practical examination.

1.	**Practical Question 1**	**20**
2.	**Practical Question 2**	**20**
3.	**Journal**	**5**
4.	**Viva Voce**	**5**

OR

1.	**Practical Question**	**40**
2.	**Journal**	**5**
3.	**Viva Voce**	**5**

University of Mumbai

No. UG/ 106 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges, the Head of the University Department and Directors of the recognized Institutions in Science & Technology Faculty is invited to the syllabus uploaded by Academic Authority Unit which was accepted by the Academic Council at its meeting held on 27th February, 2013 **vide** item No. 4.133 relating to the revised syllabus as per (CBSGS) for M.Sc. Information Technology (Sem. I & II).

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in Information & Technology at its meeting held on 25th July, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 **vide** item No.4.76 and that in accordance therewith, the revised syllabus as per the (CBCS) for the M.Sc. (I. T.) (Part – I) (Sem.-I & II) has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
11th September, 2019

(Dr. Ajay Deshmukh)
REGISTRAR

To

The Principals of the affiliated Colleges, the Head of the University Department and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.76/26/07/2019

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No. UG/ 106 -A of 2019-20 MUMBAI-400 032 11th September, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Information & Technology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)
REGISTRAR

Cover Page

AC 26/07/2019
Item No. 4.76

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	M.Sc in Information Technology Part I
2	Eligibility for Admission	B.Sc(IT), B.Sc(CS), B.E, BCA (Sem I & II) B.Sc(Phy), B.Sc(Maths), B.Sc(Stats) B.Sc(Electronics)
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	-
5	No. of Years / Semesters	Two Years - Four Semesters
6	Level	P.G. / ~~U.G.~~ / ~~Diploma~~ / ~~Certificate~~ (Strike out which is not applicable)
7	Pattern	~~Yearly~~ / Semester (Strike out which is not applicable)
8	Status	~~New~~ / Revised (Strike out which is not applicable)
9	To be implemented from Academic Year	From Academic Year 2019-2020

Date: 25/7/19

Signature :

Name of BOS Chairperson / ~~Dean~~ : Dr. (Mrs.) R. Srivaramangai

rsrimangai@udct.mu.ac.in

Rajan
(for R. G. Deshmukh)
25/7/19

Academic Council: 26/07/2019

Item No: 4.76

UNIVERSITY OF MUMBAI

Syllabus for M.Sc. Part I (Semester I and II)

Programme: M.Sc.

Subject: Information Technology

(Choice Based Credit System with effect from the academic year 2019 – 2020)

Semester – I		
Course Code	**Course Title**	**Credits**
PSIT101	Research in Computing	4
PSIT102	Data Science	4
PSIT103	Cloud Computing	4
PSIT104	Soft Computing Techniques	4
PSIT1P1	Research in Computing Practical	2
PSIT1P2	Data Science Practical	2
PSIT1P3	Cloud Computing Practical	2
PSIT1P4	Soft Computing Techniques Practical	2
	Total Credits	**24**

Semester – II		
Course Code	**Course Title**	**Credits**
PSIT201	Big Data Analytics	4
PSIT202	Modern Networking	4
PSIT203	Microservices Architecture	4
PSIT204	Image Processing	4
PSIT2P1	Big Data Analytics Practical	2
PSIT2P2	Modern Networking Practical	2
PSIT2P3	Microservices Architecture Practical	2
PSIT2P4	Image Processing Practical	2
	Total Credits	**24**

Program Specific Outcomes

PSO1: Ability to apply the knowledge of Information Technology with recent trends aligned with research and industry.

PSO2: Ability to apply IT in the field of Computational Research, Soft Computing, Big Data Analytics, Data Science, Image Processing, Artificial Intelligence, Networking and Cloud Computing.

PSO3: Ability to provide socially acceptable technical solutions in the domains of Information Security, Machine Learning, Internet of Things and Embedded System, Infrastructure Services as specializations.

PSO4: Ability to apply the knowledge of Intellectual Property Rights, Cyber Laws and Cyber Forensics and various standards in interest of National Security and Integrity along with IT Industry.

PSO5: Ability to write effective project reports, research publications and content development and to work in multidisciplinary environment in the context of changing technologies.

SEMESTER I

M. Sc (Information Technology)		Semester – I	
Course Name: Research in Computing		**Course Code: PSIT101**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To be able to conduct business research with an understanding of all the latest theories. • To develop the ability to explore research techniques used for solving any real world or innovate problem.

Pre requisites	Basic knowledge of statistical methods. Analytical and logical thinking.

Unit	Details	Lectures
I	**Introduction:** Role of Business Research, Information Systems and Knowledge Management, Theory Building, Organization ethics and Issues	**12**
II	**Beginning Stages of Research Process:** Problem definition, Qualitative research tools, Secondary data research	**12**
III	**Research Methods and Data Collection:** Survey research, communicating with respondents, Observation methods, Experimental research	**12**
IV	**Measurement Concepts, Sampling and Field work:** Levels of Scale measurement, attitude measurement, questionnaire design, sampling designs and procedures, determination of sample size	**12**
V	**Data Analysis and Presentation:** Editing and Coding, Basic Data Analysis, Univariate Statistical Analysis and Bivariate Statistical analysis and differences between two variables. Multivariate Statistical Analysis.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Business Research Methods	William G.Zikmund, B.J Babin, J.C. Carr,	Cengage	8e	2016

		Atanu Adhikari, M.Griffin			
2.	Business Analytics	Albright Winston	Cengage	5e	2015
3.	Research Methods for Business Students Fifth Edition	Mark Saunders			2011
4.	Multivariate Data Analysis	Hair	Pearson	7e	2014

M. Sc (Information Technology)		**Semester – I**	
Course Name: Research in Computing Practical		**Course Code: PSIT1P1**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	A learner will be able to: □ solve real world problems with scientific approach. □ develop analytical skills by applying scientific methods. □ recognize, understand and apply the language, theory and models of the field of business analytics □ foster an ability to critically analyze, synthesize and solve complex unstructured business problems □ understand and critically apply the concepts and methods of business analytics □ identify, model and solve decision problems in different settings □ interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity □ create viable solutions to decision making problems

M. Sc (Information Technology)		Semester – I	
Course Name: Data Science		**Course Code: PSIT102**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Develop in depth understanding of the key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling, and statistics. • Practice problem analysis and decision-making. • Gain practical, hands-on experience with statistics programming languages and big data tools through coursework and applied research experiences.

Pre requisites	Basic understanding of statistics

Unit	Details	Lectures
I	**Data Science Technology Stack:** Rapid Information Factory Ecosystem, Data Science Storage Tools, Data Lake, Data Vault, Data Warehouse Bus Matrix, Data Science Processing Tools ,Spark, Mesos, Akka , Cassandra, Kafka, Elastic Search, R ,Scala, Python, MQTT, The Future **Layered Framework:** Definition of Data Science Framework, Cross-Industry Standard Process for Data Mining (CRISP-DM), Homogeneous Ontology for Recursive Uniform Schema, The Top Layers of a Layered Framework, Layered Framework for High-Level Data Science and Engineering **Business Layer:** Business Layer, Engineering a Practical Business Layer **Utility Layer:** Basic Utility Design, Engineering a Practical Utility Layer	**12**
II	**Three Management Layers:** Operational Management Layer, Processing-Stream Definition and Management, Audit, Balance, and Control Layer, Balance, Control, Yoke Solution, Cause-and-Effect, Analysis System, Functional Layer, Data Science Process **Retrieve Superstep :** Data Lakes, Data Swamps, Training the Trainer Model, Understanding the Business Dynamics of the Data Lake, Actionable Business Knowledge from Data Lakes, Engineering a Practical Retrieve Superstep, Connecting to Other Data Sources,	**12**
III	**Assess Superstep:** Assess Superstep, Errors, Analysis of Data, Practical Actions, Engineering a Practical Assess Superstep,	**12**

IV	**Process Superstep :** Data Vault, Time-Person-Object-Location-Event Data Vault, Data Science Process, Data Science, **Transform Superstep :** Transform Superstep, Building a Data Warehouse, Transforming with Data Science, Hypothesis Testing, Overfitting and Underfitting, Precision-Recall, Cross-Validation Test.	**12**
V	**Transform Superstep:** Univariate Analysis, Bivariate Analysis, Multivariate Analysis, Linear Regression, Logistic Regression, Clustering Techniques, ANOVA, Principal Component Analysis (PCA), Decision Trees, Support Vector Machines, Networks, Clusters, and Grids, Data Mining, Pattern Recognition, Machine Learning, Bagging Data,Random Forests, Computer Vision (CV) , Natural Language Processing (NLP), Neural Networks, TensorFlow. **Organize and Report Supersteps :** Organize Superstep, Report Superstep, Graphics, Pictures, Showing the Difference	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Practical Data Science	Andreas François Vermeulen	APress		2018
2.	Principles of Data Science	Sinan Ozdemir	PACKT		2016
3.	Data Science from Scratch	Joel Grus	O'Reilly		2015
4.	Data Science from Scratch first Principle in python	Joel Grus	Shroff Publishers		2017
5.	Experimental Design in Data science with Least Resources	N C Das	Shroff Publishers		2018

M. Sc (Information Technology)		**Semester – I**	
Course Name: Data Science Practical		**Course Code: PSIT1P2**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Apply quantitative modeling and data analysis techniques to the solution of real world business problems, communicate findings, and effectively present results using data visualization techniques. • Recognize and analyze ethical issues in business related to intellectual property, data security, integrity, and privacy.

- Apply ethical practices in everyday business activities and make well-reasoned ethical business and data management decisions.
- Demonstrate knowledge of statistical data analysis techniques utilized in business decision making.
- Apply principles of Data Science to the analysis of business problems.
- Use data mining software to solve real-world problems.
- Employ cutting edge tools and technologies to analyze Big Data.
- Apply algorithms to build machine intelligence.
- Demonstrate use of team work, leadership skills, decision making and organization theory.

M. Sc (Information Technology)		Semester – I	
Course Name: Cloud Computing		**Course Code: PSIT103**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To learn how to use Cloud Services. • To implement Virtualization. • To implement Task Scheduling algorithms. • Apply Map-Reduce concept to applications. • To build Private Cloud. • Broadly educate to know the impact of engineering on legal and societal issues involved.

Unit	Details	Lectures
I	**Introduction to Cloud Computing:** Introduction, Historical developments, Building Cloud Computing Environments, **Principles of Parallel and Distributed Computing:** Eras of Computing, Parallel v/s distributed computing, Elements of Parallel Computing, Elements of distributed computing, Technologies for distributed computing. **Virtualization:** Introduction, Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples. Logical Network Perimeter, Virtual Server, Cloud Storage Device, Cloud usage monitor, Resource replication, Ready-made environment.	**12**
II	**Cloud Computing Architecture:** Introduction, Fundamental concepts and models, Roles and boundaries, Cloud Characteristics, Cloud Delivery models, Cloud Deployment models, Economics of the cloud, Open challenges. **Fundamental Cloud Security:** Basics, Threat agents, Cloud security threats, additional considerations. **Industrial Platforms and New Developments:** Amazon Web Services, Google App Engine, Microsoft Azure.	**12**
III	**Specialized Cloud Mechanisms:** Automated Scaling listener, Load Balancer, SLA monitor, Pay-per-use monitor, Audit monitor, fail over system, Hypervisor, Resource Centre, Multidevice broker, State Management Database. **Cloud Management Mechanisms:** Remote administration system, Resource Management System, SLA Management System, Billing Management System, **Cloud Security Mechanisms:** Encryption, Hashing, Digital Signature, Public Key Infrastructure (PKI), Identity and Access Management (IAM), Single	**12**

	Sign-On (SSO), Cloud-Based Security Groups, Hardened Virtual Server Images	
IV	**Fundamental Cloud Architectures:** Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture. **Advanced Cloud Architectures:** Hypervisor Clustering Architecture, Load Balanced Virtual Server Instances Architecture, Non-Disruptive Service Relocation Architecture, Zero Downtime Architecture, Cloud Balancing Architecture, Resource Reservation Architecture, Dynamic Failure Detection and Recovery Architecture, Bare-Metal Provisioning Architecture, Rapid Provisioning Architecture, Storage Workload Management Architecture	**12**
V	**Cloud Delivery Model Considerations:** Cloud Delivery Models: The Cloud Provider Perspective, Cloud Delivery Models: The Cloud Consumer Perspective, **Cost Metrics and Pricing Models**: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations, **Service Quality Metrics and SLAs:** Service Quality Metrics, SLA Guidelines	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Mastering Cloud Computing Foundations and Applications Programming	Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi	Elsevier	-	2013
2.	Cloud Computing Concepts, Technology & Architecture	Thomas Erl, Zaigham Mahmood, and Ricardo Puttini	Prentice Hall	-	2013
3.	Distributed and Cloud Computing, From Parallel Processing to the Internet of Things	Kai Hwang, Jack Dongarra, Geoffrey Fox	MK Publishers	--	2012

M. Sc (Information Technology)		Semester – I	
Course Name: Cloud Computing Practical		**Course Code: PSIT1P3**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures. • Design different workflows according to requirements and apply map reduce programming model. • Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms. • Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds • Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application • Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

M. Sc (Information Technology)		Semester – I	
Course Name: Soft Computing Techniques		**Course Code: PSIT104**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Soft computing concepts like fuzzy logic, neural networks and genetic algorithm, where Artificial Intelligence is mother branch of all. • All these techniques will be more effective to solve the problem efficiently

Pre requisites	Basic concepts of Artificial Intelligence. Knowledge of Algorithms

Unit	Details	Lectures
I	Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Classification, Clustering, Bayesian Networks, Probabilistic reasoning, applications of soft computing.	**12**
II	Artificial Neural Network: Fundamental concept, Evolution of Neural Networks, Basic Models, McCulloh-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neurons, Backpropagation Network, Radial Basis Function, Time Delay Network, Functional Link Networks, Tree Neural Network. Associative Memory Networks: Training algorithm for pattern Association, Autoassociative memory network, hetroassociative memory network, bi-directional associative memory, Hopfield networks, iterative autoassociative memory networks, temporal associative memory networks.	**12**
III	UnSupervised Learning Networks: Fixed weight competitive nets, Kohonen self-organizing feature maps, learning vectors quantization, counter propogation networks, adaptive resonance theory networks. Special Networks: Simulated annealing, Boltzman machine, Gaussian Machine, Cauchy Machine, Probabilistic neural net, cascade correlation network, cognition network, neo-cognition network, cellular neural network, optical neural network Third Generation Neural Networks: Spiking Neural networks, convolutional neural networks, deep learning neural networks, extreme learning machine model.	**12**

IV	Introduction to Fuzzy Logic, Classical Sets and Fuzzy sets: Classical sets, Fuzzy sets. Classical Relations and Fuzzy Relations: Cartesian Product of relation, classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Membership Function: features of the membership functions, fuzzification, methods of membership value assignments. Defuzzification: Lambda-cuts for fuzzy sets, Lambda-cuts for fuzzy relations, Defuzzification methods. Fuzzy Arithmetic and Fuzzy measures: fuzzy arithmetic, fuzzy measures, measures of fuzziness, fuzzy integrals.	**12**
V	Fuzzy Rule base and Approximate reasoning: Fuzzy proportion, formation of rules, decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, Fuzzy logic control systems, control system design, architecture and operation of FLC system, FLC system models and applications of FLC System. Genetic Algorithm: Biological Background, Traditional optimization and search techniques, genetic algorithm and search space, genetic algorithm vs. traditional algorithms, basic terminologies, simple genetic algorithm, general genetic algorithm, operators in genetic algorithm, stopping condition for genetic algorithm flow, constraints in genetic algorithm, problem solving using genetic algorithm, the schema theorem, classification of genetic algorithm, Holland classifier systems, genetic programming, advantages and limitations and applications of genetic algorithm. Differential Evolution Algorithm, Hybrid soft computing techniques – neuro – fuzzy hybrid, genetic neuro-hybrid systems, genetic fuzzy hybrid and fuzzy genetic hybrid systems.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Artificial Intelligence and Soft Computing	Anandita Das Battacharya	SPD	3rd	2018
2.	Principles of Soft computing	S.N.Sivanandam S.N.Deepa	Wiley	3rd	2019
3.	Neuro-Fuzzy and Soft Computing	J.S.R.Jang, C.T.Sun and E.Mizutani	Prentice Hall of India		2004
4.	Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications	S.Rajasekaran, G. A. Vijayalakshami	Prentice Hall of India		2004
5.	Fuzzy Logic with Engineering Applications	Timothy J.Ross	McGraw-Hill		1997

6.	Genetic Algorithms: Search, Optimization and Machine Learning	Davis E.Goldberg	Addison Wesley		1989
7.	Introduction to AI and Expert System	Dan W. Patterson	Prentice Hall of India		2009

M. Sc (Information Technology)		**Semester – I**	
Course Name: Soft Computing Techniques Practical		**Course Code: PSIT1P4**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Identify and describe soft computing techniques and their roles in building intelligent machines • Recognize the feasibility of applying a soft computing methodology for a particular problem • Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems • Apply genetic algorithms to combinatorial optimization problems • Apply neural networks for classification and regression problems • Effectively use existing software tools to solve real problems using a soft computing approach • Evaluate and compare solutions by various soft computing approaches for a given problem.

SEMESTER II

M. Sc (Information Technology)		Semester – II	
Course Name: BigData Analytics		**Course Code: PSIT201**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To provide an overview of an exciting growing field of big data analytics. • To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce. • To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability. • To enable students to have skills that will help them to solve complex real-world problems in for decision support.

Unit	Details	Lectures
I	Introduction to Big Data, Characteristics of Data, and Big Data Evolution of Big Data, Definition of Big Data, Challenges with big data, Why Big data? Data Warehouse environment, Traditional Business Intelligence versus Big Data. State of Practice in Analytics, Key roles for New Big Data Ecosystems, Examples of big Data Analytics. Big Data Analytics, Introduction to big data analytics, Classification of Analytics, Challenges of Big Data, Importance of Big Data, Big Data Technologies, Data Science, Responsibilities, Soft state eventual consistency. Data Analytics Life Cycle	**12**
II	Analytical Theory and Methods: Clustering and Associated Algorithms, Association Rules, Apriori Algorithm, Candidate Rules, Applications of Association Rules, Validation and Testing, Diagnostics, Regression, Linear Regression, Logistic Regression, Additional Regression Models.	**12**
III	Analytical Theory and Methods: Classification, Decision Trees, Naïve Bayes, Diagnostics of Classifiers, Additional Classification Methods, Time Series Analysis, Box Jenkins methodology, ARIMA Model, Additional methods. Text Analysis, Steps, Text Analysis Example, Collecting Raw Text, Representing Text, Term Frequency-Inverse Document Frequency (TFIDF), Categorizing Documents by Topics, Determining Sentiments	**12**
IV	Data Product, Building Data Products at Scale with Hadoop, Data Science Pipeline and Hadoop Ecosystem, Operating System for Big Data, Concepts, Hadoop Architecture, Working with Distributed file system, Working with Distributed Computation, Framework for Python and Hadoop Streaming, Hadoop Streaming, MapReduce with Python,	**12**

	Advanced MapReduce. In-Memory Computing with Spark, Spark Basics, Interactive Spark with PySpark, Writing Spark Applications,	
V	Distributed Analysis and Patterns, Computing with Keys, Design Patterns, Last-Mile Analytics, Data Mining and Warehousing, Structured Data Queries with Hive, HBase, Data Ingestion, Importing Relational data with Sqoop, Injesting stream data with flume. Analytics with higher level APIs, Pig, Spark's higher level APIs.	**12**

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Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Big Data and Analytics	Subhashini Chellappan Seema Acharya	Wiley	First	
2.	Data Analytics with Hadoop *An Introduction for Data Scientists*	*Benjamin Bengfort and Jenny Kim*	O'Reilly		2016
3.	Big Data and Hadoop	V.K Jain	Khanna Publishing	First	2018

M. Sc (Information Technology)		**Semester – II**	
Course Name: BigData Analytics Practical		**Course Code: PSIT2P1**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. • Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. • Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. • Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

M. Sc (Information Technology)		Semester – I	
Course Name: Modern Networking		**Course Code: PSIT202**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• To understand the state-of-the-art in network protocols, architectures and applications. • Analyze existing network protocols and networks. • Develop new protocols in networking • To understand how networking research is done • To investigate novel ideas in the area of Networking via term-long research projects.

Pre requisites	Fundamentals of Networking

Unit	Details	Lectures
I	Modern Networking Elements of Modern Networking The Networking Ecosystem ,Example Network Architectures,Global Network Architecture,A Typical Network Hierarchy Ethernet Applications of Ethernet Standards Ethernet Data Rates Wi-Fi Applications of Wi-Fi,Standards Wi-Fi Data Rates 4G/5G Cellular First Generation Second Generation, Third Generation Fourth Generation Fifth Generation, Cloud Computing Cloud Computing Concepts The Benefits of Cloud Computing Cloud Networking Cloud Storage, Internet of Things Things on the Internet of Things, Evolution Layers of the Internet of Things, Network Convergence Unified Communications, Requirements and Technology Types of Network and Internet Traffic,Elastic Traffic,Inelastic Traffic, Real-Time Traffic Characteristics Demand: Big Data, Cloud Computing, and Mobile TrafficBig Data Cloud Computing,,Mobile Traffic, Requirements: QoS and QoE,,Quality of Service,Quality of Experience, Routing Characteristics, Packet Forwarding, Congestion Control ,Effects of Congestion,Congestion Control Techniques, SDN and NFV Software-Defined Networking,Network Functions Virtualization Modern Networking Elements	**12**
II	Software-Defined Networks SDN: Background and Motivation, Evolving Network Requirements Demand Is Increasing,Supply Is IncreasingTraffic Patterns Are More ComplexTraditional Network Architectures are Inadequate, The SDN Approach Requirements SDN Architecture Characteristics of Software-	**12**

	Defined Networking, SDN- and NFV-Related Standards Standards-Developing Organizations Industry Consortia Open Development Initiatives, SDN Data Plane and OpenFlow SDN Data Plane, Data Plane Functions Data Plane Protocols OpenFlow Logical Network Device Flow Table Structure Flow Table Pipeline, The Use of Multiple Tables Group Table OpenFlow Protocol, SDN Control Plane SDN Control Plane Architecture Control Plane Functions, Southbound Interface Northbound InterfaceRouting, ITU-T Model, OpenDaylight OpenDaylight Architecture OpenDaylight Helium, REST REST Constraints Example REST API, Cooperation and Coordination Among Controllers, Centralized Versus Distributed Controllers, High-Availability Clusters Federated SDN Networks, Border Gateway Protocol Routing and QoS Between Domains, Using BGP for QoS Management IETF SDNi OpenDaylight SNDi SDN Application Plane SDN Application Plane Architecture Northbound Interface Network Services Abstraction Layer Network Applications, User Interface, Network Services Abstraction Layer Abstractions in SDN, Frenetic Traffic Engineering PolicyCop Measurement and Monitoring Security OpenDaylight DDoS Application Data Center Networking, Big Data over SDN Cloud Networking over SDN Mobility and Wireless Information-Centric Networking CCNx, Use of an Abstraction Layer	
III	Virtualization, Network Functions Virtualization: Concepts and Architecture, Background and Motivation for NFV, Virtual Machines The Virtual Machine Monitor, Architectural Approaches Container Virtualization, NFV Concepts Simple Example of the Use of NFV, NFV Principles High-Level NFV Framework, NFV Benefits and Requirements NFV Benefits, NFV Requirements, NFV Reference Architecture NFV Management and Orchestration, Reference Points Implementation, NFV Functionality, NFV Infrastructure,Container Interface,Deployment of NFVI Containers,Logical Structure of NFVI Domains,ComputeDomain, Hypervisor Domain,Infrastructure Network Domain, Virtualized Network Functions, VNF Interfaces,VNFC to VNFC Communication,VNF Scaling, NFV Management and Orchestration, Virtualized Infrastructure Manager,Virtual Network Function Manager,NFV Orchestrator, Repositories, Element Management, OSS/BSS, NFV Use Cases Architectural Use Cases, Service-Oriented Use Cases, SDN and NFV Network Virtualization, Virtual LANs ,The Use of Virtual LANs,Defining VLANs, Communicating VLAN Membership,IEEE 802.1Q VLAN Standard, Nested VLANs, OpenFlow VLAN Support, Virtual Private Networks, IPsec VPNs,MPLS VPNs, Network Virtualization, Simplified Example, Network Virtualization Architecture, Benefits of Network Virtualization, OpenDaylight's Virtual Tenant Network, Software-Defined Infrastructure,Software-Defined Storage, SDI Architecture	**12**

IV	Defining and Supporting User Needs, Quality of Service, Background, QoS Architectural Framework, Data Plane, Control Plane, Management Plane, Integrated Services Architecture, ISA Approach ISA Components, ISA Services, Queuing Discipline, Differentiated Services, Services, DiffServ Field, DiffServ Configuration and Operation, Per-Hop Behavior, Default Forwarding PHB, Service Level Agreements, IP Performance Metrics, OpenFlow QoS Support, Queue Structures, Meters, QoE: User Quality of Experience, Why QoE?,Online Video Content Delivery, Service Failures Due to Inadequate QoE Considerations QoE-Related Standardization Projects, Definition of Quality of Experience, Definition of Quality, Definition of Experience Quality Formation Process, Definition of Quality of Experience, QoE Strategies in Practice, The QoE/QoS Layered Model Summarizing and Merging the ,QoE/QoS Layers, Factors Influencing QoE, Measurements of QoE, Subjective Assessment, Objective Assessment, End-User Device Analytics, Summarizing the QoE Measurement Methods, Applications of QoE Network Design Implications of QoS and QoE Classification of QoE/ QoS Mapping Models, Black-Box Media-Based QoS/QoE Mapping Models, Glass-Box Parameter-Based QoS/QoE Mapping Models,Gray-Box QoS/QoE Mapping Models, Tips for QoS/QoE Mapping Model Selection,IP-Oriented Parameter-Based QoS/QoE Mapping Models,Network Layer QoE/QoS Mapping Models for Video Services, Application Layer QoE/QoS Mapping Models for Video Services Actionable QoE over IP-Based Networks, The System-Oriented Actionable QoE Solution, The Service-Oriented Actionable QoE Solution, QoE Versus QoS Service Monitoring, QoS Monitoring Solutions, QoE Monitoring Solutions, QoE-Based Network and Service Management, QoE-Based Management of VoIP Calls, QoE-Based Host-Centric Vertical Handover, QoE-Based Network-Centric Vertical Handover	**12**
V	Modern Network Architecture: Clouds and Fog, Cloud Computing, Basic Concepts, Cloud Services, Software as a Service, Platform as a Service, Infrastructure as a Service, Other Cloud Services, XaaS, Cloud Deployment Models, Public Cloud Private Cloud Community Cloud, Hybrid Cloud, Cloud Architecture, NIST Cloud Computing Reference Architecture,ITU-T Cloud Computing Reference Architecture, SDN and NFV, Service Provider Perspective Private Cloud Perspective, ITU-T Cloud Computing Functional Reference Architecture, The Internet of Things: Components The IoT Era Begins, The Scope of the Internet of Things Components of IoT-Enabled Things, Sensors, Actuators, Microcontrollers, Transceivers, RFID, The Internet of Things: Architecture and Implementation, IoT Architecture,ITU-T IoT Reference Model, IoT World Forum Reference Model, IoT Implementation, IoTivity, Cisco IoT System, ioBridge, Security Security Requirements, SDN Security Threats to SDN, Software-Defined Security, NFV Security, Attack Surfaces, ETSI Security Perspective, Security Techniques, Cloud Security, Security Issues and Concerns, Cloud Security Risks and Countermeasures, Data Protection	**12**

	in the Cloud, Cloud Securityas a Service, Addressing Cloud Computer Security Concerns, IoT Security, The Patching Vulnerability, IoT Security and Privacy Requirements Defined by ITU-TAn IoT Security Framework, Conclusion	

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud	William Stallings	Addison-Wesley Professional		October 2015
2.	SDN and NFV Simplified A Visual Guide to Understanding Software Defined Networks and Network Function Virtualization	**Jim Doherty**	Pearson Education, Inc		
3.	Network Functions Virtualization (NFV) with a Touch of SDN	Rajendra Chayapathi Syed Farrukh Hassan	Addison-Wesley		
4.	CCIE and CCDE Evolving Technologies Study Guide	Brad dgeworth, Jason Gooley, Ramiro Garza Rios	Pearson Education, Inc		2019

M. Sc (Information Technology)		**Semester – II**	
Course Name: Modern Networking Practical		**Course Code: PSIT2P2**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Demonstrate in-depth knowledge in the area of Computer Networking. • To demonstrate scholarship of knowledge through performing in a group to identify, formulate and solve a problem related to Computer Networks • Prepare a technical document for the identified Networking System Conducting experiments to analyze the identified research work in building Computer Networks

M. Sc (Information Technology)		Semester – I	
Course Name: Microservice Architecture		**Course Code: PSIT203**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Gain a thorough understanding of the philosophy and architecture of Web applications using ASP.NET Core MVC; • Gain a practical understanding of.NET Core; • Acquire a working knowledge of Web application development using ASP.NET Core MVC 6 and Visual Studio • Persist data with XML Serialization and ADO.NET with SQL Server • Create HTTP services using ASP.NET Core Web API; • Deploy ASP.NET Core MVC applications to the Windows Azure cloud.

Unit	Details	Lectures
I	**Microservices:** Understanding Microservices, Adopting Microservices, The Microservices Way. **Microservices Value Proposition:** Deriving Business Value, defining a Goal-Oriented, Layered Approach, Applying the Goal-Oriented, Layered Approach. **Designing Microservice Systems:** The Systems Approach to Microservices, A Microservices Design Process, **Establishing a Foundation:** Goals and Principles, Platforms, Culture.	**12**
II	**Service Design:** Microservice Boundaries, API design for Microservices, Data and Microservices, Distributed Transactions and Sagas, Asynchronous Message-Passing and Microservices, dealing with Dependencies, **System Design and Operations:** Independent Deployability, More Servers, Docker and Microservices, Role of Service Discovery, Need for an API Gateway, Monitoring and Alerting. **Adopting Microservices in Practice:** Solution Architecture Guidance, Organizational Guidance, Culture Guidance, Tools and Process Guidance, Services Guidance.	**12**
III	**Building Microservices with ASP.NET Core:** Introduction, Installing .NET Core, Building a Console App, Building ASP.NET Core App. **Delivering Continuously:** Introduction to Docker, Continuous integration with Wercker, Continuous Integration with Circle CI, Deploying to Dicker Hub. **Building Microservice with ASP.NET Core:** Microservice, Team Service, API First Development, Test First Controller, Creating a CI pipeline, Integration Testing, Running the team service Docker Image. **Backing Services:**	**12**

	Microservices Ecosystems, Building the location Service, Enhancing Team Service.	
IV	**Creating Data Service:** Choosing a Data Store**,** Building a Postgres Repository, Databases are Backing Services, Integration Testing Real Repositories, Exercise the Data Service.**Event Sourcing and CQRS:** Event Sourcing, CQRS pattern, Event Sourcing and CQRS, Running the samples. **Building an ASP.NET Core Web Application:** ASP.NET Core Basics, Building Cloud-Native Web Applications. **Service Discovery:** Cloud Native Factors, Netflix Eureka, Discovering and Advertising ASP.NET Core Services. DNS and Platform Supported Discovery.	**12**
V	**Configuring Microservice Ecosystems:** Using Environment Variables with Docker, Using Spring Cloud Config Server, Configuring Microservices with etcd, **Securing Applications and Microservices:** Security in the Cloud, Securing ASP.NET Core Web Apps, Securing ASP.NET Core Microservices. **Building Real-Time Apps and Services:** Real-Time Applications Defined, Websockets in the Cloud, Using a Cloud Messaging Provider, Building the Proximity Monitor. **Putting It All Together:** Identifying and Fixing Anti-Patterns, Continuing the Debate over Composite Microservices, The Future.	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Microservice Architecture: *Aligning Principles, Practices, and Culture*	Irakli Nadareishvili, Ronnie Mitra, Matt McLarty, and Mike Amundsen	O'Reilly	First	2016
2.	Building Microservices with ASP.NET Core	Kevin Hoffman	O'Reilly	First	2017
3.	Building Microservices: Designing Fine-Grained Systems	Sam Newman	O'Reilly	First	
4.	Production-ready Microservices	Susan J. Fowler	O'Reilly		2016

M. Sc (Information Technology)		Semester – II	
Course Name: Microservices Architecture Practical		**Course Code: PSIT2P3**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	Details
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	Develop web applications using Model View Control. Create MVC Models and write code that implements business logic within Model methods, properties, and events. Create Views in an MVC application that display and edit data and interact with Models and Controllers. Boost your hire ability through innovative and independent learning. Gaining a thorough understanding of the philosophy and architecture of .NET Core Understanding packages, metapackages and frameworks Acquiring a working knowledge of the .NET programming model Implementing multi-threading effectively in .NET applications

M. Sc (Information Technology)		Semester – II	
Course Name: Image Processing		**Course Code: PSIT204**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Theory Internal	**--**	**40**

Objectives	• Review the fundamental concepts of a digital image processing system. • Analyze images in the frequency domain using various transforms. • Evaluate the techniques for image enhancement and image restoration. • Categorize various compression techniques. • Interpret Image compression standards. • Interpret image segmentation and representation techniques.

Unit	Details	Lectures
I	**Introduction:** Digital Image Processing, Origins of Digital Image Processing, Applications and Examples of Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, **Digital Image Fundamentals:** Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships Between Pixels, Basic Mathematical Tools Used in Digital Image Processing, **Intensity Transformations and Spatial Filtering:** Basics, Basic Intensity Transformation Functions, Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing (Lowpass) Spatial Filters, Sharpening (Highpass) Spatial Filters, Highpass, Bandreject, and Bandpass Filters from Lowpass Filters, Combining Spatial Enhancement Methods, Using Fuzzy Techniques for Intensity Transformations and Spatial Filtering	**12**
II	**Filtering in the Frequency Domain:** Background, Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform of One Variable, Extensions to Functions of Two Variables, Properties of the 2-D DFT and IDFT, Basics of Filtering in the Frequency Domain, Image Smoothing Using Lowpass Frequency Domain Filters, Image Sharpening Using Highpass Filters, Selective Filtering, Fast Fourier Transform **Image Restoration and Reconstruction:** A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-----Spatial Filtering, Periodic Noise Reduction Using Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Image Reconstruction from Projections	**12**
III	**Wavelet and Other Image Transforms:** Preliminaries, Matrix-based Transforms, Correlation, Basis Functions in the Time-Frequency Plane, Basis	**12**

	Images, Fourier-Related Transforms, Walsh-Hadamard Transforms, Slant Transform, Haar Transform, Wavelet Transforms **Color Image Processing:** Color Fundamentals, Color Models, Pseudocolor Image Processing, Full-Color Image Processing, Color Transformations, Color Image Smoothing and Sharpening, Using Color in Image Segmentation, Noise in Color Images, Color Image Compression. **Image Compression and Watermarking:** Fundamentals, Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run-length Coding, Symbol-based Coding, 8 Bit-plane Coding, Block Transform Coding, Predictive Coding, Wavelet Coding, Digital Image Watermarking,	
IV	**Morphological Image Processing:** Preliminaries, Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transform, Morphological Algorithms, Morphological Reconstruction, Morphological Operations on Binary Images, Grayscale Morphology **Image Segmentation I: Edge Detection, Thresholding, and Region Detection:** Fundamentals, Thresholding, Segmentation by Region Growing and by Region Splitting and Merging, Region Segmentation Using Clustering and Superpixels, Region Segmentation Using Graph Cuts, Segmentation Using Morphological Watersheds, Use of Motion in Segmentation	**12**
V	**Image Segmentation II: Active Contours: Snakes and Level Sets:** Background, Image Segmentation Using Snakes, Segmentation Using Level Sets. **Feature Extraction:** Background, Boundary Preprocessing, Boundary Feature Descriptors, Region Feature Descriptors, Principal Components as Feature Descriptors, Whole-Image Features, Scale-Invariant Feature Transform (SIFT)	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Digital Image Processing	Gonzalez and Woods	Pearson/Prentice Hall	Fourth	2018
2.	Fundamentals of Digital Image Processing	A K. Jain	PHI		
3.	The Image Processing Handbook	J. C. Russ	CRC	Fifth	2010

M. Sc (Information Technology)		**Semester – II**	
Course Name: Image Processing Practical		**Course Code: PSIT2P4**	
Periods per week **1 Period is 60 minutes**	**Lectures**	**4**	
	Credits	**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**40**

Practical No	**Details**
1 - 10	10 Practical based on above syllabus, covering entire syllabus

Course Outcome	• Understand the relevant aspects of digital image representation and their practical implications. • Have the ability to design pointwise intensity transformations to meet stated specifications. • Understand 2-D convolution, the 2-D DFT, and have the abitilty to design systems using these concepts. • Have a command of basic image restoration techniques. • Understand the role of alternative color spaces, and the design requirements leading to choices of color space. • Appreciate the utility of wavelet decompositions and their role in image processing systems. • Have an understanding of the underlying mechanisms of image compression, and the ability to design systems using standard algorithms to meet design specifications.

Evaluation Scheme

Internal Evaluation (40 Marks)

The internal assessment marks shall be awarded as follows:

1. **30 marks (Any one of the following):**
    a. **Written Test or**
    b. **SWAYAM (Advanced Course) of minimum 20 hours and certification exam completed or**
    c. **NPTEL (Advanced Course) of minimum 20 hours and certification exam completed or**
    d. **Valid International Certifications (Prometric, Pearson, Certiport, Coursera, Udemy and the like)**
    e. **One certification marks shall be awarded one course only. For four courses, the students will have to complete four certifications.**
2. **10 marks**
   The marks given out of 40 for publishing the research paper should be divided into four course and should awarded out of 10 in each of the four course.

i. **Suggested format of Question paper of 30 marks for the written test.**

Q1.	**Attempt *any two* of the following:**	**16**
a.		
b.		
c.		
d.		
Q2.	**Attempt *any two* of the following:**	**14**
a.		
b.		
c.		
d.		

ii. **10 marks from every course coming to a total of 40 marks, shall be awarded on publishing of research paper in UGC approved Journal with plagiarism less than 10%. The marks can be awarded as per the impact factor of the journal, quality of the paper, importance of the contents published, social value.**

External Examination: (60 marks)

	All questions are compulsory	
Q1	**(Based on Unit 1) Attempt *any two* of the following:**	**12**
a.		
b.		
c.		
d.		
Q2	**(Based on Unit 2) Attempt *any two* of the following:**	**12**
Q3	**(Based on Unit 3) Attempt *any two* of the following:**	**12**
Q4	**(Based on Unit 4) Attempt *any two* of the following:**	**12**
Q5	**(Based on Unit 5) Attempt *any two* of the following:**	**12**

Practical Evaluation (50 marks)

A Certified copy journal is essential to appear for the practical examination.

1.	**Practical Question 1**	**20**
2.	**Practical Question 2**	**20**
3.	**Journal**	**5**
4.	**Viva Voce**	**5**

OR

1.	**Practical Question**	**40**
2.	**Journal**	**5**
3.	**Viva Voce**	**5**

Academic Council _____
Item No: 4.100

University Of Mumbai

Syllabus for M.Sc. I.T. Part II
Semester III and IV
Programme: M.Sc.
Subject: Information Technology
CHOICE BASED(REVISED)
with effect from the academic year
2020 – 2021

Artificial Intelligence Track
Image Processing Track
Cloud Computing Track
Security Track

SEMESTER - III					
	Course Title				
Course Code	Theory	Credits	Course Code	Practical	Credits
PSIT301	Technical Writing and Entrepreneurship Development	4	PSIT3P1	Project Documentation and Viva	2
Elective 1: Select Any one from the courses listed below along with corresponding practical course					
PSIT302a	Applied Artificial Intelligence	4	PSIT3P2a	Applied Artificial Intelligence Practical	2
PSIT302b	Computer Vision		PSIT3P2b	Computer Vision Practical	
PSIT302c	Cloud Application Development		PSIT3P2c	Cloud Application Development Practical	
PSIT302d	Security Breaches and Countermeasures		PSIT3P2d	Security Breaches and Countermeasures Practical	
Elective 2: Select Any one from the courses listed below along with corresponding practical course					
PSIT303a	Machine Learning	4	PSIT3P3a	Machine Learning Practical	2
PSIT303b	Biomedical Image Processing		PSIT3P3b	Biomedical Image Processing Practical	
PSIT303c	Cloud Management		PSIT3P3c	Cloud Management Practical	
PSIT303d	Malware Analysis		PSIT3P3d	Malware Analysis Practical	
Elective 3: Select Any one from the courses listed below along with corresponding practical course					
PSIT304a	Robotic Process Automation	4	PSIT3P4a	Robotic Process Automation Practical	2
PSIT304b	Virtual Reality and Augmented Reality		PSIT3P4b	Virtual Reality and Augmented Reality Practical	
PSIT304c	Data Center Technologies		PSIT3P4c	Data Center Technologies Practical	
PSIT304d	Offensive Security		PSIT3P4d	Offensive Security Practical	
	Total Theory Credits	**16**		Total Practical Credits	**8**
Total Credits for Semester III: 24					

SEMESTER - IV					
	Course Title				
Course Code	Theory	Credits	Course Code	Practical	Credits
PSIT401	Blockchain	4	PSIT4P1		2
Elective 1: Select Any one from the courses listed below along with corresponding practical course					
PSIT402a	Natural Language Processing	4	PSIT4P2a	Natural Language Processing Practical	2
PSIT402b	Digital Image Forensics		PSIT4P2b	Digital Image Forensics Practical	
PSIT402c	Advanced IoT		PSIT4P2c	Advanced IoT Practical	
PSIT402d	Cyber Forensics		PSIT4P2d	Cyber Forensics Practical	
Elective 2: Select Any one from the courses listed below along with corresponding practical course					
PSIT403a	Deep Learning	4	PSIT4P3a	Deep Learning Practical	2
PSIT403b	Remote Sensing		PSIT4P3b	Remote Sensing Practical	
PSIT403c	Server Virtualization on VMWare Platform		PSIT4P3c	Server Virtualization on VMWare Platform Practical	
PSIT403d	Security Operations Center		PSIT4P3d	Security Operations Center Practical	
Elective 3: Select Any one from the courses listed below. Project Implementation and Viva is compulsory					
PSIT404a	Human Computer Interaction	4	PSIT4P4	Project Implementation and Viva	2
PSIT404b	Advanced Applications of Image Processing				
PSIT404c	Storage as a Service				
PSIT404d	Information Security Auditing				
	Total Theory Credits	**16**		Total Practical Credits	**8**
Total Credits for Semester IV: 24					

If a student selects all 6 papers of Artificial Intelligence Track, he should be awarded the degree **M.Sc. (Information Technology), Artificial Intelligence Specialisation.**
If a student selects all 6 papers of Image Processing Track, he should be awarded the degree **M.Sc. (Information Technology), Image Processing Specialisation.**
If a student selects all 6 papers of Cloud Computing Track, he should be awarded the degree **M.Sc. (Information Technology), Cloud Computing Specialisation**
If a student selects all 6 papers of Artificial Security Track, he should be awarded the degree **M.Sc. (Information Technology), Security Specialisation**
All other students will be awarded M.Sc. (Information Technology) degree.

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SEMESTER III

PSIT301: Technical Writing and Entrepreneurship Development

M. Sc (Information Technology)		**Semester – III**	
Course Name: Technical Writing and Entrepreneurship Development		**Course Code: PSIT301**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- This course aims to provide conceptual understanding of developing strong foundation in general writing, including research proposal and reports.
- It covers the technological developing skills for writing Article, Blog, E-Book, Commercial web Page design, Business Listing Press Release, E-Listing and Product Description.
- This course aims to provide conceptual understanding of innovation and entrepreneurship development.

Unit	Details	Lectures	Outcome
I	Introduction to Technical Communication: What Is Technical Communication? The Challenges of Producing Technical Communication, Characteristics of a Technical Document, Measures of Excellence in Technical Documents, Skills and Qualities Shared by Successful Workplace Communicators, How Communication Skills and Qualities Affect Your Career? **Understanding Ethical and Legal Considerations:** A Brief Introduction to Ethics, Your Ethical Obligations, Your Legal Obligations, The Role of Corporate Culture in Ethical and Legal Conduct, Understanding Ethical and Legal Issues Related to Social Media, Communicating Ethically Across Cultures, Principles for Ethical Communication **Writing Technical Documents:** Planning, Drafting, Revising, Editing, Proofreading **Writing Collaboratively:** Advantages and Disadvantages of Collaboration, Managing Projects, Conducting Meetings, Using Social Media and Other Electronic Tools in Collaboration, Importance of Word Press Website, Gender and Collaboration, Culture and Collaboration.	**12**	**CO1**
II	**Introduction to Content Writing:** Types of Content (Article, Blog, E-Books, Press Release, Newsletters Etc), Exploring Content Publication Channels. Distribution of your content across various channels. **Blog Creation:** Understand the psychology behind your web traffic, Creating killing landing pages which attract users, Using	**12**	**CO2**

	Landing Page Creators, Setting up Accelerated Mobile Pages, Identifying UI UX Experience of your website or blog. **Organizing Your Information:** Understanding Three Principles for Organizing Technical Information, Understanding Conventional Organizational Patterns, **Emphasizing Important Information:** Writing Clear, Informative Titles, Writing Clear, Informative Headings, Writing Clear Informative Lists, Writing Clear Informative Paragraphs.		
III	**Creating Graphics:** The Functions of Graphics, The Characteristics of an Effective Graphic, Understanding the Process of Creating Graphics, Using Color Effectively, Choosing the Appropriate Kind of Graphic, Creating Effective Graphics for Multicultural Readers. **Researching Your Subject:** Understanding the Differences Between Academic and Workplace Research, Understanding the Research Process, Conducting Secondary Research, Conducting Primary Research, **Research and Documentation:** Literature Reviews, Interviewing for Information, Documenting Sources, Copyright, Paraphrasing, Questionnaires. **Report Components:** Abstracts, Introductions, Tables of Contents, Executive Summaries, Feasibility Reports, Investigative Reports, Laboratory Reports, Test Reports, Trip Reports, Trouble Reports	**12**	**CO3**
IV	**Writing Proposals:** Understanding the Process of Writing Proposals, The Logistics of Proposals, The "Deliverables" of Proposals, Persuasion and Proposals, Writing a Proposal, The Structure of the Proposal. **Writing Informational Reports:** Understanding the Process of Writing Informational Reports, Writing Directives, Writing Field Reports, Writing Progress and Status Reports, Writing Incident Reports, Writing Meeting Minutes. **Writing Recommendation Reports:** Understanding the Role of Recommendation Reports, Using a Problem-Solving Model for Preparing Recommendation Reports, Writing Recommendation Reports. **Reviewing, Evaluating, and Testing Documents and Websites:** Understanding Reviewing, Evaluating, and Testing, Reviewing Documents and Websites, Conducting Usability Evaluations, Conducting Usability Tests, Using Internet tools to check writing Quality, Duplicate Content Detector, What is Plagiarism?, How to avoid writing plagiarism content? **Innovation management: an introduction:** The importance of innovation, Models of innovation, Innovation as a management process. **Market adoption and technology diffusion:** Time lag between innovation and useable product, Innovation and the market , Innovation and market vision ,Analysing internet search data to help	**12**	**CO4**

	adoption and forecasting sales ,Innovative new products and consumption patterns, Crowd sourcing for new product ideas, Frugal innovation and ideas from everywhere, Innovation diffusion theories.		
V	**Managing innovation within firms:** Organisations and innovation, The dilemma of innovation management, Innovation dilemma in low technology sectors, Dynamic capabilities, Managing uncertainty, Managing innovation projects **Operations and process innovation:** Operations management, The nature of design and innovation in the context of operations, Process design, Process design and innovation **Managing intellectual property:** Intellectual property, Trade secrets, An introduction to patents, Trademarks, Brand names, Copyright **Management of research and development:** What is research and development?, R&D management and the industrial context, R&D investment and company success, Classifying R&D, R&D management and its link with business strategy, Strategic pressures on R&D, Which business to support and how?, Allocation of funds to R&D, Level of R&D expenditure **Managing R&D projects:** Successful technology management, The changing nature of R&D management, The acquisition of external technology, Effective R&D management, The link with the product innovation process, Evaluating R&D projects.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Technical Communication	Mike Markel	Bedford/St. Martin's	11	2014
2.	Innovation Management and New Product Development	Paul Trott	Pearson	06	2017
3.	Handbook of Technical Writing	Gerald J. Alred , Charles T. Brusaw , Walter E. Oliu	Bedford/St. Martin's	09	2008
4.	Technical Writing 101: A Real-World Guide to Planning and Writing Technical Content	Alan S. Pringle and Sarah S. O'Keefe	scriptorium	03	2009
5.	Innovation and Entrepreneurship	Peter Drucker	Harper Business	03	2009

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Develop technical documents that meet the requirements with standard guidelines. Understanding the essentials and hands-on learning about effective Website Development.
CO2: Write Better Quality Content Which Ranks faster at Search Engines. Build effective Social Media Pages.
CO3: Evaluate the essentials parameters of effective Social Media Pages.
CO4: Understand importance of innovation and entrepreneurship.
CO5: Analyze research and development projects.

PSIT3P1: Project Documentation and Viva

M. Sc (Information Technology)		**Semester – III**	
Course Name: Project Documentation and Viva		**Course Code: PSIT3P1**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

The learners are expected to develop a project beyond the undergraduate level. Normal web sites, web applications, mobile apps are not expected. Preferably, the project should be from the elective chosen by the learner at the post graduate level. In semester three. The learner is supposed to prepare the synopsis and documentation. The same project has to be implemented in Semester IV.
More details about the project is given is Appendix 1.

PSIT302a: Applied Artificial Intelligence

M. Sc (Information Technology)		**Semester – III**	
Course Name: Applied Artificial Intelligence		Course Code: PSIT302a	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To explore the applied branches of artificial intelligence
- To enable the learner to understand applications of artificial intelligence
- To enable the student to solve the problem aligned with derived branches of artificial intelligence.

Unit	*Details*	*Lectures*	*Outcome*
I	**Review of AI:** History, foundation and Applications **Expert System and Applications:** Phases in Building Expert System, Expert System Architecture, Expert System versus Traditional Systems, Rule based Expert Systems, Blackboard Systems, Truth Maintenance System, Application of Expert Systems, Shells and Tools	**12**	**CO1**
II	**Probability Theory:** joint probability, conditional probability, Bayes's theorem, probabilities in rules and facts of rule based system, cumulative probabilities, rule based system and Bayesian method **Fuzzy Sets and Fuzzy Logic:** Fuzzy Sets, Fuzzy set operations, Types of Member ship Functions, Multivalued Logic, Fuzzy Logic, Linguistic variables and Hedges, Fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems, possibility theory and other enhancement to Logic	**12**	**CO2**
III	**Machine Learning Paradigms:** Machine Learning systems, supervised and un-supervised learning, inductive learning, deductive learning, clustering, support vector machines, cased based reasoning and learning. **Artificial Neural Networks:** Artificial Neural Networks, Single-Layer feedforward networks, multi-layer feed-forward networks, radial basis function networks, design issues of artificial neural networks and recurrent networks	**12**	**CO3**
IV	**Evolutionary Computation:** Soft computing, genetic algorithms, genetic programming concepts, evolutionary programming, swarm intelligence, ant colony paradigm, particle swarm optimization and applications of evolutionary algorithms. **Intelligent Agents:** Agents vs software programs, classification of agents, working of an agent, single agent and multiagent systems, performance evaluation, architecture, agent communication language, applications	**12**	**CO4**

V	Advanced Knowledge Representation Techniques: Conceptual dependency theory, script structures, CYC theory, script structure, CYC theory, case grammars, semantic web. Natural Language Processing: Sentence Analysis phases, grammars and parsers, types of parsers, semantic analysis, universal networking language, dictionary	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Artificial Intelligence	Saroj Kaushik	Cengage	1st	2019
2.	Artificial Intelligence: A Modern Approach	A. Russel, Peter Norvig		1st	
3.	Artificial Intelligence	Elaine Rich,Kevin Knight,Shivashankar B. Nair	Tata Mc-Grawhill	3rd	

M. Sc (Information Technology)		**Semester – III**	
Course Name: Artificial Intelligence Practical		**Course Code: PSIT3P2a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of course the learner will:
CO1: be able to understand the fundamentals concepts of expert system and its applications.
CO2: be able to use probability and concept of fuzzy sets for solving AI based problems.
CO3: be able to understand the applications of Machine Learning. The learner can also apply fuzzy system for solving problems.
CO4: learner will be able to apply to understand the applications of genetic algorithms in different problems related to artificial intelligence.
CO5: A learner can use knowledge representation techniques in natural language processing.

PSIT302b: Computer Vision

M. Sc (Information Technology)		Semester – III	
Course Name: Computer Vision		**Course Code: PSIT302b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To develop the student's understanding of the issues involved in trying to define and simulate perception.
- To familiarize the student with specific, well known computer vision methods, algorithms and results.
- To provide the student additional experience in the analysis and evaluation of complicated systems.
- To provide the student additional software development experience.
- To provide the student with paper and proposal writing experience.

Unit	Details	Lectures	Outcome
I	**Introduction:** What is computer vision?, A brief history, Image formation, Geometric primitives and transformations, Geometric primitives, D transformations, D transformations, D rotations, D to D projections, Lens distortions, Photometric image formation, Lighting, Reflectance and shading, Optics, The digital camera, Sampling and aliasing, Color ,Compression **Feature-based alignment**: D and D feature-based alignment, D alignment using least squares , Application: Panography , Iterative algorithms , Robust least squares and RANSAC , D alignment , Pose estimation , Linear algorithms, Iterative algorithms , Application: Augmented reality , Geometric intrinsic calibration, Calibration patterns, Vanishing points , Application: Single view metrology , Rotational motion ,Radial distortion	**12**	**CO1**
II	**Structure from motion :** Triangulation, Two-frame structure from motion , Projective (uncalibrated) reconstruction, Self-calibration , Application: View morphing , Factorization, Perspective and projective factorization , Application: Sparse D model extraction, Bundle adjustment, Exploiting sparsity , Application: Match move and augmented reality , Uncertainty and ambiguities , Application: Reconstruction from Internet photos , Constrained structure and motion , Line-based techniques , Plane-based techniques **Dense motion estimation :** Translational alignment , Hierarchical motion estimation, Fourier-based alignment ,	**12**	**CO2**

	Incremental refinement , Parametric motion, Application: Video stabilization, Learned motion models , Spline-based motion, Application: Medical image registration, Optical flow, Multi-frame motion estimation ,Application: Video denoising , Application: De-interlacing , Layered motion, Application: Frame interpolation, Transparent layers and reflections		
III	**Image stitching :** Motion models, Planar perspective motion, Application: Whiteboard and document scanning , Rotational panoramas , Gap closing , Application: Video summarization and compression, Cylindrical and spherical coordinates, Global alignment, Bundle adjustment,Parallax removal , Recognizing panoramas, Direct vsfeature-based alignment, Compositing , Choosing a compositing surface, Pixel selection and weighting (de-ghosting) , Application: Photomontage,Blending **Computational photography :** Photometric calibration ,Radiometric response function ,Noise level estimation ,Vignetting ,Optical blur (spatial response) estimation ,High dynamic range imaging ,Tone mapping ,Application: Flash photograpy,Super-resolution and blur removal,Color image demosaicing ,Application: Colorization,Image matting and compositing ,Blue screen matting ,Natural image matting ,Optimization-based matting ,Smoke, shadow, and flash matting ,Video matting ,Texture analysis and synthesis ,Application: Hole filling and inpainting ,Application: Non-photorealistic rendering	**12**	**CO3**
IV	Stereo correspondence Epipolar geometry , Rectification ,Plane sweep , Sparse correspondence , D curves and profiles , Dense correspondence, Similarity measures , Local methods , Sub-pixel estimation and uncertainty , Application: Stereo-based head tracking , Global optimization , Dynamic programming , Segmentation-based techniques, Application: Z-keying and background replacement, Multi-view stereo, Volumetric and D surface reconstruction, Shape from silhouettes **3D reconstruction :** Shape from X , Shape from shading and photometric stereo, Shape from texture, Shape from focus , Active rangefinding , Range data merging , Application: Digital heritage , Surface representations , Surface interpolation, Surface simplification, Geometry images , Point-based representations, Volumetric representations , Implicit surfaces and level sets , Model-based reconstruction, Architecture, Heads and faces , Application: Facial animation , Whole body modeling and tracking ,Recovering texture maps and albedos , Estimating BRDFs ,Application: D photography	**12**	**CO4**

V	**Image-based rendering :** View interpolation, View-dependent texture maps, Application: Photo Tourism , Layered depth images, Impostors, sprites, and layers, Light fields and Lumigraphs , Unstructured Lumigraph, Surface light fields, Application: Concentric mosaics, Environment mattes, Higher-dimensional light fields , The modeling to rendering continuum, Video-based rendering , Video-based animation, Video textures , Application: Animating pictures, D Video, Application: Video-based walkthroughs **Recognition :** Object detection, Face detection, Pedestrian detection, Face recognition, Eigenfaces, Active appearance and D shape models, Application: Personal photo collections, Instance recognition, Geometric alignment, Large databases, Application: Location recognition, Category recognition, Bag of words, Part-based models, Recognition with segmentation, Application: Intelligent photo editing, Context and scene understanding , Learning and large image collections, Application: Image search, Recognition databases and test sets	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer Vision: Algorithms and Applications	Richard Szeliski	Springer	1st Edition	2010

M. Sc (Information Technology)		**Semester – III**	
Course Name: Computer Vision Practical		**Course Code: PSIT3P2b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Understand the basics of computer vision
CO2: Understand and analyse various structure form motion and various estimates of Dense Motion
CO3: Apply various motion models to images and understand computation photography techniques
CO4: Apply Epipolar geometry , Rectification and various other 3D correspondence and Stereo reconstruction techniques
CO5: Understand image-based rendering and reconstruction

PSIT302c: Cloud Application Development

M. Sc (Information Technology)		**Semester – III**	
Course Name: Cloud Application Development		**Course Code: PSIT302c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To develop and deploy Microservices for cloud
- To understand Kubernetes and deploy applications on Azure Kubernetes Service
- To understand DevOps for Azure
- To follow the DevOps practices for software development
- To build APIs for Azure and AWS

Unit	Details	Lectures	Outcomes
I	**Implementing Microservices:** Client to microservices communication, Interservice communication, data considerations, security, monitoring, microservices hosting platform options. **Azure Service Fabric:** Introduction, core concepts, supported programming models, service fabric clusters, develop and deploy applications of service fabric. **Monitoring Azure Service Fabric Clusters:** Azure application, resource manager template, Adding Application Monitoring to a Stateless Service Using Application Insights, Cluster monitoring, Infrastructure monitoring.	**12**	**CO1**
II	**Azure Kubernetes Service (AKS):** Introduction to kubernetes and AKS, AKS development tools, Deploy applications on AKS. **Monitoring AKS:** Monitoring, Azure monitor and analytics, monitoring AKS clusters, native kubernetes dashboard, Prometheus and Grafana. **Securing Microservices:** Authentication in microservices, Implenting security using API gateway pattern, Creating application using Ocrlot and securing APIs with Azure AD. **Database Design for Microservices:** Data stores, monolithic approach, Microservices approach, harnessing cloud computing, dataase options on MS Azure, overcoming application development challenges. **Building Microservices on Azure Stack:** Azure stack, Offering IaaS, PaaS on-premises simplified, SaaS on Azure stack.	**12**	**CO2**

III	.**NET DevOps for Azure:** DevOps introduction, Problem and solution. **Professional Grade DevOps Environment:** The state of DevOps, professional grade DevOps vision, DevOps architecture, tools for professional DevOps environment, DevOps centered application. **Tracking work:** Process template, Types of work items, Customizing the process, Working with the process. **Tracking code:** Number of repositories, Git repository, structure, branching pattern, Azure repos configuration, Git and Azure.	**12**	**CO3**
IV	**Building the code:** Structure of build, using builds with .NET core and Azure pipelines, **Validating the code:** Strategy for defect detection, Implementing defect detection. **Release candidate creation:** Designing release candidate architecture, Azure artifacts workflow for release candidates, **Deploying the release:** Designing deployment pipeline, Implementing deployment in Azure pipelines. **Operating and monitoring release:** Principles, Architectures for observability, Jumpstarting observability.	**12**	**CO4**
V	**Introduction to APIs:** Introduction, API economy, APIs in public sector. **API Strategy and Architecture:** API Strategy, API value chain, API architecture, **API** management. **API Development:** Considerations, Standards, kick-start API development, team orientation. **API Gateways:** API Gateways in public cloud, Azure API management, AWS API gateway. **API Security:** Request-based security, Authentication and authorization.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Building Microservices Applications on Microsoft Azure- Designing, Developing, Deploying, and Monitoring	Harsh Chawla Hemant Kathuria	Apress	--	2019
2.	.NET DevOps for Azure A Developer's Guide to DevOps Architecture the Right Way	Jeffrey Palermo	Apress	--	2019
3.	Practical API Architecture and Development with Azure and AWS - Design and Implementation of APIs for the Cloud	Thurupathan Vijayakumar	Apress	--	2018

M. Sc (Information Technology)		Semester – III	
Course Name: Cloud Application Development Practical		**Course Code: PSIT3P2c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

List of Practical:
10 practical covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:

CO01: Develop the Microservices for cloud and deploy them on Microsoft Azure.

CO02: Build and deploy services to Azure Kubernetes service.

CO03: Understand and build the DevOps way.

CO04: Thoroughly build the applications in the DevOps way.

CO05: Build the APIs for Microsoft Azure and AWS.

PSIT302d: Security Breaches and Countermeasures

M. Sc (Information Technology)		Semester – III	
Course Name: Security Breaches and Countermeasures		**Course Code: PSIT302d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To get the insight of the security loopholes in every aspect of computing.
- To understand the threats and different types of attacks that can be launched on computing systems.
- To know the countermeasures that can be taken to prevent attacks on computing systems.
- To test the software against the attacks.

Unit	Details	Lectures	Outcome
I	**Introduction to Security Breaching**: Overview of Information Security, Threats and Attack vectors, Concepts of Hacking – Ethical and Unethical, Information Security Controls, Concepts of penetration Testing, Information Security Laws and Standards. **Evaluation Security of IT Organisation:** Concepts, Methodology, Tools, Countermeasures, Penetration Testing. **Network Scanning:** Concepts, Scanning beyond IDS and firewalls, Tools, Banner Grabbing, Scanning Techniques, Network Diagrams, penetration testing. **Enumeration:** Concepts, Different types of enumeration: Netbios, SNMP, LDAP, NTP, SMTP, DNS, other enumeration techniques, Countermeasures, Penetration Testing	**12**	**CO1**
II	**Analysis of Vulnerability:** Concepts, Assessment Solutions, Scoring Systems, Assessment Tools, Assessment Reports. **Breaching System Security:** Concepts, Cracking passwords, Escalating privileges, Executing Applications, Hiding files, covering tracks, penetration testing. **Threats due to malware:** Concepts, Malware Analysis, Trojan concepts, countermeasures, Virus and worm concepts, anti-malware software, penetration testing. **Network Sniffing:** Concepts, countermeasures, sniffing techniques, detection techniques, tools, penetration testing.	**12**	**CO2**

III	**Social Engineering:** Concepts, Impersonation on networking sites, Techniques, Identity theft, Insider threats, countermeasures, Pen testing. **Denial of Service and Distributed Denial of service:** Concepts, techniques, botnets, attack tools, countermeasures, protection tools, penetration testing. **Hijacking an active session:** Concepts, tools, application level session hijacking, countermeasures, network level session hijacking, penetration testing. **Evasion of IDS, Firewalls and Honeypots:** Introduction and concepts, detecting honeypots, evading IDS, IDS and Firewall evasion countermeasures, evading firewalls, penetration testing.	**12**	**CO3**
IV	**Compromising Web Servers:** Concepts, attacks, attack methodology, attack tools, countermeasures, patch management, web server security tools, penetration testing. **Compromising Web Applications:** Concepts**,** threats, methods, tools, countermeasures, testing tools, penetration testing. **Performing SQL Injection:** Concepts, types, methodology, tools, techniques, countermeasures. **Compromising Wireless Networks:** Concepts, wireless encryption, threats, methodology, tools, compromising Bluetooth, countermeasures, wireless security tools, penetration testing.	**12**	**CO4**
V	**Compromising Mobile Platforms:** Attack vectors, Compromising Android OS, Compromising iOS, Mobile spyware, Mobile Device Management, Mobile security, penetration testing. **Compromising IoT:** Concepts, attacks, compromising methodology, tools, countermeasures, penetration testing. **Cloud Security:** Concepts, Security, threats, attacks, tools, penetration testing. **Cryptography:** Concepts, email encryption, algorithms, disk encryption, tools, cryptanalysis, Public key infrastructure, countermeasures.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	CEHv10, Certified Ethical Hacker Study Guide	Ric Messier	Sybex - Wiley	-	2019
2.	All in One, Certified Ethical Hacker	Matt Walker	Tata McGraw Hill	-	2012
3.	CEH V10: EC-Council Certified Ethical Hacker Complete Training Guide	I.P. Specialist	IPSPECIALIST	-	2018

M. Sc (Information Technology)		Semester – III	
Course Name: Security Breaches and Countermeasures Practical		**Course Code: PSIT3P3d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcome:
CO1: The student should be able to identify the different security breaches that can occur. The student should be able to evaluate the security of an organization and identify the loopholes. The student should be able to perform enumeration and network scanning.

CO2: The student should be able to identify the vulnerability in the systems, breach the security of the system, identify the threats due to malware and sniff the network. The student should be able to do the penetration testing to check the vulnerability of the system towards malware and network sniffing.

CO3: The student should be able to perform social engineering and educate people to be careful from attacks due to social engineering, understand and launch DoS and DDoS attacks, hijack and active session and evade IDS and Firewalls. This should help the students to make the organization understand the threats in their systems and build robust systems.

CO4: The student should be able to identify the vulnerabilities in the Web Servers, Web Applications, perform SQL injection and get into the wireless networks. The student should be able to help the organization aware about these vulnerabilities in their systems.

CO5: The student should be able to identify the vulnerabilities in the newer technologies like mobiles, IoT and cloud computing. The student should be able to use different methods of cryptography.

PSIT303a: Machine Learning

M. Sc (Information Technology)		**Semester – III**	
Course Name: Machine Learning		**Course Code: PSIT303a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understanding Human learning aspects.
- Understanding primitives in learning process by computer.
- Understanding nature of problems solved with Machine Learning

Unit	Details	Lectures	Outcome
I	**Introduction:** Machine learning, Examples of Machine Learning Problems, Structure of Learning, learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, Machine learning Models: Geometric Models, Logical Models, Probabilistic Models. Features: Feature types, Feature Construction and Transformation, Feature Selection.	**12**	**CO1**
II	**Classification and Regression: Classification:** Binary Classification- Assessing Classification performance, Class probability Estimation Assessing class probability Estimates, Multiclass Classification. **Regression**: Assessing performance of Regression- Error measures, Overfitting- Catalysts for Overfitting, Case study of Polynomial Regression. **Theory of Generalization:** Effective number of hypothesis, Bounding the Growth function, VC Dimensions, Regularization theory.	**12**	**CO2**
III	**Linear Models:** Least Squares method, Multivariate Linear Regression, Regularized Regression, Using Least Square regression for Classification. Perceptron, Support Vector Machines, Soft Margin SVM, Obtaining probabilities from Linear classifiers, Kernel methods for non-Linearity.	**12**	**CO2 CO3**
IV	**Logic Based and Algebraic Model: Distance Based Models:** Neighbours and Examples, Nearest Neighbours Classification, Distance based clustering-K means Algorithm, Hierarchical clustering, **Rule Based Models:** Rule learning for subgroup discovery, Association rule mining. **Tree Based Models:** Decision Trees, Ranking and Probability estimation Trees, Regression trees, Clustering Trees.	**12**	**CO2 CO3 CO4**

V	Probabilistic Model: Normal Distribution and Its Geometric Interpretations, Naïve Bayes Classifier, Discriminative learning with Maximum likelihood, Probabilistic Models with Hidden variables: Estimation-Maximization Methods, Gaussian Mixtures, and Compression based Models. **Trends In Machine Learning :** Model and Symbols-Bagging and Boosting, Multitask learning, Online learning and Sequence Prediction, Data Streams and Active Learning, Deep Learning, Reinforcement Learning.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Machine Learning: The Art and Science of Algorithms that Make Sense of Data	Peter Flach	Cambridge University Press		2012
2.	Introduction to Statistical Machine Learning with Applications in R	Hastie, Tibshirani, Friedman	Springer	2nd	2012
3.	Introduction to Machine Learning	Ethem Alpaydin	PHI	2nd	2013

M. Sc (Information Technology)		**Semester – III**	
Course Name: Machine Learning Practical		**Course Code: PSIT3P3a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Understand the key issues in Machine Learning and its associated applications in intelligent business and scientific computing.
CO2: Acquire the knowledge about classification and regression techniques where a learner will be able to explore his skill to generate data base knowledge using the prescribed techniques.
CO3: Understand and implement the techniques for extracting the knowledge using machine learning methods.
CO4: Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.
CO5: Understand the statistical approach related to machine learning. He will also Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

PSIT303b: Biomedical Image Processing

M. Sc (Information Technology)		**Semester – III**	
Course Name: Biomedical Image Processing		**Course Code: PSIT303b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To design intelligent systems that can analyze biomedical images.
- To understand different scientific approaches in biomedical image processing.
- To understand the structure of biomedical images and how to correlate it with different biological data.
- To design systems to identify different physical conditions on the basis of biomedical data.

Unit	Details	Lectures	Outcome
I	**Introduction:** Biosignals, Biosignal Measurement Systems, Transducers, Amplifier/Detector, Analog Signal Processing and Filters, ADC Conversion, Data Banks **Bio signal Measurements, Noise, and Analysis:** Biosignals, Noise, Signal Analysis: Data Functions and Transforms **Spectral Analysis: Classical Methods :** Fourier Series Analysis, Power Spectrum, Spectral Averaging: Welch's Method **Noise Reduction and Digital Filters :** Noise Reduction, Noise Reduction through Ensemble Averaging, Z-Transform, Finite Impulse Response Filters, Infinite Impulse Response Filters	**12**	**CO1**
II	**Modern Spectral Analysis: The Search for Narrowband Signals:** Parametric Methods, Nonparametric Analysis: Eigen analysis Frequency Estimation **Time Frequency Analysis:** Basic Approaches, The Short-Term Fourier Transform: The Spectrogram, The Wigner Ville Distribution: A Special Case of Cohen's Class, Cohen's Class Distributions **Wavelet Analysis:** Continuous Wavelet Transform, Discrete Wavelet Transform, Feature Detection: Wavelet Packets **Optimal and Adaptive Filters:** Optimal Signal Processing: Wiener Filters, Adaptive Signal Processing, Phase-Sensitive Detection	**12**	**CO2**

III	Multivariate Analyses: Principal Component Analysis and Independent Component Analysis : Linear Transformations, Principal Component Analysis, Independent Component Analysis **Chaos and Nonlinear Dynamics :** Nonlinear Systems, Phase Space, Estimating the Embedding Parameters, Quantifying Trajectories in Phase Space: The Lyapunov Exponent, Nonlinear Analysis: The Correlation Dimension, Tests for Nonlinearity: Surrogate Data Analysis **Nonlinearity Detection: Information-Based Methods :** Information and Regularity, Mutual Information Function, Spectral Entropy, Phase-Space-Based Entropy Methods, Detrended Fluctuation Analysis	**12**	**CO3**
IV	**Image Processing: Filters, Transformations, and Registration :** Two-Dimensional Fourier Transform, Linear Filtering, Spatial Transformations, Image Registration **Image Segmentation :** Pixel-Based Methods, Continuity-Based Methods, Multi thresholding Morphological Operations, Edge-Based Segmentation **Image Acquisition and Reconstruction :** Imaging Modalities, CT, PET, and SPECT, Magnetic Resonance Imaging, Functional MRI	**12**	**CO4**
V	**Classification I: Linear Discriminant Analysis and Support Vector Machines :** Linear Discriminators, Evaluating Classifier Performance, Higher Dimensions: Kernel Machines Support Vector Machines, Machine Capacity: Overfitting or "Less Is More", Extending the Number of Variables and Classes, Cluster Analysis **Classification II: Adaptive Neural Nets :** Training the McCullough Pitts Neuron, The Gradient Decent Method or Delta Rule, Two-Layer Nets: Back Projection, Three-Layer Nets, Training Strategies, Multiple Classifications, Multiple Input Variables	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Biosignal and Medical Image Processing	John L. Semmlow, Benjamin Griffel	CRC Press	3rd	2014
2.	Biomedical Signal and Image Processing	Kayvan Najarian Robert Splinter	CRC Press	2nd	2012
3.	Introduction to Biomedical Imaging	Andrew Webb	Wiley-Interscience		2003

M. Sc (Information Technology)		Semester – III	
Course Name: Biomedical Image Processing Practical		**Course Code: PSIT3P3b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand basics of Bio signals and various classical techniques of bio signal processing.

CO2: Understand various modern spectral analysis techniques.

CO3: Understand and apply various multivariate analysis techniques on bio signals.

CO4: Understand and apply various transformations filters to images, and different techniques for image acquisition and construction.

CO5: Understand the AI perspective in biological image processing using SVM and Neural Networks.

PSIT303c: Cloud Management

M. Sc (Information Technology)		Semester – III	
Course Name: Cloud Management		**Course Code: PSIT303c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To Understand the Fundamental Ideas Behind Cloud Computing, The Evolution Of The Paradigm, Its Applicability; Benefits, As Well As Current And Future Challenges;
- The Basic ideas And Principles In Data Center Design; Cloud Management Techniques And Cloud Software Deployment Considerations;
- Different CPU, Memory And I/O Virtualization Techniques That Serve In Offering Software, Computation
- And Storage Services On The Cloud; Software Defined Networks (SDN) And Software Defined Storage (SDS);
- Cloud Storage Technologies And Relevant Distributed File Systems, Nosql Databases And Object Storage;
- The Variety Of Programming Models And Develop Working Experience In Several Of Them.

Unit	Details	Lectures	Outcome
I	What is VMM? What's new in VMM Get Started Release notes - VMM Turn telemetry data on/off Deploy a VMM cloud Create a VMM cloud Manage a VMM cloud Deploy a guarded host fabric Deploy guarded hosts Configure fallback HGS settings Deploy a shielded VHDX and VM template Deploy a shielded VM Deploy a shielded Linux VM Deploy and manage a software defined network (SDN) infrastructure Deploy an SDN network controller Deploy an SDN SLB Deploy an SDN RAS gateway Deploy SDN using PowerShell Set up a VM network in SDN Encrypt VM networks in SDN Allow and block VM traffic with SDN port ACLs Control SDN virtual network bandwidth with QoS Load balance network traffic Set up NAT for traffic forwarding in an SDN Route traffic across networks in the SDN infrastructure Configure SDN guest clusters Update the NC server certificate Set up SDN SLB VIPs Back up and restore the SDN infrastructure Remove an SDN from VMM Manage SDN resources in the VMM fabric Deploy and manage Storage Spaces	**12**	**CO1**

	Direct Set up a hyper-converged Storage Spaces Direct cluster Set up a disaggregated Storage Spaces Direct cluster Manage Storage Spaces Direct clusters Assign storage QoS policies for Clusters How To Plan System requirements – VMM Plan VMM installation Plan a VMM high availability deployment Identify VMM ports and protocols Plan the VMM compute fabric Plan the VMM networking fabric Identify supported storage arrays Upgrade and install Upgrade VMM Install VMM Install the VMM console Enable enhanced console session Deploy VMM for high availability Deploy a highly available VMM management server Deploy a highly available SQL Server database for VMM Deploy a highly available VMM library Set up TLS 1.2 Deploy update rollups Back up and restore VMM Manage the VMM library Library overview Add file-based resources to the VMM library Add profiles to the VMM library Add VM templates to the VMM library Add service templates to the VMM library Manage VMM library resources Manage virtualization servers Manage VMM host groups Add existing Hyper-V hosts and clusters to the fabric Add a Nano server as a Hyper-V host or cluster Run a script on host Create a cluster from standalone Hyper-V hosts Provision a Hyper-V host or cluster from bare-metal Create a guest Hyper-V cluster from a service template Set up networking for Hyper-V hosts and clusters Set up storage for Hyper-V hosts and clusters Manage MPIO for Hyper-V hosts and clusters Manage Hyper-V extended port ACLs Manage Hyper-V clusters Update Hyper-V hosts and clusters Run a rolling upgrade of Hyper-V clusters Service Hyper-V hosts for maintenance Manage VMware servers Manage management servers Manage infrastructure servers Manage update servers Manage networking Network fabric overview Set up logical networks Set up logical networks in UR1 Set up VM networks Set up IP address pools Add a network gateway Set up port profiles Set up logical switches Set up MAC address pools Integrate NLB with service templates Set up an IPAM server Manage storage Set up storage fabric Set up storage classifications Add storage devices Allocate storage to host groups Set up a Microsoft iSCSI Target Server Set up a Virtual Fibre Channel Set up file storage Set up Storage Replica in VMM		

II	Service Manager What's new in Service Manager Get started Evaluation and activation of Service Manager Service Manager components Supported configurations System requirements - Service Manager Release notes - Service Manager Enable service log on Manage telemetry settings How to Plan Planning for Service Manager Plan for deployment Service Manager editions Recommended deployment topologies Operations Manager considerations Service Manager databases Port assignments Prepare for deployment Service Manager performance Plan for performance and scalability Plan for hardware performance Deploy Deploy Service Manager Deployment scenarios Install on a single computer Install on two computers Install on four computers Set up remote SQL Server Reporting Services Use SQL Server AlwaysOn availability groups for failover Create and deploy server images Install on VMs Configure PowerShell Register with the data warehouse to enable reporting Deploy additional management servers Deployment considerations with a disjointed namespace Learn about the new Self Service portal Deploy the Self-Service portal Set up load balancing Back up the encryption key Index non-English knowledge articles Troubleshoot deployment issues Deploy from a command line Move databases Upgrade Upgrade Service Manager Upgrade the self-service portal to Service Manager 2016 Upgrade SQL Server Reporting Services Set up a lab environment for upgrade Prepare the production environment Prepare the lab environment Run an upgrade Complete tasks after upgrade Troubleshoot upgrade issues Administer Use management packs to add functionality Use connectors to import data Import data from Active Directory Domain Services Import data and alerts from Operations Manager Import data from Configuration Manager Import runbooks from Orchestrator Import data from VMM Use a CSV file to import data Optionally disable ECL logging for faster connector synchronization Configuration items Configure incident management Configure service level management Configure workflows Configure change and activity management Configure release management Configure Desired Configuration Management to generate incidents Configure notifications Use the service catalog to offer services Use groups, queues, and lists in Service Manager	**12**	**CO2**

	Use runbooks to automate procedures User interface customization Manage user roles Manage Run As accounts Manage knowledge articles Configure and use Service Manager cmdlets Manage the data warehouse Register source systems to the data warehouse Troubleshoot computer problems with tasks Configure your preference for sharing diagnostic and usage data Operate Search for information Manage incidents and problems Manage changes and activities Manage service requests Manage release records Data warehouse reporting and analytics Use and manage standard reports		
III	What is Configuration Manager? Microsoft Endpoint Configuration Manager FAQ What happened to SCCM? Introduction Find help for Configuration Manager How to use the docs How to use the console Accessibility features Software Center user guide Fundamentals Configuration Manager fundamentals Sites and hierarchies About upgrade, update, and install Manage devices Client management Security Role-based administration Configuration Manager and Windows as a Service Plan and design Get ready for Configuration Manager Product changes Features and capabilities Security and privacy for Configuration Manager Security and privacy overview Plan for security Security best practices and privacy information Privacy statement - Configuration Manager Cmdlet Library Additional privacy information Configure security Cryptographic controls technical reference Enable TLS About enabling TLS Enable TLS on clients Enable TLS on site servers and remote site systems Common issues when enabling TLS 1Migrate data between hierarchies Migration overview Plan for migration Planning for migration Prerequisites for migration Checklists for migration Determine whether to migrate data Planning the source hierarchy Planning migration jobs Planning client migration Planning for content deployment Planning to migrate objects Planning to monitor migration Planning to complete migration Configure source hierarchies and source sites Operations for migrating Security and privacy for migration Deploy servers and roles Deploy servers and roles Install infrastructure Get installation media Before you run setup Setup reference Setup downloader Prerequisite checker	**12**	**CO3**

	Prerequisite checks Installing sites Prepare to install sites overview Prepare to install sites Prerequisites for installing sites Use the setup wizard Use a command-line Command-line overview Command-line options Install consoles Upgrade an evaluation install Upgrade to Configuration Manager Scenarios to streamline your installation Configure sites and hierarchies Configure sites and hierarchies overview Add site system roles Add site system roles overview Install site system roles Install cloud-based distribution points About the service connection point Configuration options for site system roles Database replicas for management points Site components Publish site data Manage content and content infrastructure Content infrastructure overview Install and configure distribution points Deploy and manage content Monitor content Microsoft Connected Cache Troubleshoot Microsoft Connected Cache Run discovery Discovery methods overview About discovery methods Select discovery methods Configure discovery methods Site boundaries and boundary groups Site boundaries and boundary groups overview Boundaries Boundary groups Procedures for boundary groups High availability High availability options Site server high availability Flowchart - Passive site server setup Flowchart - Promote site server (planned) Flowchart - Promote site server (unplanned) Prepare to use SQL Server Always On Configure SQL Server Always On Use a SQL Server cluster Custom locations for database files Configure role-based administration		
IV	What's new in Orchestrator Automate with runbooks Get started Install Orchestrator Work with runbooks in the Orchestrator console Example runbook: Creating a runbook to monitor a folder Release notes – Orchestrator Turn on/off telemetry How To Plan Database sizing and performance Feature performance considerations System requirements – Orchestrator Design a runbook Deploy Upgrade Orchestrator Deploy runbooks Configure Orchestrator database connections Migrate Orchestrator between environments Change the Orchestrator database Manage Runbooks Design and build runbooks Create and test a sample runbook Control runbook activities Monitor activities Runbook properties Track runbooks Install TLS Install and enable TLS 1.2 Manage Orchestrator Servers Runbook permissions Back up Orchestrator	**12**	**CO4**

	Bench mark Optimize performance of .Net activities Configure runbook throttling Recover a database Recover web components Add an integration pack View Orchestrator data with PowerPivot Change Orchestrator user groups Common activity properties Computer groups Standard Activities Orchestrator standard activities Alphabetical list of Standard Activities Ports and protocols of Standard Activities System Run Program Run .NET Script End Process Start/Stop Service Restart System Save Event Log Query WMI Run SSH Command Get SNMP Variable Monitor SNMP Trap Send SNMP Trap Set SNMP Variable Scheduling Monitor Date/Time Check Schedule Monitoring Monitor Event Log Monitor Service Get Service Status Monitor Process Get Process Status Monitor Computer/IP Get Computer/IP Status Monitor Disk Space Get Disk Space Status Monitor Internet Application Get Internet Application Status Monitor WMI File Management Compress File Copy File Create Folder Decompress File Delete File Delete Folder Get File Status Monitor File Monitor Folder Move File Move Folder PGP Decrypt File PGP Encrypt File Print File Rename File Email Send Email Notification Send Event Log Message Send Syslog Message Send Platform Event Utilities Apply XSLT Query XML Map Published Data Compare Values Write Web Pages Read Text Log Write to Database Query Database Monitor Counter Get Counter Value Modify Counter Invoke Web Services Format Date/Time Generate Random Text Map Network Path Disconnect Network Path Get Dial-up Status Connect/Disconnect Dial-up Text File Management Append Line Delete Line Find Text Get Lines Insert Line Read Line Search and Replace Text Runbook Control Invoke Runbook Initialize Data Junction Return Data Orchestrator Integration Toolkit Overview of Orchestrator Integration Toolkit Installation Command Line Activity Wizard Integration Pack Wizard Integration Packs Active Directory Active Directory activities Add Computer To Group Add Group To Group Add User To Group Create Computer Create Group Create User Delete Computer Delete Group Delete User Disable Computer Disable User Enable Computer Enable User		

	Get Computer Get Group Get Organizational Unit Get User Move Computer Move Group Move User Remove Computer From Group Remove Group From Group Remove User From Group Rename Group Rename User Reset User Password Unlock User Update Computer Update Group Update User		
V	Data Protection Manager How does DPM work? What can DPM back up? DPM-compatible tape libraries Get Started DPM build versions DPM release notes What's new in DPM What DPM supports How To Plan Your DPM Environment Get ready to deploy DPM servers Prepare your environment for DPM Prepare data storage Identify compatible tape libraries Identify data sources you want to protect Install or Upgrade DPM Install DPM Upgrade your DPM installation Add Modern Backup storage Deduplicate DPM storage Deploy DPM Deploy the DPM protection agent Deploy protection groups Configure firewall settings Offline backup Using own disk Protect Workloads Back up Hyper-V virtual machines Back up Exchange with DPM Back up SharePoint with DPM Back up SQL Server with DPM Back up client computers with DPM Back up file data with DPM Back up system state and bare metal Back up and restore VMware servers Back up and restore VMM servers Prepare to back up a generic data source Prepare machines in workgroups and untrusted domains for backup Back up the DPM server Monitor and Manage Monitor DPM Set up DPM logging Generate DPM reports Use SCOM to manage and monitor DPM servers Improve replication performance Use central console to manage DPM servers	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Microsoft SCVMM 2019	Whitepaper	Microsoft		2019
2.	Microsoft Endpoint Manager 2019	Whitepaper	Microsoft		2019
3.	Microsoft SCO 2019	Whitepaper	Microsoft		2019
4.	Microsoft SCOM 2019	Whitepaper	Microsoft		2019
5.	Microsoft SCSM 2019	Whitepaper	Microsoft		2019
6.	Microsoft DPM 2019	Whitepaper	Microsoft		2019
7.	Introducing Microsoft System Center 2012	Mitch Tulloch with Symon Perriman and the System Center Team	Microsoft Press		2012

M. Sc (Information Technology)		Semester – III	
Course Name: Cloud Management Practical		**Course Code: PSIT3P3c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:

CO1: Understand the concepts of VMM, SDN, NAS , HyperV etc.
CO2: Understand and demonstrate the use of Service manager with various deployments that can be performed using it.
CO3: Understand SCCM and Demonstrate the use of Configuration Manager
CO4: Understand automation with runbooks and demonstrate the use of Windows Orchestrator
CO5: Understand and demonstrate the use of Data Protection Manager

PSIT303d: Malware Analysis

M. Sc (Information Technology)		Semester – III	
Course Name: Malware Analysis		**Course Code: PSIT303d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Possess the skills necessary to carry out independent analysis of modern malware samples using both static and dynamic analysis techniques.
- Have an intimate understanding of executable formats, Windows internals and API, and analysis techniques.
- Extract investigative leads from host and network-based indicators associated with a malicious program.
- Apply techniques and concepts to unpack, extract, decrypt, or bypass new anti-analysis techniques in future malware samples.
- Achieve proficiency with industry standard tools including IDA Pro, OllyDbg, WinDBG, PE Explorer, ProcMon etc.

Unit	Details	Lectures	Outcome
I	**Malware Analysis:** Introduction, Techniques, Types of malware, General rules for Malware Analysis. **Basic Static Techniques:** Antivirus Scanning, Hashing, Finding Strings, Packed and Obfuscated Malware, Portable Executable Malware, Portable executable File Format, Linked Libraries and Functions, Static Analysis, The PE file headers and sections. **Malware Analysis in Virtual Machines:** Structure of VM, Creating and using Malware Analysis machine, Risks of using VMware for malware analysis, Record/Replay. **Basic Dynamic Analysis:** Sandboxes, Running Malware, Monitoring with process monitor, Viewing processes with process explorer, Comparing registry snapshots with regshot, Faking a network, Packet sniffing with Wireshark, Using INetSim, Basic Dynamic Tools. x86 Disassembly	**12**	**CO1**
II	**IDA PRO:** Loading an executable, IDA Pro Interface, Using cross references, Analysing functions, Using graphing options, Enhancing disassembly, Extending IDA with plug-ins. **Recognising C Code constructs in assembly:** Global v/s local variables, Disassembling arithmetic operations, recognizing if statements, recognizing loops, function call conventions, Analysing switch statements, Disassembling arrays, Identifying structs, Analysing linked list traversal. **Analysing Malicious Windows Programs:** The windows API, The Windows Registry, Networking APIs,	**12**	**CO2**

	Understanding running malware. Kernel v/s user mode, Native API. **Advanced Dynamic Analysis – Debugging:** Source-level v/s Assembly-level debugging, kernel v/s user mode debugging, Using a debugger, Exceptions, Modifying execution with a debugger, modifying program execution.		
III	**Advanced Dynamic Analysis – OLLYDBG:** Loading Malware, The Ollydbg Interface, Memory Map, Viewing threads and Stacks, Executing code, Breakpoints, Loading DLLs, Tracing, Exception handling, Patching, Analysing shell code, Assistance features, Plug-ins, Scriptable debugging. **Kernel Debugging with WINDBG:** Drivers and kernel code, Using WinDbg, Microsoft Symbols, kernel debugging and using it, Rootkits, Loading drivers, kernel issues with windows. **Malware Functionality – Malware Behavior:** Downloaders and launchers, Backdoors, Credential stealers, Persistence mechanisms, Privilege escalation, covering the tracks. **Covert Malware Launching:** Launchers, Process injection, Process replacement, Hook injection, detours, APC injection.	**12**	**CO3**
IV	**Data Encoding:** Goal of Analysing algorithms, Simple ciphers, Common cryptographic algorithms, Custom encoding, decoding. **Malware – focused network signatures:** Network countermeasures**,** Safely investigating attacker online, Content-Based Network Countermeasures, Combining Dynamic and Static Analysis Techniques, Understanding the Attacker's Perspective**.** **Anti-disassembly:** Concepts, Defeating disassembly algorithms, anti-disassembly techniques, Obscuring flow control, Thwarting stack-frame analysis. **Anti-debugging:** Windows debugger detection, debugger behavior, Interfering with debugger functionality, Debugger vulnerabilities.	**12**	**CO4**
V	**Anti-virtual machine techniques:** VMWare artifacts, Vulnerable functions, Tweaking settings, Escaping the virtual machine. **Packers and unpacking:** Packer anatomy, Identifying Packed Programs, Unpacking options, Automated Unpacking, Manual Unpacking, Common packers, Analysing without unpacking, Packed DLLs, **Shellcode Analysis:** Loading shellcode for analysis, Position-independent Code, Identifying Execution Location, Manual Symbol Resolution, Shellcode encoding, NOP Sleds, Finding Shellcode. **C++ Analysis:** OOP, Virtual and Non-virtual functions, Creating and destroying objects.	**12**	**CO5**

	64-bit Malware: Why 64-bit malware? Differences in x64 architecture, Windows 32-bit on Windows 64-bit, 64-bit hints at malware functionality.		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Practical Malware Analysis – The Hands-On Guide to Dissecting Malicious Software	Michael Sikorski, Andrew Honig	No Scratch Press	-	2013
2.	Mastering Malware Analysis	Alexey Kleymenov, Amr Thabet	Packt Publishing	-	2019
3.	Windows Malware Analysis Essentials	Victor Marak	Packt Publishing		2015

M. Sc (Information Technology)		**Semester – III**	
Course Name: Malware Analysis Practical		**Course Code: PSIT3P3d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Understand various introductory techniques of malware analysis and creating the testing environment
CO2: Perform advanced dynamic analysis and recognize constructs in assembly code.
CO3: Perform Reverse Engineering using OLLYDBG and WINDBG and study the behaviours and functions of malware
CO4: Understand data encoding, various techniques for anti-disassembly and anti-debugging
CO5: Understand various anti virtual machine techniques and perform shellcode analysis of various languages along with x64 architecture.

PSIT304a: Robotic Process Automation

M. Sc (Information Technology)		Semester – III	
Course Name: Robotic Process Automation		**Course Code: PSIT304a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To make the students aware about the automation today in the industry.
- To make the students aware about the tools used for automation.
- To help the students automate a complete process

Unit	Details	Lectures	Outcome
I	**Robotic Process Automation:** Scope and techniques of automation, About UiPath **Record and Play:** UiPath stack, Downloading and installing UiPath Studio, Learning UiPath Studio, Task recorder, Step-by-step examples using the recorder.	**12**	**CO1**
II	**Sequence, Flowchart, and Control Flow:** Sequencing the workflow, Activities, Control flow, various types of loops, and decision making, Step-by-step example using Sequence and Flowchart, Step-by-step example using Sequence and Control flow **Data Manipulation:** Variables and scope, Collections, Arguments – Purpose and use, Data table usage with examples, Clipboard management, File operation with step-by-step example, CSV/Excel to data table and vice versa (with a step-by-step example)	**12**	**CO2**
III	**Taking Control of the Controls :** Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls – mouse and keyboard activities, Working with UiExplorer, Handling events, Revisit recorder, Screen Scraping, When to use OCR, Types of OCR available, How to use OCR, Avoiding typical failure points **Tame that Application with Plugins and Extensions:** Terminal plugin, SAP automation, Java plugin, Citrix automation, Mail plugin, PDF plugin, Web integration, Excel and Word plugins, Credential management, Extensions – Java, Chrome, Firefox, and Silverlight	**12**	**CO3**
IV	**Handling User Events and Assistant Bots:** What are assistant bots?, Monitoring system event triggers, Hotkey trigger, Mouse trigger, System trigger ,Monitoring image and element triggers, An example of	**12**	**CO4**

	monitoring email, Example of monitoring a copying event and blocking it, Launching an assistant bot on a keyboard event **Exception Handling, Debugging, and Logging:** Exception handling, Common exceptions and ways to handle them, Logging and taking screenshots, Debugging techniques, Collecting crash dumps, Error reporting		
V	**Managing and Maintaining the Code:** Project organization, Nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines, or Sequences, Using config files and examples of a config file, Integrating a TFS server **Deploying and Maintaining the Bot:** Publishing using publish utility, Overview of Orchestration Server, Using Orchestration Server to control bots, Using Orchestration Server to deploy bots, License management, Publishing and managing updates	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Learning Robotic Process Automation	Alok Mani Tripathi	Packt	1st	2018
2.	Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation	Srikanth Merianda	Createspace Independent Publishing	1st	2018
3.	The Simple Implementation Guide to Robotic Process Automation (Rpa): How to Best Implement Rpa in an Organization	Kelly Wibbenmeyer	iUniverse	1st	2018

M. Sc (Information Technology)		**Semester – III**	
Course Name: Robotic Process Automation		**Course Code: PSIT3P4a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completing the course, a learner will be able to:

CO1: Understand the mechanism of business process and can provide the solution in an optimize way.

CO2: Understand the features use for interacting with database plugins.

CO3: Use the plug-ins and other controls used for process automation.

CO4: Use and handle the different events, debugging and managing the errors.

CO5: Test and deploy the automated process.

PSIT304b: Virtual Reality and Augmented Reality

M. Sc (Information Technology)		**Semester – III**	
Course Name: Virtual Reality and Augmented Reality		**Course Code: PSIT304b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To learn background of VR including a brief history of VR, different forms of VR and related technologies, and broad overview of some of the most important concepts
- To provide background in perception to educate VR creators on concepts and theories of how we perceive and interact with the world around us
- To make learner aware of high-level concepts for designing/building assets and how subtle design choices can influence user behavior
- To learn about art for VR and AR should be optimized for spatial displays with spatially aware input devices to interact with digital objects in true 3D
- Walkthrough of VRTK, an open source project meant to spur on cross-platform development

Unit	Details	Lectures	Outcome
I	Introduction: What Is Virtual Reality, A History of VR, An Overview of Various Realities, Immersion, Presence, and Reality Trade-Offs, The Basics: Design Guidelines, Objective and Subjective Reality, Perceptual Models and Processes, Perceptual Modalities	**12**	**CO1**
II	Perception of Space and Time, Perceptual Stability, Attention, and Action, Perception: Design Guidelines, Adverse Health Effects, Motion Sickness, Eye Strain, Seizures, and Aftereffects, Hardware Challenges, Latency, Measuring Sickness, Reducing Adverse Effects, Adverse Health Effects: Design Guidelines	**12**	**CO2**
III	Content Creation, Concepts of Content Creation, Environmental Design, Affecting Behavior, Transitioning to VR Content Creation, Content Creation: Design Guidelines, Interaction, Human-Centered Interaction, VR Interaction Concepts, Input Devices, Interaction Patterns and Techniques, Interaction: Design Guidelines	**12**	**CO3**
IV	Design and Art Across Digital Realities, Designing for Our Senses, Virtual Reality for Art, 3D Art Optimization, Computer Vision That Makes Augmented Reality Possible Works, Virtual Reality and Augmented Reality: Cross-Platform Theory	**12**	**CO4**
V	Virtual Reality Toolkit: Open Source Framework for the Community, Data and Machine Learning Visualization	**12**	**CO5**

	Design and Development in Spatial Computing, Character AI and Behaviors, The Virtual and Augmented Reality Health Technology Ecosystem		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	The VR Book, Human Centered Design for Virtual Reality	Jason Jerald	ACM Books	1st	2016
2.	Creating Augmented and Virtual Realities	Erin Pangilinan, Steve Lukas, Vasanth Mohan	O'Reilly	1st	2019
3.	Virtual reality with VRTK4	Rakesh Baruah	APress	1st	2020

M. Sc (Information Technology)		**Semester – III**	
Course Name: Virtual Reality and Augmented Reality Practical		**Course Code: PSIT3P4b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Apply the concepts of VR and AR in real life.
CO2: Reduce the greatest risk to VR.
CO3: Design the way users interact within the scenes they find themselves in.
CO4: be exposed to VR, AR and today's resources
CO5: Effectively use open source VR software.

PSIT304c: Data Centre Technologies

M. Sc (Information Technology)		Semester – III	
Course Name: Data Centre Technologies		**Course Code: PSIT304c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Identify important requirements to design and support a data center.
- Determine a data center environment's requirement including systems and network architecture as well as services.
- Evaluate options for server farms, network designs, high availability, load balancing, data center services, and trends that might affect data center designs.
- Assess threats, vulnerabilities and common attacks, and network security devices available to protect data centers.
- Design a data center infrastructure integrating features that address security, performance, and availability.
- Measure data center traffic patterns and performance metrics.

Unit	Details	Lectures	Outcome
I	Virtualization History and Definitions Data Center Essential Definitions Data Center Evolution Operational Areas and Data Center Architecture The Origins of Data Center Virtualization Virtual Memory Mainframe Virtualization Hot Standby Router Protocol Defining Virtualization Data Center Virtualization Timeline Classifying Virtualization Technologies A Virtualization Taxonomy Virtualization Scalability Technology Areas Classification Examples Summary Data Center Network Evolution Ethernet Protocol: Then and Now Ethernet Media Coaxial Cable Twisted-Pair Optical Fiber Direct-Attach Twinaxial Cables Ethernet Data Rate Timeline Data Center Network Topologies Data Center Network Layers Design Factors for Data Center Networks Physical Network Layout Considerations The ANSI/TIA-942 Standard Network Virtualization Benefits Network Logical Partitioning Network Simplification and Traffic Load Balancing Management Consolidation and Cabling Optimization Network Extension	**12**	**CO1**

	The Humble Beginnings of Network Virtualization Network Partitioning Concepts from the Bridging World Defining VLANs VLAN Trunks Two Common Misconceptions About VLANs Misconception Number 1: A VLAN Must Be Associated to an IP Subnet Misconception Number 2: Layer 3 VLANs Spanning Tree Protocol and VLANs Spanning Tree Protocol at Work Port States Spanning Tree Protocol Enhancements Spanning Tree Instances Private VLANs VLAN Specifics Native VLAN Reserved VLANs IDs Resource Sharing Control and Management Plane Concepts from the Routing World Overlapping Addresses in a Data Center Defining and Configuring VRFs VRFs and Routing Protocols VRFs and the Management Plane VRF-Awareness VRF Resource Allocation Control		
II	An Army of One: ACE Virtual Contexts Application Networking Services The Use of Load Balancers Load-Balancing Concepts Layer 4 Switching Versus Layer 7 Switching Connection Management Address Translation and Load Balancing Server NAT Dual NAT Port Redirection Transparent Mode Other Load-Balancing Applications Firewall Load Balancing Reverse Proxy Load Balancing Offloading Servers SSL Offload TCP Offload HTTP Compression Load Balancer Proliferation in the Data Center Load Balancer Performance Security Policies Suboptimal Traffic Application Environment Independency ACE Virtual Contexts Application Control Engine Physical Connections Connecting an ACE Appliance Connecting an ACE Module Creating and Allocating Resources to Virtual Contexts Integrating ACE Virtual Contexts to the Data Center Network Routed Design Bridged Design One-Armed Design Managing and Configuring ACE Virtual Contexts Allowing Management Traffic to a Virtual Context Allowing Load Balancing Traffic Through a Virtual Context Controlling Management Access to Virtual Contexts ACE Virtual Context Additional Characteristics Sharing VLANs Among Contexts Virtual Context Fault Tolerance Instant Switches: Virtual Device Contexts Extending Device Virtualization Why Use VDCs? VDCs in Detail Creating and Configuring VDCs VDC Names	**12**	**CO2**

	and CLI Prompts Virtualization Nesting Allocating Resources to VDCs Using Resource Templates Managing VDCs VDC Operations Processes Failures and VDCs VDC Out-of-Band Management Role-Based Access Control and VDCs Global Resources Fooling Spanning Tree Spanning Tree Protocol and Link Utilization Link Aggregation Server Connectivity and NIC Teaming Cross-Switch PortChannels Virtual PortChannels Virtual PortChannel Definitions Configuring Virtual PortChannels Step 1: Defining the Domain Step 2: Establishing Peer Keepalive Connectivity Step 3: Creating the Peer Link Step 4: Creating the Virtual PortChannel Spanning Tree Protocol and Virtual Port Channels Peer Link Failure and Orphan Ports First-Hop Routing Protocols and Virtual Port Channels Layer 2 Multipathing and vPC+ FabricPath Data Plane FabricPath Control Plane FabricPath and Spanning Tree Protocol Virtual PortChannel Plus Virtualized Chassis with Fabric Extenders Server Access Models Understanding Fabric Extenders Fabric Extender Options Connecting a Fabric Extender to a Parent Switch Fabric Extended Interfaces and Spanning Tree Protocol Fabric Interfaces Redundancy Fabric Extender Topologies Straight-Through Topologies Dual-Homed Topologies		
III	Virtualized Chassis with Fabric Extenders Server Access Models Understanding Fabric Extenders Fabric Extender Options Connecting a Fabric Extender to a Parent Switch Fabric Extended Interfaces and Spanning Tree Protocol Fabric Interfaces Redundancy Fabric Extender Topologies Straight-Through Topologies Dual-Homed Topologies Use Case: Mixed Access Data Center A Tale of Two Data Centers A Brief History of Distributed Data Centers The Cold Age (Mid-1970s to 1980s) The Hot Age (1990s to Mid-2000s) The Active-Active Age (Mid-2000s to Today) The Case for Layer 2 Extensions Challenges of Layer 2 Extensions Ethernet Extensions over Optical Connections Virtual PortChannels FabricPath Ethernet Extensions over MPLS MPLS Basic Concepts Ethernet over MPLS Virtual Private LAN Service Ethernet Extensions over IP MPLS over GRE	**12**	**CO3**

	Overlay Transport Virtualization OTV Terminology OTV Basic Configuration OTV Loop Avoidance and Multihoming Migration to OTV OTV Site Designs VLAN Identifiers and Layer 2 Extensions Internal Routing in Connected Data Centers Use Case: Active-Active Greenfield Data Centers Summary Storage Evolution Data Center Storage Devices Hard Disk Drives Disk Arrays Tape Drives and Libraries Accessing Data in Rest Block-Based Access *Small Computer Systems Interface Mainframe Storage Access* Advanced Technology Attachment File Access Network File System Common Internet File System Record Access Storage Virtualization Virtualizing Storage Devices Virtualizing LUNs Virtualizing File Systems Virtualizing SANs		
IV	Server Evolution Server Architectures Mainframes RISC Servers x86 Servers x86 Hardware Evolution CPU Evolution Memory Evolution Expansion Bus Evolution Physical Format Evolution Introducing x86 Server Virtualization Virtualization Unleashed Unified Computing Changing Personalities Server Provisioning Challenges Server Domain Operations Infrastructure Domain Operations Unified Computing and Service Profiles Building Service Profiles Identifying a Service Profile Storage Definitions Network Definitions Virtual Interface Placement Server Boot Order Maintenance Policy Server Assignment Operational Policies Configuration External IPMI Management Configuration Management IP Address *Additional Policies* Associating a Service Profile to a Server Installing an Operating System Verifying Stateless Computing Using Policies BIOS Setting Policies Firmware Policies Industrializing Server Provisioning Cloning Pools Service Profile Templates Server Pools Use Case: Seasonal Workloads	**12**	**CO4**
V	Moving Targets Virtual Network Services Definitions Virtual Network Services Data Path vPath-Enabled Virtual Network Services	**12**	**CO5**

	Cisco Virtual Security Gateway: Compute Virtual Firewall Installing Virtual Security Gateway Creating Security Policies, Sending Data Traffic to VSG Virtual Machine Attributes and Virtual Zones Application Acceleration, WAN Acceleration and Online Migration Routing in the Virtual World Site Selection and Server Virtualization Route Health Injection Global Server Load Balancing Location/ID Separation Protocol Use Case: Virtual Data Center The Virtual Data Center and Cloud Computing The Virtual Data Center Automation and Standardization What Is Cloud Computing? Cloud Implementation Example Journey to the Cloud Networking in the Clouds Software-Defined Networks Open Stack Network Overlays		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Data Center Virtualization Fundamentals	Gustavo Alessandro Andrade Santana	Cisco Press	1st	2014

M. Sc (Information Technology)		**Semester – III**	
Course Name: Data Centre Technologies Practical		**Course Code: PSIT3P4c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand basic concepts in Virtualization.
CO2: Understand concepts of Load Balancing and Aggregation /virtual switching
CO3: Understand Data center Migration and Fabric Building
CO4: Understand various Changes in Server Architecture
CO5: Understand the concepts of Cloud computing and how to move towards a cloud computing technology.

PSIT304d: Offensive Security

M. Sc (Information Technology)		Semester – III	
Course Name: Offensive Security		**Course Code: PSIT304d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understanding of security requirements within an organization
- How to inspect, protect assets from technical and managerial perspectives
- To Learn various offensive strategies to penetrate the organizations security.
- To learn various tools that aid in offensive security testing.

Unit	Details	Lectures	Outcome
I	Fault Tolerance and Resilience in Cloud Computing Environments, Securing Web Applications, Services, and Servers, Wireless Network Security, Wireless Sensor Network Security: The Internet of Things, Security for the Internet of Things, Cellular Network Security	**12**	**CO1**
II	Social Engineering Deceptions and Defenses, What Is Vulnerability Assessment, Risk Management, Insider Threat, Disaster Recovery, Security Policies and Plans Development	**12**	**CO2**
III	Introduction to Metasploit and Supporting Tools The importance of penetration testing Vulnerability assessment versus penetration testing The need for a penetration testing framework Introduction to Metasploit When to use Metasploit? Making Metasploit effective and powerful using supplementary tools Nessus NMAP w3af Armitage Setting up Your Environment Using the Kali Linux virtual machine - the easiest way Installing Metasploit on Windows Installing Metasploit on Linux Setting up exploitable targets in a virtual environment Metasploit Components and Environment Configuration Anatomy and structure of Metasploit Metasploit components Auxiliaries Exploits Encoders Payloads Post, Playing around with msfconsole Variables in Metasploit Updating the Metasploit Framework 55	**12**	**CO3**

IV	Information Gathering with Metasploit Information gathering and enumeration Transmission Control Protocol User Datagram Protocol File Transfer Protocol Server Message Block Hypertext Transfer Protocol Simple Mail Transfer Protocol Secure Shell Domain Name System Remote Desktop Protocol Password sniffing Advanced search with shodan Vulnerability Hunting with Metasploit Managing the database Work spaces Importing scans Backing up the database **NMAP** NMAP scanning approach **Nessus** Scanning using Nessus from msfconsole Vulnerability detection with Metasploit auxiliaries Auto exploitation with db_autopwn **Post exploitation** What is meterpreter? Searching for content Screen capture Keystroke logging Dumping the hashes and cracking with JTR Shell command Privilege escalation Client-side Attacks with Metasploit Need of client-side attacks What are client-side attacks? What is a Shellcode? What is a reverse shell? What is a bind shell? What is an encoder? **The msfvenom utility** Generating a payload with msfvenom Social Engineering with Metasploit Generating malicious PDF Creating infectious media drives	**12**	**CO4**
V	Approaching a Penetration Test Using Metasploit Organizing a penetration test Preinteractions Intelligence gathering/reconnaissance phase Predicting the test grounds Modeling threats Vulnerability analysis Exploitation and post-exploitation Reporting Mounting the environment Setting up Kali Linux in virtual environment The fundamentals of Metasploit Conducting a penetration test with Metasploit Recalling the basics of Metasploit Benefits of penetration testing using Metasploit Open source Support for testing large networks and easy naming conventions Smart payload generation and switching mechanism Cleaner exits The GUI environment	**12**	**CO5**

	Penetration testing an unknown network Assumptions Gathering intelligence Using databases in Metasploit Modeling threats Vulnerability analysis of VSFTPD backdoor The attack procedure The procedure of exploiting the vulnerability Exploitation and post exploitation Vulnerability analysis of PHP-CGI query string parameter vulnerability Exploitation and post exploitation Vulnerability analysis of HFS Exploitation and post exploitation Maintaining access Clearing tracks Revising the approach Reinventing Metasploit Ruby – the heart of Metasploit Creating your first Ruby program Interacting with the Ruby shell Defining methods in the shell Variables and data types in Ruby Working with strings Concatenating strings The substring function The split function Numbers and conversions in Ruby Conversions in Ruby Ranges in Ruby Arrays in Ruby Methods in Ruby Decision-making operators Loops in Ruby Regular expressions Wrapping up with Ruby basics **Developing custom modules** Building a module in a nutshell The architecture of the Metasploit framework Understanding the file structure The libraries layout Understanding the existing modules The format of a Metasploit module Disassembling existing HTTP server scanner module Libraries and the function Writing out a custom FTP scanner module Libraries and the function Using msftidy Writing out a custom SSH authentication brute forcer Rephrasing the equation Writing a drive disabler post exploitation module Writing a credential harvester post exploitation module **Breakthrough meterpreter scripting** Essentials of meterpreter scripting Pivoting the target network Setting up persistent access API calls and mixins Fabricating custom meterpreter scripts Working with RailGun Interactive Ruby shell basics Understanding RailGun and its scripting Manipulating Windows API calls Fabricating sophisticated RailGun scripts		

	The Exploit Formulation Process The absolute basics of exploitation The basics The architecture System organization basics Registers Exploiting stack-based buffer overflows with Metasploit Crashing the vulnerable application Building the exploit base Calculating the offset Using the pattern_create tool Using the pattern_offset tool Finding the JMP ESP address Using Immunity Debugger to find executable modules Using msfbinscan Stuffing the space Relevance of NOPs Determining bad characters Determining space limitations Writing the Metasploit exploit module Exploiting SEH-based buffer overflows with Metasploit Building the exploit base Calculating the offset Using pattern_create tool Using pattern_offset tool *Table of Contents* Finding the POP/POP/RET address The Mona script Using msfbinscan Writing the Metasploit SEH exploit module Using NASM shell for writing assembly instructions **Bypassing DEP in Metasploit modules** Using msfrop to find ROP gadgets Using Mona to create ROP chains Writing the Metasploit exploit module for DEP bypass		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer and Information Security Handbook	John R. Vacca	Morgan Kaufmann Publisher	3rd	2017
2.	Metasploit Revealed: Secrets of the Expert Pentester	Sagar Rahalkar	Packt Publishing		2017

M. Sc (Information Technology)		**Semester – III**	
Course Name: Offensive Security Practical		**Course Code: PSIT3P4d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:
CO1: Understand basic security issues in cloud, IoT etc.
CO2: Understand different security techniques and policies
CO3: Use Vulnerability assessment and exploitation tool
CO4: Analyze the network perform reconnaissance and enumerate the target to detect vulnerabilities
CO5: Perform offensive tests using Metasploit on various application, generating payloads etc.

SEMESTER IV

PSIT401: Blockchain

M. Sc (Information Technology)		Semester – IV	
Course Name: Blockchain		**Course Code: PSIT401**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To provide conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.
- To cover the technological underpinnings of blockchain operations as distributed data structures and decision-making systems, their functionality and different architecture types.
- To provide a critical evaluation of existing "smart contract" capabilities and platforms, and examine their future directions, opportunities, risks and challenges.

Unit	Details	Lectures	Outcome
I	**Blockchain:** Introduction, History, Centralised versus Decentralised systems, Layers of blockchain, Importance of blockchain, Blockchain uses and use cases. **Working of Blockchain:** Blockchain foundation, Cryptography, Game Theory, Computer Science Engineering, Properties of blockchain solutions, blockchain transactions, distributed consensus mechanisms, Blockchain mechanisms, Scaling blockchain **Working of Bitcoin:** Money, Bitcoin, Bitcoin blockchain, bitcoin network, bitcoin scripts, Full Nodes and SVPs, Bitcoin wallets.	**12**	**CO1**
II	**Ethereum:** three parts of blockchain, Ether as currency and commodity, Building trustless systems, Smart contracts, Ethereum Virtual Machine, The Mist browser, Wallets as a Computing Metaphor, The Bank Teller Metaphor, Breaking with Banking History, How Encryption Leads to Trust, System Requirements, Using Parity with Geth, Anonymity in Cryptocurrency, Central Bank Network, Virtual Machines, EVM Applications, State Machines, Guts of the EVM, Blocks, Mining's Place in the State Transition Function, Renting Time on the EVM, Gas, Working with Gas, Accounts, Transactions, and Messages, Transactions and Messages, Estimating Gas Fees for Operations, Opcodes in the EVM.	**12**	**CO2**

	Solidity Programming: Introduction, Global Banking Made Real, Complementary Currency, Programming the EVM, Design Rationale, Importance of Formal Proofs, Automated Proofs, Testing, Formatting Solidity Files, Reading Code, Statements and Expressions in Solidity, Value Types, Global Special Variables, Units, and Functions,		
III	**Hyperledger:** Overview, Fabric, composer, installing hyperledger fabric and composer, deploying, running the network, error troubleshooting. **Smart Contracts and Tokens:** EVM as Back End, Assets Backed by Anything, Cryptocurrency Is a Measure of Time, Function of Collectibles in Human Systems, Platforms for High-Value Digital Collectibles, Tokens as Category of Smart Contract, Creating a Token, Deploying the Contract, Playing with Contracts.	**12**	**CO3**
IV	**Mining Ether:** Why? Ether's Source, Defining Mining, Difficulty, Self-Regulation, and the Race for Profit, How Proof of Work Helps Regulate Block Time, DAG and Nonce, Faster Blocks, Stale Blocks, Difficulties, Ancestry of Blocks and Transactions, Ethereum and Bitcoin, Forking, Mining, Geth on Windows, Executing Commands in the EVM via the Geth Console, Launching Geth with Flags, Mining on the Testnet, GPU Mining Rigs, Mining on a Pool with Multiple GPUs. **Cryptoecnomics:** Introduction, Usefulness of cryptoeconomics, Speed of blocks, Ether Issuance scheme, Common Attack Scenarios.	**12**	**CO4**
V	**Blockchain Application Development:** Decentralized Applications, Blockchain Application Development, Interacting with the Bitcoin Blockchain, Interacting Programmatically with Ethereum—Sending Transactions, Creating a Smart Contract, Executing Smart Contract Functions, Public vs. Private Blockchains, Decentralized Application Architecture, **Building an Ethereum DApp:** The DApp, Setting Up a Private Ethereum Network, Creating the Smart Contract, Deploying the Smart Contract, Client Application, **DApp deployment:** Seven Ways to Think About Smart Contracts, Dapp Contract Data Models, EVM back-end and front-end communication, JSON-RPC, Web 3, JavaScript API, Using Meteor with the EVM, Executing Contracts in the Console, Recommendations for Prototyping, Third-Party Deployment Libraries, **Creating Private Chains.**	**12**	**CO5**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Beginning Blockchain A Beginner's Guide to Building Blockchain Solutions	Bikramaditya Singhal, Gautam Dhameja, Priyansu Sekhar Panda	Apress		2018
2.	Introducing Ethereum and Solidity	Chris Dannen	Apress		2017
3.	The Blockchain Developer	Elad Elrom	Apress		2019
4.	Mastering Ethereum	Andreas M. Antonopoulos Dr. Gavin Wood	O'Reilly	First	2018
5.	Blockchain Enabled Applications	Vikram Dhillon David Metcalf Max Hooper	Apress		2017

M. Sc (Information Technology)		**Semester – III**	
Course Name: Blockchain		**Course Code: PSIT**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:

CO1: The students would understand the structure of a blockchain and why/when it is better than a simple distributed database.

CO2: Analyze the incentive structure in a blockchain based system and critically assess its functions, benefits and vulnerabilities

CO3: Evaluate the setting where a blockchain based structure may be applied, its potential and its limitations

CO4: Understand what constitutes a "smart" contract, what are its legal implications and what it can and cannot do, now and in the near future

CO5: Develop blockchain DApps.

PSIT402a: Natural Language Processing

M. Sc (Information Technology)		Semester – IV	
Course Name: Natural Language Processing		**Course Code: PSIT402a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- The prime objective of this course is to introduce the students to the field of Language Computing and its applications ranging from classical era to modern context.
- To provide understanding of various NLP tasks and NLP abstractions such as Morphological analysis, POS tagging, concept of syntactic parsing, semantic analysis etc.
- To provide knowledge of different approaches/algorithms for carrying out NLP tasks.
- To highlight the concepts of Language grammar and grammar representation in Computational Linguistics.

Unit	Details	Lectures	Outcome
I	Introduction to NLP, brief history, NLP applications: Speech to Text(STT), Text to Speech(TTS), Story Understanding, NL Generation, QA system, Machine Translation, Text Summarization, Text classification, Sentiment Analysis, Grammar/Spell Checkers etc., challenges/Open Problems, NLP abstraction levels, Natural Language (NL) Characteristics and NL computing approaches/techniques and steps, NL tasks: Segmentation, Chunking, tagging, NER, Parsing, Word Sense Disambiguation, NL Generation, Web 2.0 Applications : Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).	**12**	**CO1**
II	Text Processing Challenges, Overview of Language Scripts and their representation on Machines using Character Sets, Language, Corpus and Application Dependence issues, Segmentation: word level(Tokenization), Sentence level. Regular Expression and Automata Morphology, Types, Survey of English and Indian Languages Morphology, Morphological parsing FSA and FST, Porter stemmer, Rule based and Paradigm based Morphology, Human Morphological Processing, Machine Learning approaches.	**12**	**CO2**
III	Word Classes ad Part-of-Speech tagging(POS), survey of POS tagsets, Rule based approaches (ENGTOWL), Stochastic approaches(Probabilistic, N-gram and HMM), TBL morphology, unknown word handling,	**12**	**CO3**

	evaluation metrics: Precision/Recall/F-measure, error analysis.		
IV	NL parsing basics, approaches: TopDown, BottomUp, Overview of Grammar Formalisms: constituency and dependency school, Grammar notations CFG, LFG, PCFG, LTAG, Feature- Unification, overview of English CFG, Indian Language Parsing in Paninian Karaka Theory, CFG parsing using Earley's and CYK algorithms, Probabilistic parsing, Dependency Parsing: Covington algorithm, MALT parser, MST parser.	**12**	**CO4**
V	Concepts and issues in NL, Theories and approaches for Semantic Analysis, Meaning Representation, word similarity, Lexical Semantics, word senses and relationships, WordNet (English and IndoWordnet), Word Sense Disambiguation: Lesk Algorithm Walker's algorithm, Coreferences Resolution:Anaphora, Cataphora.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Handbook of Natural Language Processing	Indurkhya, N., & Damerau, F. J.	CRC Press Taylor and Francis Group	2nd	2010
2.	Speech and Language Processing	Martin, J. H., & Jurafsky, D.	Pearson Education India	2nd	2013
3.	Foundations of Statistical Natural Language Processing	Manning, Christopher and Heinrich, Schutze	MIT Press	1st	1997
4.	Natural Language Processing With Python	Steven Bird, Edward Loper	O'Reilly Media	2nd	2016
5.	Video Links 1. http://www.nptelvideos.in/2012/11/natural-language-processing.html				

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Natural Language Processing Practical		**Course Code: PSIT4P2a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Students will get idea about know-hows, issues and challenge in Natural Language Processing and NLP applications and their relevance in the classical and modern context.

CO2: Student will get understanding of Computational techniques and approaches for solving NLP problems and develop modules for NLP tasks and tools such as Morph Analyzer, POS tagger, Chunker, Parser, WSD tool etc.

CO3: Students will also be introduced to various grammar formalisms, which they can apply in different fields of study.

CO4: Students can take up project work or work in R&D firms working in NLP and its allied areas.

CO5: Student will be able to understand applications in different sectors

PSIT402b: Digital Image Forensics

M. Sc (Information Technology)		Semester – IV	
Course Name: Digital Image Forensics		**Course Code: PSIT402b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To understand describe the origin of computer forensics and the relationship between law enforcement and industry.
- Describe electronic evidence and the computing investigation process.
- Extracting Digital Evidence from Images and establishing them in court of Law.
- Enhancing images for investigation and various techniques to enhance images.
- Interpret and present Evidences in Court of Law.

Unit	Details	Lectures	Outcome
I	History of Forensic Digital Enhancement, Establishing Integrity of Digital Images for Court,	**12**	**CO1**
II	Digital Still and Video Cameras, Color Modes and Channel Blending to Extract Detail	**12**	**CO2**
III	Multiple Image Techniques, Fast Fourier Transform (FFT) – Background Pattern Removal.	**12**	**CO3**
IV	Contrast Adjustment Techniques, Advanced Processing Techniques, Comparison and Measurement	**12**	**CO4**
V	The Approach – Developing Enhancement Strategies for Images Intended for Analysis, Digital Imaging in the Courts, Interpreting and Presenting Evidence	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Forensic Digital Image Processing: Optimization of Impression Evidence	Brian Dalrymple, Jill Smith	CRC Press		2018
2.	Forensic Uses of Digital Imaging	John C. Russ, Jens Rindel, P. Lord	Taylor & Francis Group	2nd	2016

M. Sc (Information Technology)		Semester – III	
Course Name: Digital Image Forensics Practical		**Course Code: PSIT4P2b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand the basics of image forensics and techniques to establish their integrity

CO2: Understand different techniques for extracting detail from images.

CO3: Understand and apply various advanced techniques in image processing and to compare and measure various parameters associated with them

CO4: Apply various enhancement strategies for digital images

CO5: Prepare the evidence to be acceptable in the court of law.

PSIT402c: Advanced IoT

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Advanced IoT		**Course Code: PSIT402c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To understand the latest developments in IoT
- To build smart IoT applications
- To leverage the applications of IoT in different technologies
- To build own IoT platform

Unit	Details	Lectures	Outcome
I	The Artificial Intelligence 2.0, IoT and Azure IoT Suite, Creating Smart IoT Application	**12**	**CO1**
II	Cognitive APIs, Consuming Microsoft Cognitive APIs, Building Smarter Application using Cognitive APIs.	**12**	**CO2**
III	Implementing Blockchain as a service, Capturing, Analysing and Visualizing real-time data, Making prediction with machine learning.	**12**	**CO3**
IV	IoT and Microservices, Service Fabric, Build your own IoT platform: Introduction, Building blocks for IoT solution, Essentials for building your own platform, Platform requirements, building the platform by initializing cloud instance, installing basic software stacks, securing instance and software, installing node.js and Node-RED, Message broker.	**12**	**CO4**
V	Building Critical components, configuring message broker, creating REST interface, Rule engine and authentication, documentation and testing, Introspection on what we build and deliverables.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	IoT, AI, and Blockchain for .NET- Building a Next-Generation Application from the Ground Up	Nishith Pathak Anurag Bhandari	Apress	--	2018
2.	Microservices, IoT and Azure	Bob Familiar	Apress	--	2015
3.	Build your own IoT Platform	Anand Tamboli	Apress	--	2019

4.	Internet of Things Architectures, Protocols and Standards	Simone Cirani Gianluigi Ferrari Marco Picone Luca Veltri	Wiley	1	2019

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Advanced IoT Practical		**Course Code: PSIT4P2c**	
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**50**
	Internal	**--**	**-**

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Build smart IoT applications on Azure.

CO2: Use Microsoft cognitive APIs to build IoT applications.

CO3: Implement Blockchain in IoT.

CO4: Install and use microservices in IoT.

CO5: Build own IoT platform and use it in a customised way.

PSIT402d: Cyber Forensics

M. Sc (Information Technology)		Semester – IV	
Course Name: Cyber Forensics		**Course Code: PSIT402d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Explain laws relevant to computer forensics
- Seize digital evidence from pc systems
- Recover data to be used as evidence
- Analyse data and reconstruct events
- Explain how data may be concealed or hidden

Unit	Details	Lectures	Outcome
I	Computer Forensics: The present Scenario, The Investigation Process, Computers – Searching and Seizing, Electronic Evidence, Procedures to be followed by the first responder.	**12**	**CO1**
II	Setting up a lab for Computer Forensics, Hard Disks and File Systems, Forensics on Windows Machine, Acquire and Duplicate Data	**12**	**CO2**
III	Recovery of deleted files and partitions, Using Access Data FTK and Encase for forensics Investigation, Forensic analysis of Steganography and Image files, Cracking Application passwords.	**12**	**CO3**
IV	Capturing logs and correlating to the events, Network Forensics – Investigating logs and Network traffic, Investigating Wireless and Web Attacks.	**12**	**CO4**
V	Email Tracking and Email Crime investigation. Mobile Forensics, Reports of Investigation, Become an expert witness.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	EC-Council CHFIv10 Study Guide	--	EC-Council	--	2018
2.	The official CHFI Exam 312-49 study Guide	Dave Kleiman	SYNGRESS	--	2007
3.	Digital Forensics and Incident Response	Gerard Johansen	Packt Publishing	--	2020
4.	Practical Cyber Forensics	Niranjan Reddy	Apress	--	2019

M. Sc (Information Technology)		Semester – IV	
Course Name: Cyber Forensics Practical		**Course Code: PSIT4P2d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Investigate the cyber forensics with standard operating procedures.

CO2: Recover the data from the hard disk with legal procedure.

CO3: To recover and analyse the data using forensics tool

CO4: Acquire the knowledge of network analysis and use it for analysing the internet attacks.

CO5: Able to investigate internet frauds done through various gadgets like mobile, laptops, tablets and become a forensic investigator.

PSIT403a: Deep Learning

M. Sc (Information Technology)		Semester – IV	
Course Name: Deep Learning		**Course Code: PSIT403a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To present the mathematical, statistical and computational challenges of building neural networks
- To study the concepts of deep learning
- To enable the students to know deep learning techniques to support real-time applications

Unit	Details	Lectures	Outcome
I	**Applied Math and Machine Learning Basics:** Linear Algebra: Scalars, Vectors, Matrices and Tensors , Multiplying Matrices and Vectors , Identity and Inverse Matrices, Linear Dependence and Span , norms, special matrices and vectors, eigen decompositions. **Numerical Computation:** Overflow and under flow, poor conditioning, Gradient Based Optimization, Constraint optimization.	**12**	**CO1**
II	**Deep Networks:** Deep feedforward network , regularization for deep learning , Optimization for Training deep models	**12**	**CO2**
III	Convolutional Networks, Sequence Modelling, Applications	**12**	**CO3**
IV	Deep Learning Research: Linear Factor Models, Autoencoders, representation learning	**12**	**CO4**
V	Approximate Inference, Deep Generative Models	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Deep Learning	Ian Goodfellow, Yoshua Bengio, Aaron Courvile	An MIT Press book	1st	2016
2.	Fundamentals of Deep Learning	Nikhil Buduma	O'Reilly	1st	2017
3.	Deep Learning: Methods and Applications	Deng & Yu	Now Publishers	1st	2013
4.	Deep Learning CookBook	Douwe Osinga	O'Reilly	1st	2017

M. Sc (Information Technology)		Semester – IV	
Course Name: Deep Learning Practical		**Course Code: PSIT4P3a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Describes basics of mathematical foundation that will help the learner to understand the concepts of Deep Learning.
CO2: Understand and describe model of deep learning
CO3: Design and implement various deep supervised learning architectures for text & image data.
CO4: Design and implement various deep learning models and architectures.
CO5: Apply various deep learning techniques to design efficient algorithms for real-world applications.

PSIT403b: Remote Sensing

M. Sc (Information Technology)		Semester – IV	
Course Name: Remote Sensing Practical		**Course Code: PSIT403b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Attain a foundational knowledge and comprehension of the physical, computational, and perceptual basis for remote sensing.
- Gain familiarity with a variety of physical, biological, and human geographic applications of remote sensing.
- Gain basic experience in the hands-on application of remote sensing data through visual interpretation and digital image processing exercises.
- Analyze and synthesize understanding by identifying and developing a research and application proposal using remote sensing.

Unit	Details	Lectures	Outcome
I	Remote Sensing: Basic Principles Introduction, Electromagnetic Radiation and Its Properties, Terminology, Nature of Electromagnetic Radiation, The Electromagnetic Spectrum, Sources of Electromagnetic Radiation, Interactions with the Earth's Atmosphere, Interaction with Earth-Surface Materials, Spectral Reflectance of Earth Surface Materials Remote Sensing Platforms and Sensors Introduction, Characteristics of Imaging Remote Sensing Instruments, Spatial Resolution, Spectral Resolution, Radiometric Resolution, Optical, Near-infrared and Thermal Imaging Sensors, Along-Track Scanning Radiometer (ATSR), Advanced Very High Resolution Radiometer (AVHRR) and NPOESS VIIRS, MODIS, Ocean Observing Instruments, IRS LISS, Landsat Instruments, SPOT Sensors, Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), High-Resolution Commercial and Small Satellite Systems, Microwave Imaging Sensors, European Space Agency Synthetic Aperture Spaceborne Radars, Radarsat, TerraSAR-X and COSMO/Skymed, ALOS PALSAR	**12**	**CO1**
II	Hardware and Software Aspects of Digital Image Processing Introduction, Properties of Digital Remote Sensing Data, Digital Data, Data Formats, System Processing,	**12**	**CO2**

	Numerical Analysis and Software Accuracy, Some Remarks on Statistics, Preprocessing of Remotely-Sensed Data Introduction, Cosmetic Operations, Missing Scan Lines, Destriping Methods, Geometric Correction and Registration, Orbital Geometry Model, Transformation Based on Ground Control Points, Resampling Procedures, Image Registration, Other Geometric Correction Methods, Atmospheric Correction, Background, Image-Based Methods, Radiative Transfer Models, Empirical Line Method, Illumination and View Angle Effects, Sensor Calibration, Terrain Effects		
III	Image Enhancement Techniques Introduction, Human Visual System, Contrast Enhancement, Linear Contrast Stretch, Histogram Equalization, Gaussian Stretch, Pseudocolour Enhancement, Density Slicing, Pseudocolour Transform, Image Transforms Introduction, Arithmetic Operations, Image Addition, Image Subtraction, Image Multiplication, Image Division and Vegetation Indices, Empirically Based Image Transforms, Perpendicular Vegetation Index, Tasselled Cap (Kauth–Thomas) Transformation, Principal Components Analysis, Standard Principal Components Analysis, Noise-Adjusted PCA, Decorrelation Stretch, Hue-Saturation-Intensity (HSI) Transform, The Discrete Fourier Transform, Two-Dimensional Fourier Transform, Applications of the Fourier Transform, The Discrete Wavelet Transform, The One-Dimensional Discrete Wavelet Transform, The Two-Dimensional Discrete Wavelet Transform, Change Detection, Introduction, NDVI Difference Image, PCA, Canonical Correlation Change Analysis, Image Fusion, HSI Algorithm, PCA, Gram-Schmidt Orthogonalization, Wavelet-Based Methods, Evaluation – Subjective Methods, Evaluation – Objective Methods	**12**	**CO3**
IV	Filtering Techniques Spatial Domain Low-Pass (Smoothing) Filters, Moving Average Filter, Median Filter, Adaptive Filters, Spatial Domain High-Pass (Sharpening) Filters, Image Subtraction Method, Derivative-Based Methods, Spatial Domain Edge Detectors, Frequency Domain Filters **Classification :** Geometrical Basis of Classification, Unsupervised Classification, The *k*-Means Algorithm, ISODATA, A Modified *k*-Means Algorithm, Supervised Classification, Training Samples, Statistical Classifiers, Neural Classifiers, Subpixel Classification Techniques, The Linear Mixture Model, Spectral Angle Mapping, ICA, Fuzzy Classifiers, More Advanced Approaches to	**12**	**CO4**

	Image Classification, Support Vector Machines , Decision Trees , Other Methods of Classification, Incorporation of Non-spectral Features, Texture, Use of External Data, Contextual Information, Feature Selection, Classification Accuracy Advanced Topics Introduction, SAR Interferometry, Basic Principles, Interferometric Processing, Problems in SAR Interferometry, Applications of SAR Interferometry, Imaging Spectroscopy, Processing Imaging Spectroscopy Data, Lidar, Lidar Details, Lidar Applications		
V	**Environmental Geographical Information Systems**: A Remote Sensing Perspective, Definitions, The Synergy between Remote Sensing and GIS, Data Models, Data Structures and File Formats, Spatial Data Models, Data Structures, File Formats, Raster to Vector and Vector to Raster Conversion, Geodata Processing, Buffering, Overlay, Locational Analysis, Slope and Aspect, Proximity Analysis, Contiguity and Connectivity, Spatial Analysis, Point Patterns and Interpolation. **Relating Field and Remotely-Sensed Measurements**: Statistical Analysis, Exploratory Data Analysis and Data Mining, Environmental Modelling, Visualization, Multicriteria Decision Analysis of Groundwater Recharge Zones, Data Characteristics, Multicriteria Decision Analysis, Evaluation, Assessing Flash Flood Hazards by Classifying Wadi Deposits in Arid Environments, Water Resources in Arid Lands, Case Study from the Sinai Peninsula, Egypt, Optical and Microwave Data Fusion, Classification of Wadi Deposits, Correlation of Classification Results with Geology and Terrain Data, Remote Sensing and GIS in Archaeological Studies, Introduction, Homul (Guatemala) Case Study, Aksum (Ethiopia) Case Study	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer Processing of Remotely-Sensed Images: An Introduction	Paul M. Mather, Magaly Koch	Wiley-Blackwell	4th	2011
2.	Remote Sensing for Geoscientists Image Analysis and Integration	Gary L. Prost	CRC Press	3rd	2014
3.	Remote Sensing: Models and Methods for Image Processing	Robert A. Schowengerdt	Elsevier	3rd	2007

4.	Introductory Digital Image Processing: A Remote Sensing Perspective	John R. Jensen	Pearson		2015

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Remote Sensing Practical		**Course Code: PSIT4P3b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand the basics of remote sensing and its various applications

CO2: Understand the Hardware and Software aspects of Digital Image Processing and demonstrate various techniques in pre-processing data

CO3: Demonstrate various image enhancement and transformation techniques.
CO4: Understand and Demonstrate various filtering, classification techniques along with advanced functionalities.

CO5: Perform comparison of Field and Remotely sensed measurements using various techniques.

PSIT403c: Server Virtualization on VMWare Platform

M. Sc (Information Technology)		Semester – IV	
Course Name: Server Virtualization on VMWare Platform		**Course Code: PSIT403c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Identify the need for Server Virtualization
- Describe the components and features of vSphere 6.7 and ESXi
- Describe how VMware's products help solve business and technical challenges with regard to Server Virtualization

Unit	Details	Lectures	Outcome
I	**Introducing VMware vSphere 6.7:** Exploring VMware vSphere 6.7, Examining the Products in the vSphere Suite, Examining the Features in VMware vSphere, Licensing VMware vSphere, Why Choose vSphere? **Planning and Installing VMware ESXi:** VMware ESXi Architecture, Understanding the ESXi Hypervisor, Examining the ESXi Components, Planning a VMware vSphere Deployment, Choosing a Server Platform, Determining a Storage Architecture, Integrating with the Network Infrastructure, Deploying VMware ESXi, Installing VMware ESXi Interactively, Performing an Unattended Installation of VMware ESXi, Deploying VMware ESXi with vSphere Auto Deploy, Performing Post-installation Configuration, Reconfiguring the Management Network, Using the vSphere Host Client, Configuring Time Synchronization, Configuring Name Resolution, **Installing and Configuring vCenter Server:** Introducing vCenter Server, Centralizing User Authentication Using vCenter Single Sign-On, Understanding the Platform Services Controller, Using the vSphere Web Client for Administration, Providing an Extensible Framework, Choosing the Version of vCenter Server, Planning and Designing a vCenter Server Deployment, Sizing Hardware for vCenter Server, Planning for vCenter Server Availability, Running vCenter Server and Its Components as VMs, Installing vCenter Server and Its Components, Installing vCenter Server in an Enhanced Linked Mode Group, Exploring vCenter Server, The vSphere Web Client Home Screen,	**12**	**CO1**

	Using the Navigator, Creating and Managing a vCenter Server Inventory, Understanding Inventory Views and Objects, Creating and Adding Inventory Objects, Exploring vCenter Server's Management Features, Understanding Basic Host Management, Examining Basic Host Configuration, Using Scheduled Tasks, Using the Events and Events Consoles in vCenter Server, Working with Host Profiles, Tags and Custom Attributes, Managing vCenter Server Settings, General vCenter Server Settings, Licensing, Message of the Day, Advanced Settings, Auto Deploy, vCenter HA, Key Management Servers, Storage Providers, vSphere Web Client Administration, Roles, Licensing, vCenter Solutions Manager, System Configuration, VMware Appliance Management Administration, Summary, Monitor, Access, Networking, Time, Services, Update, Administration, Syslog, Backup.		
II	vSphere Update Manager and the vCenter Support Tools: vSphere Update Manager, vSphere Update Manager and the vCenter Server Appliance, Installing the Update Manager Download Service, The vSphere Update Manager Plug-in Contents, Reconfiguring the VUM or UMDS, Installation with the Update Manager Utility, Upgrading VUM from a Previous Version, Configuring vSphere Update Manager, Creating Baselines Routine Updates, Attaching and Detaching Baselines or Baseline Groups, Performing a Scan, Staging Patches, Remediating Hosts, Upgrading VMware Tools, Upgrading Host Extensions, Upgrading Hosts with vSphere Update Manager, Importing an ESXi Image and Creating the Host Upgrade Baseline, Upgrading a Host, Upgrading VM Hardware, Performing an Orchestrated Upgrade, Investigating Alternative Update Options, Using vSphere Update Manager PowerCLI, Upgrading and Patching without vSphere Update Manager, vSphere Auto Deploy, Deploying Hosts with Auto Deploy, vCenter Support Tools, ESXi Dump Collector, Other vCenter Support Tools. **Creating and Configuring a vSphere Network:** Putting Together a vSphere Network, Working with vSphere Standard Switches, Comparing Virtual Switches and Physical Switches, Understanding Ports and Port Groups, Understanding Uplinks, Configuring the Management Network, Configuring VMkernel Networking, Enabling Enhanced Multicast Functions, Configuring TCP/IP Stacks, Configuring Virtual Machine Networking, Configuring VLANs, Configuring NIC Teaming, Using and Configuring Traffic Shaping, Bringing It All Together, Working with vSphere Distributed Switches,	**12**	**CO2**

	Creating a vSphere Distributed Switch, Removing an ESXi Host from a Distributed Switch, Removing a Distributed Switch, Managing Distributed Switches, Working with Distributed Port Groups, Managing VMkernel Adapters, Using NetFlow on vSphere Distributed Switches, Enabling Switch Discovery Protocols, Enabling Enhanced Multicast Functions, Setting Up Private VLANs, Configuring LACP, Configuring Virtual Switch Security, Understanding and Using Promiscuous Mode, Allowing MAC Address Changes and Forged Transmits.		
III	**Creating and Configuring Storage Devices:** Reviewing the Importance of Storage Design, Examining Shared Storage Fundamentals, Comparing Local Storage with Shared Storage, Defining Common Storage Array Architectures, Explaining RAID, Understanding vSAN, Understanding Midrange and External Enterprise Storage Array Design, Choosing a Storage Protocol, Making Basic Storage Choices, Implementing vSphere Storage Fundamentals, Reviewing Core vSphere Storage Concepts, Understanding Virtual Volumes, SCs vs LUNs, Storage Policies, Virtual Volumes, Working with VMFS Datastores, Working with Raw Device Mappings, Working with NFS Datastores, Working with vSAN, Working with Virtual Machine–Level Storage, Configuration, Leveraging SAN and NAS Best Practices **Ensuring High Availability and Business Continuity:** Understanding the Layers of High Availability, Clustering VMs, Introducing Network Load Balancing Clustering, Introducing Windows Server Failover Clustering, Implementing vSphere High Availability, Understanding vSphere High Availability Clusters. Understanding vSphere High Availability's Core Components, Enabling vSphere HA, Configuring vSphere High Availability, Configuring vSphere HA Groups, Rules, Overrides, and Orchestrated VM Restart, Managing vSphere High Availability, Introducing vSphere SMP Fault Tolerance, Using vSphere SMP Fault Tolerance with vSphere High Availability, Examining vSphere Fault Tolerance, Use Cases, Planning for Business Continuity, Providing Data Protection, Recovering from Disasters, Using vSphere Replication. **Securing VMware vSphere:** Overview of vSphere Security, Securing ESXi Hosts, Working with ESXi Authentication, Controlling Access to ESXi Hosts, Keeping ESXi Hosts Patched, Managing ESXi Host Permissions, Configuring ESXi Host Logging, Securing the ESXi Boot Process, Reviewing Other ESXi Security Recommendations, Securing vCenter Server,	**12**	**CO3**

	Managing vSphere Certificates, Working with Certificate Stores, Getting Started with Certificate Management, Authenticating Users with Single Sign-On, Understanding the vpxuser Account, Managing vCenter Server Permissions, Configuring vCenter Server Appliance Logging, Securing Virtual Machines, Configuring a Key Management Server for VM and VSAN Encryption, Virtual Trusted Platform Module, Configuring Network Security Policies, Keeping VMs Patched.		
IV	**Creating and Managing Virtual Machines:** Understanding Virtual Machines, Examining Virtual Machines from the Inside, Examining Virtual Machines from the Outside, Creating a Virtual Machine, Choosing Values for Your New Virtual Machine, Sizing Virtual Machines, Naming Virtual Machines, Sizing Virtual Machine Hard Disks, Virtual Machine Graphics, Installing a Guest Operating System, Working with Installation Media, Using the Installation Media, Working in the Virtual Machine Console, Installing VMware Tools, Installing VMware Tools in Windows, Installing VMware Tools in Linux, Managing Virtual Machines, Adding or Registering Existing VMs, Changing VM Power States, Removing VMs, Deleting VMs, Modifying Virtual Machines, Changing Virtual Machine Hardware, Using Virtual Machine Snapshots. **Using Templates and vApps:** Cloning VMs, Creating a Customization Specification, Cloning a Virtual Machine, Introducing vSphere Instant Cloning, Creating Templates and Deploying Virtual Machines, Cloning a Virtual Machine to a Template, Deploying a Virtual Machine from a Template, Using OVF Templates, Deploying a VM from an OVF Template, Exporting a VM as an OVF Template, Examining OVF Templates, Using Content Libraries, Content Library Data and Storage, Content Library Synchronization, Creating and Publishing a Content Library, Subscribing to a Content Library, Operating Content Libraries, Working with vApps, Creating a vApp, Editing a vApp, Changing a vApp's Power State, Cloning a vApp, Importing Machines from Other Environments, **Managing Resource Allocation:** Reviewing Virtual Machine, Resource Allocation, Working with Virtual Machine Memory, Understanding ESXi Advanced Memory Technologies, Controlling Memory Allocation, Managing Virtual Machine CPU Utilization, Default CPU Allocation, Setting CPU Affinity, Using CPU Reservations, Using CPU Limits, Using CPU Shares, Summarizing How Reservations, Limits, and Shares Work with CPUs, Using Resource Pools, Configuring	**12**	**CO4**

	Resource Pools, Understanding Resource Allocation with Resource Pools, Regulating Network I/O Utilization, Controlling Storage I/O Utilization, Enabling Storage I/O Control, Configuring Storage Resource Settings for a Virtual Machine, Using Flash Storage.		
V	**Balancing Resource Utilization:** Comparing Utilization with Allocation, Exploring vMotion, Examining vMotion Requirements, Performing a vMotion Migration Within a Cluster, Ensuring vMotion Compatibility, Using Per-Virtual-Machine CPU Masking, Using Enhanced vMotion Compatibility, Using Storage vMotion, Combining vMotion with Storage vMotion, Cross-vCenter vMotion, Examining Cross-vCenter vMotion Requirements, Performing a Cross-vCenter Motion, Exploring vSphere Distributed Resource Scheduler, Understanding Manual Automation Behavior, Reviewing Partially Automated Behavior, Examining Fully Automated Behavior, Working with Distributed Resource Scheduler Rules, Working with Storage DRS, Creating and Working with Datastore Clusters , Configuring Storage DRS. **Monitoring VMware vSphere Performance:** Overview of Performance Monitoring, Using Alarms Understanding Alarm Scopes, Creating Alarms, Managing Alarms, Working with Performance Charts, Overview Layout, Advanced Layout, Working with *esxtop,* Monitoring CPU Usage, Monitoring Memory Usage, Monitoring Network Usage, Monitoring Disk Usage. **Automating VMware vSphere:** Why Use Automation? vSphere Automation Automating with PowerCLI, PowerShell and PowerCLI, What's New in PowerCLI, Installing and Configuring PowerCLI on Windows, Installing and Configuring PowerCLI on macOS, Installing and Configuring PowerCLI on Linux, Additional PowerCLI Capabilities Getting Started with PowerCLI, Building PowerCLI Scripts, PowerCLI Advanced Capabilities, Additional Resources.	**12**	**CO5**

Books and References:					
Sr No	Title	Author/s	Publisher	Edition	Year
1.	Mastering VMware vSphere 67	Nick Marshall, Mike Brown, G Blair Fritz, Ryan Johnson	Sybex, Wiley	--	2019
2.	Mastering VMware vSphere 67	Martin Gavanda, Andrea Mauro, Paolo Valsecchi, Karel Novak	Packt	--	2019

M Sc (Information Technology)		Semester – IV	
Course Name: Server Virtualization on VMWare Platform Practical		**Course Code: PSIT4P3c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed The detailed list of practical will be circulated later in the official workshop

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand VMWare VSphere 67, Install ESXi and Configure VSphere Centre

CO2: Demonstrate the use of VSphere Update Manager and Create a VSphere Network

CO3: Understand VSphere Security, Create and configure storage devices and Perform configurations to ensure business continuity
CO4: Demonstrate Resource allocation, Creating and managing virtual machine and the use of templates

CO5: Understand automation of vSphere and manage resource allocation

PSIT403d: Security Operations Centre

M. Sc (Information Technology)		Semester – IV	
Course Name: Security Operations Centre		**Course Code: PSIT403d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- The SOC (Security Operations Centre) allows an organization to enforce and test its security policies, processes, procedures and activities through one central platform that monitors and evaluates the effectiveness of the individual elements and the overall security system of the organization.
- This will also allow the learners to configure various use cases and detect various attacks across the network and report them in real time and also take appropriate actions.
- This course will cover the design, deployment and operation of the SOC.
- Once this course is completed, students will have the skills to perform your SOC responsibilities effectively.

Unit	Details	Lectures	Outcome
I	**Introduction to Security Operations Management** Foundation Topics Introduction to Identity and Access Management Phases of the Identity and Access Lifecycle Registration and Identity Validation Privileges Provisioning Access Review Access Revocation Password Management Password Creation Password Storage and Transmission Password Reset Password Synchronization Directory Management Single Sign-On Kerberos Federated SSO Security Assertion Markup Language OAuth OpenID Connect Security Events and Logs Management Logs Collection, Analysis, and Disposal Syslog Security Information and Event Manager Assets Management Assets Inventory Assets Ownership Assets Acceptable Use and Return Policies Assets Classification Assets Labeling Assets and Information Handling Media Management Introduction to Enterprise Mobility Management Mobile Device Management Configuration and Change Management Configuration Management Change Management Vulnerability Management	**12**	**CO1**

	Vulnerability Identification Finding Information about a Vulnerability Vulnerability Scan Penetration Assessment Product Vulnerability Management Vulnerability Analysis and Prioritization Vulnerability Remediation Patch Management References and Additional Readings **Fundamentals of Cryptography and Public Key Infrastructure** (PKI) Cryptography Ciphers and Keys Ciphers Keys Block and Stream Ciphers Symmetric and Asymmetric Algorithms Symmetric Algorithms Asymmetric Algorithms Hashes Hashed Message Authentication Code Digital Signatures Digital Signatures in Action Key Management Next-Generation Encryption Protocols IPsec and SSL IPsec SSL Fundamentals of PKI Public and Private Key Pairs RSA Algorithm, the Keys, and Digital Certificates Certificate Authorities Root and Identity Certificates Root Certificate Identity Certificate X.500 and X.509v3 Certificates Authenticating and Enrolling with the CA Public Key Cryptography Standards Simple Certificate Enrollment Protocol Revoking Digital Certificates Using Digital Certificates PKI Topologies Single Root CA Hierarchical CA with Subordinate CAs Cross-certifying CAs Exam Preparation Tasks Review All Key Topics Complete Tables and Lists from Memory **Introduction to Virtual Private Networks (VPNs)** What Are VPNs? Site-to-site vs. Remote-Access VPNs An Overview of IPsec IKEv1 Phase 1 IKEv1 Phase 2 IKEv2 SSL VPNs SSL VPN Design Considerations User Connectivity VPN Device Feature Set Infrastructure Planning Implementation Scope		
II	**Windows-Based Analysis** Process and Threads Memory Allocation Windows Registration Windows Management Instrumentation Handles Services Windows Event Logs Exam Preparation Tasks **Linux- and Mac OS X–Based Analysis** Processes Forks Permissions Symlinks Daemons UNIX-Based Syslog Apache Access Logs **Endpoint Security Technologies** Antimalware and Antivirus Software	**12**	**CO2**

	Host-Based Firewalls and Host-Based Intrusion Prevention Application-Level Whitelisting and Blacklisting System-Based Sandboxing		
III	**Threat Analysis** What Is the CIA Triad: Confidentiality, Integrity, and Availability? Confidentiality Integrity Availability Threat Modeling Defining and Analyzing the Attack Vector Understanding the Attack Complexity Privileges and User Interaction The Attack Scope Exam Preparation Tasks **Forensics** Introduction to Cybersecurity Forensics The Role of Attribution in a Cybersecurity Investigation The Use of Digital Evidence Defining Digital Forensic Evidence Understanding Best, Corroborating, and Indirect or Circumstantial Evidence Collecting Evidence from Endpoints and Servers Collecting Evidence from Mobile Devices Collecting Evidence from Network Infrastructure Devices Chain of Custody Fundamentals of Microsoft Windows Forensics Processes, Threads, and Services Memory Management Windows Registry The Windows File System Master Boot Record (MBR) The Master File Table (MFT) Data Area and Free Space FAT NTFS MFT Timestamps, MACE, and Alternate Data Streams EFI Fundamentals of Linux Forensics Linux Processes Ext4 Journaling Linux MBR and Swap File System Exam Preparation Tasks **Fundamentals of Intrusion Analysis** Common Artifact Elements and Sources of Security Events False Positives, False Negatives, True Positives, and True Negatives Understanding Regular Expressions Protocols, Protocol Headers, and Intrusion Analysis Using Packet Captures for Intrusion Analysis Mapping Security Event Types to Source Technologies	**12**	**CO3**
IV	**Introduction to Incident Response and the Incident Handling Process** **Introduction to Incident Response** What Are Events and Incidents? The Incident Response Plan The Incident Response Process The Preparation Phase The Detection and Analysis Phase Containment, Eradication, and Recovery Post-Incident Activity (Postmortem) Information Sharing and	**12**	**CO4**

	Coordination Incident Response Team Structure The Vocabulary for Event Recording and Incident Sharing (VERIS) **Incident Response Teams** Computer Security Incident Response Teams (CSIRTs) Product Security Incident Response Teams (PSIRTs) Security Vulnerabilities and Their Severity Vulnerability Chaining Role in Fixing Prioritization Fixing Theoretical Vulnerabilities Internally Versus Externally Found Vulnerabilities National CSIRTs and Computer Emergency Response Teams (CERTs) Coordination Centers Incident Response Providers and Managed Security Service Providers (MSSPs) **Compliance Frameworks** Payment Card Industry Data Security Standard (PCI DSS) PCI DSS Data Health Insurance Portability and Accountability Act (HIPAA) HIPAA Security Rule HIPAA Safeguards Administrative Safeguards Physical Safeguards Technical Safeguards Sarbanes-Oxley (SOX) Section 302 Section 404 Section 409 SOX Auditing Internal Controls **Network and Host Profiling** Network Profiling Throughput Measuring Throughput Used Ports Session Duration Critical Asset Address Space Host Profiling Listening Ports Logged-in Users/Service Accounts Running Processes Applications		
V	**The Art of Data and Event Analysis** Normalizing Data Interpreting Common Data Values into a Universal Format Using the 5-Tuple Correlation to Respond to Security Incidents Retrospective Analysis and Identifying Malicious Files Identifying a Malicious File Mapping Threat Intelligence with DNS and Other Artifacts Deterministic Versus Probabilistic Analysis **Intrusion Event Categories** Diamond Model of Intrusion Cyber Kill Chain Model Reconnaissance Weaponization Delivery Exploitation Installation Command and Control Action and Objectives **Types of Attacks and Vulnerabilities** Types of Attacks Reconnaissance Attacks Social Engineering Privilege Escalation Attacks Backdoors Code Execution Man-in-the Middle Attacks Denial-of-Service Attacks Direct DDoS Botnets Participating in DDoS Attacks Reflected DDoS Attacks	**12**	**CO5**

	Attack Methods for Data Exfiltration ARP Cache Poisoning Spoofing Attacks Route Manipulation Attacks Password Attacks Wireless Attacks Types of Vulnerabilities **Security Evasion Techniques** Key Encryption and Tunneling Concepts Resource Exhaustion Traffic Fragmentation Protocol-Level Misinterpretation Traffic Timing, Substitution, and Insertion Pivoting		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	CCNA Cyber Ops SECOPS 210-255 Official Cert Guide	Omar Santos, Joseph Muniz	CISCO	1st	2017
2.	CCNA Cyber Ops SECFND 210-250 Official Cert Guide	Omar Santos, Joseph Muniz	CISCO	1st	2017
3.	CCNA Cyber security Operations Companion Guide		CISCO	1st	2018

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Security Operations Centre Practical		**Course Code: PSIT4P3d**	
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**50**
	Internal	**--**	**-**

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:
CO1: Understanding basics of SOC, Cryptography and managing and deploying VPNs.

CO2: Analyse Windows and Linux based logs along with logs generated by endpoints.

CO3: Understand and analyze various forms of intrusions, threats and perform forensic analysis on them.

CO4: Understand the incident response process and handle incidents by adhering to compliance policies and standards set by the organization.

CO5: Understand the various types of attacks and vulnerabilities, categorize events and perform incident analysis.

PSIT404a: Human Computer Interaction

M. Sc (Information Technology)		Semester – IV	
Course Name: Human Computer Interaction		**Course Code: PSIT404a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understand the important aspects of implementation of human-computer interfaces.
- Identify the various tools and techniques for interface analysis, design, and evaluation.
- Identify the impact of usable interfaces in the acceptance and performance utilization of information systems

Unit	Details	Lectures	Outcome
I	**The Interaction:** Models of interaction, Design Focus, Frameworks and HCI, Ergonomics, Interaction styles, Elements of the WIMP interface,Interactivity **Paradigms:** Introduction, Paradigms for interaction **Interaction design basics:** What is design?, The process of design, User focus, Cultural probes, Navigation design, the big button trap, Modes, Screen design and layout, Alignment and layout matters, Checking screen colors, Iteration and prototyping **HCI in the software process**: The software life cycle, Usability engineering , Iterative design and prototyping, Prototyping in practice, Design rationale	**12**	**CO1**
II	**Design**: Principles to support usability, Standards, Guidelines, Golden rules and heuristics, HCI patterns **Implementation support:** Elements of windowing systems, Programming the application, Going with the grain, Using toolkits, User interface management systems **Evaluation techniques:** What is evaluation?, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method	**12**	**CO2**
III	**Universal design:** Universal design principles, Multi-modal interaction, Designing websites for screen readers, Choosing the right kind of speech, Designing for diversity **User support:** Requirements of user support, Approaches to user support, Adaptive help systems, Designing user support systems **Cognitive models:** Goal and task hierarchies, Linguistic	**12**	**CO3**

	models, The challenge of display-based systems, Physical and device models, Cognitive architectures		
IV	**Socio-organizational issues and stakeholder requirements:** Organizational issues, Capturing requirements **Communication and collaboration models:** Face-to-face communication, Conversation, Text-based communication, Group working **Task analysis:** Differences between task analysis and other techniques, Task decomposition, Knowledge-based analysis, Entity–relationship-based techniques, Sources of information and data collection, Uses of task analysis	**12**	**CO4**
V	**Dialog notations and design:** What is dialog?, Dialog design notations, Diagrammatic notations, Textual dialog notations, Dialog semantics, Dialog analysis and design **Models of the system:** Standard formalisms, Interaction models, Continuous behavior **Modeling rich interaction:** Status–event analysis, Rich contexts, Low intention and sensor-based interaction	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Human Computer Interaction	Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale	Pearson Education	3rd	
2.	Designing the User Interface	Shneiderman B., Plaisant C., Cohen M., Jacobs S.	Pearson	5th	2013

Course Outcomes:

After completion of the course, a student should be able to:

CO1: have a clear understanding of HCI principles that influence a system's interface design, before writing any code.
CO2: understand the evaluation techniques used for any of the proposed system.
CO3: understand the cognitive models and its design.
CO4: able to understand how to manage the system resources and do the task analysis.
CO5: able to design and implement a complete system.

PSIT404b: Advanced IoT

M. Sc (Information Technology)		Semester – IV	
Course Name: Advanced IoT		**Course Code: PSIT404b**	
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Internal	**--**	**40**

Course Objectives:

- To understand the applications on image processing in different disciplines.
- To apply the concepts to new areas of research in Image processing.

Unit	Details	Lectures	Outcome
I	Fuzzy Approaches and Analysis in Image Processing, Text information extraction from images, Image and Video steganography based on DCT and wavelet transform.	**12**	**CO1**
II	Zernike-Moments-Based Shape Descriptors for Pattern Recognition and Classification Applications, An Image De-Noising Method Based on Intensity Histogram Equalization Technique for Image Enhancement, A New Image Encryption Method Based on Improved Cipher Block Chaining with Optimization Technique	**12**	**CO2**
III	A Technique to Approximate Digital Planar Curve with Polygon, Shape Determination of Aspired Foreign Body on Pediatric Radiography Images Using Rule-Based Approach, Evaluation of Image Detection and Description Algorithms for Application in Monocular SLAM, Diophantine Equations for Enhanced Security in Watermarking Scheme for Image Authentication	**12**	**CO3**
IV	Design, Construction, and Programming of a Mobile Robot Controlled by Artificial Vision, Review and Applications of Multimodal Biometrics for Secured Systems, Background Subtraction and Object Tracking via Key Frame-Based Rotational Symmetry Dynamic Texture, A Novel Approach of Human Tracking Mechanism in Wireless Camera Networks	**12**	**CO4**
V	Digital Image Steganography: Survey, Analysis, and Application, Vegetation Index: Ideas, Methods, Influences, and Trends, Expert System through GIS-Based Cloud	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Advanced Image Processing Techniques and Applications	N. Suresh Kumar, Arun Kumar Sangaiah, M. Arun, S. Anand	IGI global	--	2017

Course Outcomes:

After completion of the course, a student should be able to:

CO01: Understand the advanced applications of Image processing.

CO02: Understand the application of image processing pattern recognition, encryption and image enhancement.

CO03: Understand and apply the image processing techniques in identification of foreign body using radiography, watermarking techniques.

CO04: Apply the image processing techniques to robot vision, biometrics, human tracking using wireless camera.

CO05: Apply image processing in steganography, expert systems through GIS based cloud.

PSIT404c: Storage as a Service

M. Sc (Information Technology)		Semester – IV	
Course Name: Storage as a Service		**Course Code: PSIT404c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understand the need for Storage Area Network and Data protection to satisfy the information explosion requirements.
- Study storage technologies: SAN, NAS, IP storage etc., which will bridge the gap between the emerging trends in industry and academics.
- To get an insight of Storage area network architecture, protocols and its infrastructure.
- To study and discuss the applications of SAN to fulfill the needs of the storage management in the heterogeneous environment.
- Study and understand the management of Storage Networks
- To understand different techniques of managing store.

Unit	Details	Lectures	Outcome
I	Introduction to Information Storage Information Storage Data Types of Data Big Data Information Storage Evolution of Storage Architecture Data Center Infrastructure Core Elements of a Data Center Key Characteristics of a Data Center Managing a Data Center Virtualization and Cloud Computing Data Center Environment Application Database Management System (DBMS) Host (Compute) Operating System Memory Virtualization Device Driver 20 Volume Manager File System Compute Virtualization Connectivity Physical Components of Connectivity Interface Protocols IDE/ATA and Serial ATA 28 SCSI and Serial SCSI Fiber Channel Internet Protocol (IP) Storage Disk Drive Components Platter Spindle Read/Write Head Actuator Arm Assembly Drive Controller Board Physical Disk Structure Zoned Bit Recording Logical Block Addressing Disk Drive Performance Disk Service Time Seek Time Rotational Latency Data Transfer Rate Disk I/O Controller Utilization Host Access to Data Direct-Attached Storage DAS Benefit and Limitations Storage Design Based on Application Requirements and Disk Performance Disk Native Command Queuing	**12**	**CO1**

	Introduction to Flash Drives Components and Architecture of Flash Drives Features of Enterprise Flash Drives Concept in Practice: VMware ESXi Data Protection: RAID RAID Implementation Methods Software RAID Hardware RAID Array Components RAID Techniques Striping Mirroring Parity RAID Levels RAID 0 RAID 1 Nested RAID RAID 3 RAID 4 RAID 5 RAID 6 RAID Impact on Disk Performance Application IOPS and RAID Configurations RAID Comparison Hot Spares		
II	**Intelligent Storage Systems** Components of an Intelligent Storage System Front End Cache Structure of Cache Read Operation with Cache Write Operation with Cache Implementation Cache Management Cache Data Protection Back End Physical Disk Storage Provisioning Traditional Storage Provisioning LUN Expansion: MetaLUN Virtual Storage Provisioning 82 Comparison between Virtual and Traditional Storage Provisioning Use Cases for Thin and Traditional LUNs LUN Masking Types of Intelligent Storage Systems High-End Storage Systems Midrange Storage Systems **Fiber Channel Storage Area Networks** Fiber Channel: Overview The SAN and Its Evolution Components of FC SAN Node Ports Cables and Connectors Contents Interconnect Devices SAN Management Software FC Connectivity Point-to-Point Fiber Channel Arbitrated Loop Fiber Channel Switched Fabric FC-SW Transmission Switched Fabric Ports Fiber Channel Architecture Fiber Channel Protocol Stack FC-4 Layer FC-2 Layer FC-1 Layer FC-0 Layer Fiber Channel Addressing World Wide Names FC Frame 110. Structure and Organization of FC Data Flow Control BB_Credit EE_Credit Classes of Service Fabric Services Switched Fabric Login Types Zoning Types of Zoning FC SAN Topologies Mesh Topology Core-Edge Fabric Benefits and Limitations of Core-Edge Fabric Virtualization in SAN Block-level Storage Virtualization Virtual SAN (VSAN) **IP SAN and FCoE** iSCSI Components of iSCSI iSCSI Host Connectivity iSCSI Topologies Native iSCSI Connectivity Bridged iSCSI Connectivity Combining FC and Native iSCSI Connectivity iSCSI Protocol Stack iSCSI PDU 6 iSCSI Discovery iSCSI Names iSCSI Session iSCSI Command Sequencing FCIP FCIP Protocol Stack FCIP Topology FCIP Performance and Security FCoE I/O	**12**	**CO2**

	Consolidation Using FCoE Components of an FCoE Network Converged Network Adapter Cables FCoE Switches FCoE Frame Structure FCoE Frame Mapping FCoE Enabling Technologies Priority-Based Flow Control (PFC) Enhanced Transmission Selection (ETS Congestion Notification (CN) Data Center Bridging Exchange Protocol (DCBX) 1		
III	**Network-Attached Storage** General-Purpose Servers versus NAS Devices Benefits of NAS File Systems and Network File Sharing Accessing a File System Network File Sharing Components of NAS NAS I/O Operation NAS Implementations Unifi ed NAS Unifi ed NAS Connectivity 164 Gateway NAS Gateway NAS Connectivity Scale-Out NAS Scale-Out NAS Connectivity NAS File-Sharing Protocols NFS CIFS Factors Affecting NAS Performance File-Level Virtualization Object-Based and Unified Storage Object-Based Storage Devices Object-Based Storage Architecture Components of OSD Object Storage and Retrieval in OSD Benefits of Object-Based Storage Common Use Cases for Object-Based Storage Content-Addressed Storage CAS Use Cases Healthcare Solution: Storing Patient Studies Finance Solution: Storing Financial Records Unified Storage Components of Unifi ed Storage Data Access from Unified Storage Introduction to Business Continuity Information Availability Causes of Information Unavailability Consequences of Downtime Measuring Information Availability BC Terminology BC Planning Life Cycle Failure Analysis Single Point of Failure Resolving Single Points of Failure Multipathing Software Business Impact Analysis BC Technology Solutions I/O Operation without PowerPath I/O Operation with PowerPath Automatic Path Failover Path Failure without PowerPath Path Failover with PowerPath: Active-Active Array Path Failover with PowerPath: Active-Passive Array Backup and Archive Backup Purpose Disaster Recovery Operational Recovery Archival Backup Considerations Backup	**12**	**CO3**

	Granularity Recovery Considerations Backup Methods 6 Backup Architecture Backup and Restore Operations Backup Topologies Backup in NAS Environments Server-Based and Serverless Backup NDMP-Based Backup Backup Targets Backup to Tape Physical Tape Library Limitations of Tape 2 Backup to Disk Backup to Virtual Tape Virtual Tape Library Data Deduplication for Backup Data Deduplication Methods Data Deduplication Implementation Source-Based Data Deduplication Target-Based Data Deduplication Backup in Virtualized Environments Data Archive Archiving Solution Architecture Use Case: E-mail Archiving Use Case: File Archiving		
IV	Local Replication Replication Terminology Uses of Local Replicas Replica Consistency Consistency of a Replicated File System Consistency of a Replicated Database Local Replication Technologies Host-Based Local Replication LVM-Based Replication Advantages of LVM-Based Replication Limitations of LVM-Based Replication File System Snapshot Storage Array-Based Local Replication Full-Volume Mirroring Pointer-Based, Full-Volume Replication Pointer-Based Virtual Replication Network-Based Local Replication Continuous Data Protection CDP Local Replication Operation Tracking Changes to Source and Replica Restore and Restart Considerations Creating Multiple Replicas Local Replication in a Virtualized Environment Remote Replication Modes of Remote Replication Remote Replication Technologies Host-Based Remote Replication LVM-Based Remote Replication Host-Based Log Shipping Storage Array-Based Remote Replication Synchronous Replication Mode Asynchronous Replication Mode Disk-Buffered Replication Mode Network-Based Remote Replication CDP Remote Replication Three-Site Replication Three-Site Replication — Cascade/Multihop Synchronous + Asynchronous Synchronous + Disk Buffered Three-Site Replication — Triangle/Multitarget Data Migration Solutions Remote Replication and Migration in aVirtualized Environment Cloud Computing Cloud Enabling Technologies Characteristics of Cloud Computing Benefits of Cloud Computing	**12**	**CO4**

	Cloud Service Models Infrastructure-as-a-Service Platform-as-a-Service Software-as-a-Service Cloud Deployment Models Public Cloud Private Cloud Community Cloud Hybrid Cloud Cloud Computing Infrastructure Physical Infrastructure Virtual Infrastructure Applications and Platform Software Cloud Management and Service Creation Tools Cloud Challenges Challenges for Consumers Challenges for Providers Cloud Adoption Considerations		
V	Securing the Storage Infrastructure Information Security Framework Risk Triad Assets Threats Vulnerability Storage Security Domains Securing the Application Access Domain Controlling User Access to Data Protecting the Storage Infrastructure 341 Data Encryption Securing the Management Access Domain Controlling Administrative Access Protecting the Management Infrastructure Securing Backup, Replication, and Archive Security Implementations in Storage Networking FC SAN FC SAN Security Architecture Basic SAN Security Mechanisms LUN Masking and Zoning Securing Switch Ports Switch-Wide and Fabric-Wide Access Control Logical Partitioning of a Fabric: Virtual SAN NAS NAS File Sharing: Windows ACLs NAS File Sharing: UNIX Permissions NAS File Sharing: Authentication and Authorization Kerberos Network-Layer Firewalls IP SAN Securing Storage Infrastructure in Virtualized and Cloud Environments Security Concerns Security Measures Security at the Compute Level Security at the Network Level Security at the Storage Level Concepts in Practice: RSA and VMware Security Products RSA Secure ID RSA Identity and Access Management RSA Data Protection Manager VMware vShield Managing the Storage Infrastructure Monitoring the Storage Infrastructure Monitoring Parameters Components Monitored Hosts Storage Network Storage Monitoring Examples Accessibility Monitoring Capacity Monitoring Performance Monitoring Security Monitoring Alerts Storage Infrastructure Management Activities Availability Management Capacity Management Performance Management Security Management Reporting Storage Infrastructure Management in a	**12**	**CO5**

	Virtualized Environment Storage Management Examples Storage Allocation to a New Server/Host File System Space Management Chargeback Report Storage Infrastructure Management Challenges Developing an Ideal Solution 384Storage Management Initiative Enterprise Management Platform Information Lifecycle Management Storage Tiering Intra-Array Storage Tiering Inter-Array Storage Tiering		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Information Storage and Management: Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments	EMC	John Wiley & Sons	2nd	2012

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand different techniques of storage and RAID Technologies
CO2: Understand different intelligent storage technologies. Also, understand the benefits of Fibre Channel Storage Networks along with iSCSI.
CO3: Understand the architecture of NAS and deployment along with Object based and unified storage technologies. Also, the learner will be able to configure the storage devices to maintain highest level of availability
CO4: Understand Replication and Migration techniques and implement them.
CO5: Understand Different techniques for managing and securing storage infrastructure.

PSIT404d: Information Security Auditing

M. Sc (Information Technology)		Semester – IV	
Course Name: Information Security Auditing		**Course Code: PSIT404d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understand various information security policies in place.
- Assess an organization based on the needs and suggest the requisite information security policies to be deployed.
- Audit the organization across relevant policies and assist the organization in implementing such policies along with suggesting improvements.

Unit	Details	Lectures	Outcome
I	Secrets of a Successful Auditor Understanding the Demand for IS Audits Understanding Policies, Standards, Guidelines, and Procedures Understanding Professional Ethics Understanding the Purpose of an Audit Differentiating between Auditor and Auditee Roles Implementing Audit Standards Auditor Is an Executive Position Understanding the Corporate Organizational Structure Governance Strategy Planning for Organizational Control Overview of Tactical Management Planning and Performance Overview of Business Process Reengineering Operations Management Summary Audit Process Understanding the Audit Program Establishing and Approving an Audit Charter Preplanning Specific Audits Performing an Audit Risk Assessment Determining Whether an Audit Is Possible Performing the Audit Gathering Audit Evidence Conducting Audit Evidence Testing Generating Audit Findings Report Findings Conducting Follow-up (Closing Meeting)	**12**	**CO1**
II	Information Systems Acquisition and Development Project Governance and Management Business Case and Feasibility Analysis System Development Methodologies Control Identification and Design Testing Methodologies Configuration and Release Management	**12**	**CO2**

	System Migration, Infrastructure Deployment and Data Conversion Post-implementation Review		
III	Information Systems Operations Introduction Common Technology Components IT Asset Management Job Scheduling and Production Process Automation System Interfaces End-user Computing Data Governance Systems Performance Management Problem and Incident Management Change, Configuration, Release and IT Service Level Management Database Management Business Resilience Business Impact Analysis Data Backup, Storage and Restoration Business Continuity Plan Disaster Recovery Plans	**12**	**CO3**
IV	Information Systems Life Cycle Governance in Software Development Management of Software Quality Overview of the Executive Steering Committee Change Management Management of the Software Project Overview of the System Development Life Cycle Overview of Data Architecture Decision Support Systems Program Architecture Centralization vs. Decentralization Electronic Commerce System Implementation and Operations Understanding the Nature of IT Services Performing IT Operations Management Performing Capacity Management Using Administrative Protection Performing Problem Management Monitoring the Status of Controls Implementing Physical Protection	**12**	**CO4**
V	Protecting Information Assets Understanding the Threat Using Technical Protection Business Continuity and Disaster Recovery Debunking the Myths Understanding the Five Conflicting Disciplines Called Business Continuity Defining Disaster Recovery Defining the Purpose of Business Continuity Uniting Other Plans with Business Continuity Understanding the Five Phases of a Business Continuity Program Understanding the Auditor Interests in BC/DR Plans	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	CISA®: Certified Information Systems Auditor	David Cannon	SYBEX	Fourth Edition	2016
2.	CISA Review Manual 27th Edition		ISACA		2019
3.	CISA Certified Information Systems Auditor All-in-One Exam Guide, Fourth Edition,		O'Reilly	4th Edition	2019

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand various information security policies and process flow, Ethics of an Information security Auditor.

CO2: Understand various information systems in an organization, their criticality and various governance and management policies associated with them.

CO3: Critically analyse various operational strategies like asset management, data governance etc. and suggest requisite changes as per organizations requirements with improvements.

CO4: Understand the information flow across the organization and identify the weak spots, and also suggest improvements to strengthen them.

CO5: Come up with strong strategies to protect information assets and come up with an efficient business continuity plan, disaster recovery strategy etc.

PSIT4P4: Project Implementation and Viva

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Project Implementation and Viva		**Course Code: PSIT4P4**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

The project dissertation and Viva Voce details are given in Appendix 1.

Evaluation Scheme

Internal Evaluation (40 Marks)

The internal assessment marks shall be awarded as follows:

1. **30 marks (Any one of the following):**
   a. **Written Test or**
   b. **SWAYAM (Advanced Course) of minimum 20 hours and certification exam completed or**
   c. **NPTEL (Advanced Course) of minimum 20 hours and certification exam completed or**
   d. **Valid International Certifications (Prometric, Pearson, Certiport, Coursera, Udemy and the like)**
   e. **One certification marks shall be awarded one course only. For four courses, the students will have to complete four certifications.**
2. **10 marks**
   The marks given out of 40 (30 in Semester 4) for publishing the research paper should be divided into four course and should awarded out of 10 in each of the four course.

i. Suggested format of Question paper of 30 marks for the written test.

Q1.	**Attempt *any two* of the following:**	**16**
a.		
b.		
c.		
d.		
Q2.	**Attempt *any two* of the following:**	**14**
a.		
b.		
c.		
d.		

ii. 10 marks from every course coming to a total of 40 marks, shall be awarded on publishing of research paper in UGC approved / Other Journal with plagiarism less than 10%. The marks can be awarded as per the impact factor of the journal, quality of the paper, importance of the contents published, social value.

External Examination: (60 marks)

	All questions are compulsory	
Q1	**(Based on Unit 1) Attempt *any two* of the following:**	**12**
a.		
b.		

c.		
d.		
Q2	**(Based on Unit 2) Attempt *any two* of the following:**	**12**
Q3	**(Based on Unit 3) Attempt *any two* of the following:**	**12**
Q4	**(Based on Unit 4) Attempt *any two* of the following:**	**12**
Q5	**(Based on Unit 5) Attempt *any two* of the following:**	**12**

Practical Evaluation (50 marks)

A Certified copy of hard-bound journal is essential to appear for the practical examination.

1.	**Practical Question 1**	**20**
2.	**Practical Question 2**	**20**
3.	**Journal**	**5**
4.	**Viva Voce**	**5**

OR

1.	**Practical Question**	**40**
2.	**Journal**	**5**
3.	**Viva Voce**	**5**

Project Documentation and Viva Voce Evaluation

The documentation should be checked for plagiarism and as per UGC guidelines, should be less than 10%.

1.	**Documentation Report (Chapter 1 to 4)**	**20**
2.	**Innovation in the topic**	**10**
3.	**Documentation/Topic presentation and viva voce**	**20**

Project Implementation and Viva Voce Evaluation

1.	**Documentation Report (Chapter 5 to last)**	**20**
2.	**Implementation**	**10**
3.	**Relevance of the topic**	**10**
4.	**Viva Voce**	**10**

Appendix – 1

Project Documentation and Viva-voce (Semester III) and Project Implementation and Viva-Voce (Semester IV)

Goals of the course Project Documentation and Viva-Voce

The student should:

- be able to apply relevant knowledge and abilities, within the main field of study, to a given problem
- within given constraints, even with limited information, independently analyse and discuss complex inquiries/problems and handle larger problems on the advanced level within the main field of study
- reflect on, evaluate and critically review one's own and others' scientific results
- be able to document and present one's own work with strict requirements on structure, format, and language usage
- be able to identify one's need for further knowledge and continuously develop one's own knowledge

To start the project:

- Start thinking early in the programme about suitable projects.
- Read the instructions for the project.
- Attend and listen to other student´s final oral presentations.
- Look at the finished reports.
- Talk to senior master students.
- Attend possible information events (workshops / seminars / conferences etc.) about the related topics.

Application and approval:

- Read all the detailed information about project.
- Finalise finding a place and supervisor.
- Check with the coordinator about subject/project, place and supervisor.
- Write the project proposal and plan along with the supervisor.
- Fill out the application together with the supervisor.
- Hand over the complete application, proposal and plan to the coordinator.
- Get an acknowledgement and approval from the coordinator to start the project.

During the project:

- Search, gather and read information and literature about the theory.
- Document well the practical work and your results.
- Take part in seminars and the running follow-ups/supervision.
- Think early on about disposition and writing of the final report.
- Discuss your thoughts with the supervisor and others.
- Read the SOP and the rest you need again.
- Plan for and do the mid-term reporting to the coordinator/examiner.
- Do a mid-term report also at the work-place (can be a requirement in some work-places).
- Write the first draft of the final report and rewrite it based on feedback from the supervisor and possibly others.
- Plan for the final presentation of the report.

Finishing the project:

- Finish the report and obtain an OK from the supervisor.

- Ask the supervisor to send the certificate and feedback form to the coordinator.
- Attend the pre-final oral presentation arranged by the Coordinator.
- Rewrite the final report again based on feedback from the opponents and possibly others.
- Prepare a title page and a popular science summary for your report.
- Send the completed final report to the coordinator (via plagiarism software)
- Rewrite the report based on possible feedback from the coordinator.
- Appear for the final exam.

Project Proposal/research plan

- The student should spend the first 1-2 weeks writing a 1-2 pages project plan containing:
  - Short background of the project
  - Aims of the project
  - Short description of methods that will be used
  - Estimated time schedule for the project
- The research plan should be handed in to the supervisor and the coordinator.
- Writing the project plan will help you plan your project work and get you started in finding information and understanding of methods needed to perform the project.

Project Documentation

The documentation should contain:

- Introduction - that should contain a technical and social (when possible) motivation of the project topic.
- Description of the problems/topics.
- Status of the research/knowledge in the field and literature review.
- Description of the methodology/approach. (The actual structure of the chapters here depends on the topic of the documentation.)
- Results - must always contain analyses of results and associated uncertainties.
- Conclusions and proposals for the future work.
- Appendices (when needed).
- Bibliography - references and links.

For the master's documentation, the chapters cannot be dictated, they may vary according to the type of project. However, in Semester III Project Documentation and Viva Voce must contain at least 4 chapters (Introduction, Review of Literature, Methodology / Approach, Proposed Design / UI design, etc. depending on the type of project.) The Semester III report should be spiral bound.

In Semester IV, the remaining Chapters should be included (which should include Experiments performed, Results and discussion, Conclusions and proposals for future work, Appendices) and Bibliography - references and links. Semester IV report should include all the chapters and should be hardbound.

Academic Council _____
Item No: 4.100

University Of Mumbai

Syllabus for M.Sc. I.T. Part II
Semester III and IV
Programme: M.Sc.
Subject: Information Technology
CHOICE BASED(REVISED)
with effect from the academic year
2020 – 2021

Artificial Intelligence Track
Image Processing Track
Cloud Computing Track
Security Track

SEMESTER - III					
	Course Title				
Course Code	Theory	Credits	Course Code	Practical	Credits
PSIT301	Technical Writing and Entrepreneurship Development	4	PSIT3P1	Project Documentation and Viva	2
Elective 1: Select Any one from the courses listed below along with corresponding practical course					
PSIT302a	Applied Artificial Intelligence	4	PSIT3P2a	Applied Artificial Intelligence Practical	2
PSIT302b	Computer Vision		PSIT3P2b	Computer Vision Practical	
PSIT302c	Cloud Application Development		PSIT3P2c	Cloud Application Development Practical	
PSIT302d	Security Breaches and Countermeasures		PSIT3P2d	Security Breaches and Countermeasures Practical	
Elective 2: Select Any one from the courses listed below along with corresponding practical course					
PSIT303a	Machine Learning	4	PSIT3P3a	Machine Learning Practical	2
PSIT303b	Biomedical Image Processing		PSIT3P3b	Biomedical Image Processing Practical	
PSIT303c	Cloud Management		PSIT3P3c	Cloud Management Practical	
PSIT303d	Malware Analysis		PSIT3P3d	Malware Analysis Practical	
Elective 3: Select Any one from the courses listed below along with corresponding practical course					
PSIT304a	Robotic Process Automation	4	PSIT3P4a	Robotic Process Automation Practical	2
PSIT304b	Virtual Reality and Augmented Reality		PSIT3P4b	Virtual Reality and Augmented Reality Practical	
PSIT304c	Data Center Technologies		PSIT3P4c	Data Center Technologies Practical	
PSIT304d	Offensive Security		PSIT3P4d	Offensive Security Practical	
	Total Theory Credits	**16**		Total Practical Credits	**8**
Total Credits for Semester III: 24					

SEMESTER - IV					
	Course Title				
Course Code	Theory	Credits	Course Code	Practical	Credits
PSIT401	Blockchain	4	PSIT4P1		2
Elective 1: Select Any one from the courses listed below along with corresponding practical course					
PSIT402a	Natural Language Processing	4	PSIT4P2a	Natural Language Processing Practical	2
PSIT402b	Digital Image Forensics		PSIT4P2b	Digital Image Forensics Practical	
PSIT402c	Advanced IoT		PSIT4P2c	Advanced IoT Practical	
PSIT402d	Cyber Forensics		PSIT4P2d	Cyber Forensics Practical	
Elective 2: Select Any one from the courses listed below along with corresponding practical course					
PSIT403a	Deep Learning	4	PSIT4P3a	Deep Learning Practical	2
PSIT403b	Remote Sensing		PSIT4P3b	Remote Sensing Practical	
PSIT403c	Server Virtualization on VMWare Platform		PSIT4P3c	Server Virtualization on VMWare Platform Practical	
PSIT403d	Security Operations Center		PSIT4P3d	Security Operations Center Practical	
Elective 3: Select Any one from the courses listed below. Project Implementation and Viva is compulsory					
PSIT404a	Human Computer Interaction	4	PSIT4P4	Project Implementation and Viva	2
PSIT404b	Advanced Applications of Image Processing				
PSIT404c	Storage as a Service				
PSIT404d	Information Security Auditing				
	Total Theory Credits	**16**		Total Practical Credits	**8**
Total Credits for Semester IV: 24					

If a student selects all 6 papers of Artificial Intelligence Track, he should be awarded the degree **M.Sc. (Information Technology), Artificial Intelligence Specialisation.**
If a student selects all 6 papers of Image Processing Track, he should be awarded the degree **M.Sc. (Information Technology), Image Processing Specialisation.**
If a student selects all 6 papers of Cloud Computing Track, he should be awarded the degree **M.Sc. (Information Technology), Cloud Computing Specialisation**
If a student selects all 6 papers of Artificial Security Track, he should be awarded the degree **M.Sc. (Information Technology), Security Specialisation**
All other students will be awarded M.Sc. (Information Technology) degree.

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SEMESTER III

PSIT301: Technical Writing and Entrepreneurship Development

M. Sc (Information Technology)		**Semester – III**	
Course Name: Technical Writing and Entrepreneurship Development		**Course Code: PSIT301**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- This course aims to provide conceptual understanding of developing strong foundation in general writing, including research proposal and reports.
- It covers the technological developing skills for writing Article, Blog, E-Book, Commercial web Page design, Business Listing Press Release, E-Listing and Product Description.
- This course aims to provide conceptual understanding of innovation and entrepreneurship development.

Unit	Details	Lectures	Outcome
I	Introduction to Technical Communication: What Is Technical Communication? The Challenges of Producing Technical Communication, Characteristics of a Technical Document, Measures of Excellence in Technical Documents, Skills and Qualities Shared by Successful Workplace Communicators, How Communication Skills and Qualities Affect Your Career? **Understanding Ethical and Legal Considerations:** A Brief Introduction to Ethics, Your Ethical Obligations, Your Legal Obligations, The Role of Corporate Culture in Ethical and Legal Conduct, Understanding Ethical and Legal Issues Related to Social Media, Communicating Ethically Across Cultures, Principles for Ethical Communication **Writing Technical Documents:** Planning, Drafting, Revising, Editing, Proofreading **Writing Collaboratively:** Advantages and Disadvantages of Collaboration, Managing Projects, Conducting Meetings, Using Social Media and Other Electronic Tools in Collaboration, Importance of Word Press Website, Gender and Collaboration, Culture and Collaboration.	**12**	**CO1**
II	**Introduction to Content Writing:** Types of Content (Article, Blog, E-Books, Press Release, Newsletters Etc), Exploring Content Publication Channels. Distribution of your content across various channels. **Blog Creation:** Understand the psychology behind your web traffic, Creating killing landing pages which attract users, Using	**12**	**CO2**

	Landing Page Creators, Setting up Accelerated Mobile Pages, Identifying UI UX Experience of your website or blog. **Organizing Your Information:** Understanding Three Principles for Organizing Technical Information, Understanding Conventional Organizational Patterns, **Emphasizing Important Information:** Writing Clear, Informative Titles, Writing Clear, Informative Headings, Writing Clear Informative Lists, Writing Clear Informative Paragraphs.		
III	**Creating Graphics:** The Functions of Graphics, The Characteristics of an Effective Graphic, Understanding the Process of Creating Graphics, Using Color Effectively, Choosing the Appropriate Kind of Graphic, Creating Effective Graphics for Multicultural Readers. **Researching Your Subject:** Understanding the Differences Between Academic and Workplace Research, Understanding the Research Process, Conducting Secondary Research, Conducting Primary Research, **Research and Documentation:** Literature Reviews, Interviewing for Information, Documenting Sources, Copyright, Paraphrasing, Questionnaires. **Report Components:** Abstracts, Introductions, Tables of Contents, Executive Summaries, Feasibility Reports, Investigative Reports, Laboratory Reports, Test Reports, Trip Reports, Trouble Reports	**12**	**CO3**
IV	**Writing Proposals:** Understanding the Process of Writing Proposals, The Logistics of Proposals, The "Deliverables" of Proposals, Persuasion and Proposals, Writing a Proposal, The Structure of the Proposal. **Writing Informational Reports:** Understanding the Process of Writing Informational Reports, Writing Directives, Writing Field Reports, Writing Progress and Status Reports, Writing Incident Reports, Writing Meeting Minutes. **Writing Recommendation Reports:** Understanding the Role of Recommendation Reports, Using a Problem-Solving Model for Preparing Recommendation Reports, Writing Recommendation Reports. **Reviewing, Evaluating, and Testing Documents and Websites:** Understanding Reviewing, Evaluating, and Testing, Reviewing Documents and Websites, Conducting Usability Evaluations, Conducting Usability Tests, Using Internet tools to check writing Quality, Duplicate Content Detector, What is Plagiarism?, How to avoid writing plagiarism content? **Innovation management: an introduction:** The importance of innovation, Models of innovation, Innovation as a management process. **Market adoption and technology diffusion:** Time lag between innovation and useable product, Innovation and the market , Innovation and market vision ,Analysing internet search data to help	**12**	**CO4**

	adoption and forecasting sales ,Innovative new products and consumption patterns, Crowd sourcing for new product ideas, Frugal innovation and ideas from everywhere, Innovation diffusion theories.		
V	**Managing innovation within firms:** Organisations and innovation, The dilemma of innovation management, Innovation dilemma in low technology sectors, Dynamic capabilities, Managing uncertainty, Managing innovation projects **Operations and process innovation:** Operations management, The nature of design and innovation in the context of operations, Process design, Process design and innovation **Managing intellectual property:** Intellectual property, Trade secrets, An introduction to patents, Trademarks, Brand names, Copyright **Management of research and development:** What is research and development?, R&D management and the industrial context, R&D investment and company success, Classifying R&D, R&D management and its link with business strategy, Strategic pressures on R&D, Which business to support and how?, Allocation of funds to R&D, Level of R&D expenditure **Managing R&D projects:** Successful technology management, The changing nature of R&D management, The acquisition of external technology, Effective R&D management, The link with the product innovation process, Evaluating R&D projects.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Technical Communication	Mike Markel	Bedford/St. Martin's	11	2014
2.	Innovation Management and New Product Development	Paul Trott	Pearson	06	2017
3.	Handbook of Technical Writing	Gerald J. Alred , Charles T. Brusaw , Walter E. Oliu	Bedford/St. Martin's	09	2008
4.	Technical Writing 101: A Real-World Guide to Planning and Writing Technical Content	Alan S. Pringle and Sarah S. O'Keefe	scriptorium	03	2009
5.	Innovation and Entrepreneurship	Peter Drucker	Harper Business	03	2009

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Develop technical documents that meet the requirements with standard guidelines. Understanding the essentials and hands-on learning about effective Website Development.
CO2: Write Better Quality Content Which Ranks faster at Search Engines. Build effective Social Media Pages.
CO3: Evaluate the essentials parameters of effective Social Media Pages.
CO4: Understand importance of innovation and entrepreneurship.
CO5: Analyze research and development projects.

PSIT3P1: Project Documentation and Viva

M. Sc (Information Technology)		**Semester – III**	
Course Name: Project Documentation and Viva		**Course Code: PSIT3P1**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

The learners are expected to develop a project beyond the undergraduate level. Normal web sites, web applications, mobile apps are not expected. Preferably, the project should be from the elective chosen by the learner at the post graduate level. In semester three. The learner is supposed to prepare the synopsis and documentation. The same project has to be implemented in Semester IV.
More details about the project is given is Appendix 1.

PSIT302a: Applied Artificial Intelligence

M. Sc (Information Technology)		**Semester – III**	
Course Name: Applied Artificial Intelligence		Course Code: PSIT302a	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To explore the applied branches of artificial intelligence
- To enable the learner to understand applications of artificial intelligence
- To enable the student to solve the problem aligned with derived branches of artificial intelligence.

Unit	*Details*	*Lectures*	*Outcome*
I	**Review of AI:** History, foundation and Applications **Expert System and Applications:** Phases in Building Expert System, Expert System Architecture, Expert System versus Traditional Systems, Rule based Expert Systems, Blackboard Systems, Truth Maintenance System, Application of Expert Systems, Shells and Tools	**12**	**CO1**
II	**Probability Theory:** joint probability, conditional probability, Bayes's theorem, probabilities in rules and facts of rule based system, cumulative probabilities, rule based system and Bayesian method **Fuzzy Sets and Fuzzy Logic:** Fuzzy Sets, Fuzzy set operations, Types of Member ship Functions, Multivalued Logic, Fuzzy Logic, Linguistic variables and Hedges, Fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems, possibility theory and other enhancement to Logic	**12**	**CO2**
III	**Machine Learning Paradigms:** Machine Learning systems, supervised and un-supervised learning, inductive learning, deductive learning, clustering, support vector machines, cased based reasoning and learning. **Artificial Neural Networks:** Artificial Neural Networks, Single-Layer feedforward networks, multi-layer feed-forward networks, radial basis function networks, design issues of artificial neural networks and recurrent networks	**12**	**CO3**
IV	**Evolutionary Computation:** Soft computing, genetic algorithms, genetic programming concepts, evolutionary programming, swarm intelligence, ant colony paradigm, particle swarm optimization and applications of evolutionary algorithms. **Intelligent Agents:** Agents vs software programs, classification of agents, working of an agent, single agent and multiagent systems, performance evaluation, architecture, agent communication language, applications	**12**	**CO4**

V	Advanced Knowledge Representation Techniques: Conceptual dependency theory, script structures, CYC theory, script structure, CYC theory, case grammars, semantic web. Natural Language Processing: Sentence Analysis phases, grammars and parsers, types of parsers, semantic analysis, universal networking language, dictionary	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Artificial Intelligence	Saroj Kaushik	Cengage	1st	2019
2.	Artificial Intelligence: A Modern Approach	A. Russel, Peter Norvig		1st	
3.	Artificial Intelligence	Elaine Rich,Kevin Knight,Shivashankar B. Nair	Tata Mc-Grawhill	3rd	

M. Sc (Information Technology)		**Semester – III**	
Course Name: Artificial Intelligence Practical		**Course Code: PSIT3P2a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of course the learner will:
CO1: be able to understand the fundamentals concepts of expert system and its applications.
CO2: be able to use probability and concept of fuzzy sets for solving AI based problems.
CO3: be able to understand the applications of Machine Learning. The learner can also apply fuzzy system for solving problems.
CO4: learner will be able to apply to understand the applications of genetic algorithms in different problems related to artificial intelligence.
CO5: A learner can use knowledge representation techniques in natural language processing.

PSIT302b: Computer Vision

M. Sc (Information Technology)		Semester – III	
Course Name: Computer Vision		**Course Code: PSIT302b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To develop the student's understanding of the issues involved in trying to define and simulate perception.
- To familiarize the student with specific, well known computer vision methods, algorithms and results.
- To provide the student additional experience in the analysis and evaluation of complicated systems.
- To provide the student additional software development experience.
- To provide the student with paper and proposal writing experience.

Unit	Details	Lectures	Outcome
I	**Introduction:** What is computer vision?, A brief history, Image formation, Geometric primitives and transformations, Geometric primitives, D transformations, D transformations, D rotations, D to D projections, Lens distortions, Photometric image formation, Lighting, Reflectance and shading, Optics, The digital camera, Sampling and aliasing, Color ,Compression **Feature-based alignment**: D and D feature-based alignment, D alignment using least squares , Application: Panography , Iterative algorithms , Robust least squares and RANSAC , D alignment , Pose estimation , Linear algorithms, Iterative algorithms , Application: Augmented reality , Geometric intrinsic calibration, Calibration patterns, Vanishing points , Application: Single view metrology , Rotational motion ,Radial distortion	**12**	**CO1**
II	**Structure from motion :** Triangulation, Two-frame structure from motion , Projective (uncalibrated) reconstruction, Self-calibration , Application: View morphing , Factorization, Perspective and projective factorization , Application: Sparse D model extraction, Bundle adjustment, Exploiting sparsity , Application: Match move and augmented reality , Uncertainty and ambiguities , Application: Reconstruction from Internet photos , Constrained structure and motion , Line-based techniques , Plane-based techniques **Dense motion estimation :** Translational alignment , Hierarchical motion estimation, Fourier-based alignment ,	**12**	**CO2**

	Incremental refinement , Parametric motion, Application: Video stabilization, Learned motion models , Spline-based motion, Application: Medical image registration, Optical flow, Multi-frame motion estimation ,Application: Video denoising , Application: De-interlacing , Layered motion, Application: Frame interpolation, Transparent layers and reflections		
III	**Image stitching :** Motion models, Planar perspective motion, Application: Whiteboard and document scanning , Rotational panoramas , Gap closing , Application: Video summarization and compression, Cylindrical and spherical coordinates, Global alignment, Bundle adjustment,Parallax removal , Recognizing panoramas, Direct vsfeature-based alignment, Compositing , Choosing a compositing surface, Pixel selection and weighting (de-ghosting) , Application: Photomontage,Blending **Computational photography :** Photometric calibration ,Radiometric response function ,Noise level estimation ,Vignetting ,Optical blur (spatial response) estimation ,High dynamic range imaging ,Tone mapping ,Application: Flash photograpy,Super-resolution and blur removal,Color image demosaicing ,Application: Colorization,Image matting and compositing ,Blue screen matting ,Natural image matting ,Optimization-based matting ,Smoke, shadow, and flash matting ,Video matting ,Texture analysis and synthesis ,Application: Hole filling and inpainting ,Application: Non-photorealistic rendering	**12**	**CO3**
IV	Stereo correspondence Epipolar geometry , Rectification ,Plane sweep , Sparse correspondence , D curves and profiles , Dense correspondence, Similarity measures , Local methods , Sub-pixel estimation and uncertainty , Application: Stereo-based head tracking , Global optimization , Dynamic programming , Segmentation-based techniques, Application: Z-keying and background replacement, Multi-view stereo, Volumetric and D surface reconstruction, Shape from silhouettes **3D reconstruction :** Shape from X , Shape from shading and photometric stereo, Shape from texture, Shape from focus , Active rangefinding , Range data merging , Application: Digital heritage , Surface representations , Surface interpolation, Surface simplification, Geometry images , Point-based representations, Volumetric representations , Implicit surfaces and level sets , Model-based reconstruction, Architecture, Heads and faces , Application: Facial animation , Whole body modeling and tracking ,Recovering texture maps and albedos , Estimating BRDFs ,Application: D photography	**12**	**CO4**

V	**Image-based rendering :** View interpolation, View-dependent texture maps, Application: Photo Tourism , Layered depth images, Impostors, sprites, and layers, Light fields and Lumigraphs , Unstructured Lumigraph, Surface light fields, Application: Concentric mosaics, Environment mattes, Higher-dimensional light fields , The modeling to rendering continuum, Video-based rendering , Video-based animation, Video textures , Application: Animating pictures, D Video, Application: Video-based walkthroughs **Recognition :** Object detection, Face detection, Pedestrian detection, Face recognition, Eigenfaces, Active appearance and D shape models, Application: Personal photo collections, Instance recognition, Geometric alignment, Large databases, Application: Location recognition, Category recognition, Bag of words, Part-based models, Recognition with segmentation, Application: Intelligent photo editing, Context and scene understanding , Learning and large image collections, Application: Image search, Recognition databases and test sets	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer Vision: Algorithms and Applications	Richard Szeliski	Springer	1st Edition	2010

M. Sc (Information Technology)		**Semester – III**	
Course Name: Computer Vision Practical		**Course Code: PSIT3P2b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Understand the basics of computer vision
CO2: Understand and analyse various structure form motion and various estimates of Dense Motion
CO3: Apply various motion models to images and understand computation photography techniques
CO4: Apply Epipolar geometry , Rectification and various other 3D correspondence and Stereo reconstruction techniques
CO5: Understand image-based rendering and reconstruction

PSIT302c: Cloud Application Development

M. Sc (Information Technology)		**Semester – III**	
Course Name: Cloud Application Development		**Course Code: PSIT302c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To develop and deploy Microservices for cloud
- To understand Kubernetes and deploy applications on Azure Kubernetes Service
- To understand DevOps for Azure
- To follow the DevOps practices for software development
- To build APIs for Azure and AWS

Unit	Details	Lectures	Outcomes
I	**Implementing Microservices:** Client to microservices communication, Interservice communication, data considerations, security, monitoring, microservices hosting platform options. **Azure Service Fabric:** Introduction, core concepts, supported programming models, service fabric clusters, develop and deploy applications of service fabric. **Monitoring Azure Service Fabric Clusters:** Azure application, resource manager template, Adding Application Monitoring to a Stateless Service Using Application Insights, Cluster monitoring, Infrastructure monitoring.	**12**	**CO1**
II	**Azure Kubernetes Service (AKS):** Introduction to kubernetes and AKS, AKS development tools, Deploy applications on AKS. **Monitoring AKS:** Monitoring, Azure monitor and analytics, monitoring AKS clusters, native kubernetes dashboard, Prometheus and Grafana. **Securing Microservices:** Authentication in microservices, Implenting security using API gateway pattern, Creating application using Ocrlot and securing APIs with Azure AD. **Database Design for Microservices:** Data stores, monolithic approach, Microservices approach, harnessing cloud computing, dataase options on MS Azure, overcoming application development challenges. **Building Microservices on Azure Stack:** Azure stack, Offering IaaS, PaaS on-premises simplified, SaaS on Azure stack.	**12**	**CO2**

III	.**NET DevOps for Azure:** DevOps introduction, Problem and solution. **Professional Grade DevOps Environment:** The state of DevOps, professional grade DevOps vision, DevOps architecture, tools for professional DevOps environment, DevOps centered application. **Tracking work:** Process template, Types of work items, Customizing the process, Working with the process. **Tracking code:** Number of repositories, Git repository, structure, branching pattern, Azure repos configuration, Git and Azure.	**12**	**CO3**
IV	**Building the code:** Structure of build, using builds with .NET core and Azure pipelines, **Validating the code:** Strategy for defect detection, Implementing defect detection. **Release candidate creation:** Designing release candidate architecture, Azure artifacts workflow for release candidates, **Deploying the release:** Designing deployment pipeline, Implementing deployment in Azure pipelines. **Operating and monitoring release:** Principles, Architectures for observability, Jumpstarting observability.	**12**	**CO4**
V	**Introduction to APIs:** Introduction, API economy, APIs in public sector. **API Strategy and Architecture:** API Strategy, API value chain, API architecture, **API** management. **API Development:** Considerations, Standards, kick-start API development, team orientation. **API Gateways:** API Gateways in public cloud, Azure API management, AWS API gateway. **API Security:** Request-based security, Authentication and authorization.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Building Microservices Applications on Microsoft Azure- Designing, Developing, Deploying, and Monitoring	Harsh Chawla Hemant Kathuria	Apress	--	2019
2.	.NET DevOps for Azure A Developer's Guide to DevOps Architecture the Right Way	Jeffrey Palermo	Apress	--	2019
3.	Practical API Architecture and Development with Azure and AWS - Design and Implementation of APIs for the Cloud	Thurupathan Vijayakumar	Apress	--	2018

M. Sc (Information Technology)		Semester – III	
Course Name: Cloud Application Development Practical		**Course Code: PSIT3P2c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	--

List of Practical:
10 practical covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:

CO01: Develop the Microservices for cloud and deploy them on Microsoft Azure.

CO02: Build and deploy services to Azure Kubernetes service.

CO03: Understand and build the DevOps way.

CO04: Thoroughly build the applications in the DevOps way.

CO05: Build the APIs for Microsoft Azure and AWS.

PSIT302d: Security Breaches and Countermeasures

M. Sc (Information Technology)		Semester – III	
Course Name: Security Breaches and Countermeasures		**Course Code: PSIT302d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To get the insight of the security loopholes in every aspect of computing.
- To understand the threats and different types of attacks that can be launched on computing systems.
- To know the countermeasures that can be taken to prevent attacks on computing systems.
- To test the software against the attacks.

Unit	Details	Lectures	Outcome
I	**Introduction to Security Breaching**: Overview of Information Security, Threats and Attack vectors, Concepts of Hacking – Ethical and Unethical, Information Security Controls, Concepts of penetration Testing, Information Security Laws and Standards. **Evaluation Security of IT Organisation:** Concepts, Methodology, Tools, Countermeasures, Penetration Testing. **Network Scanning:** Concepts, Scanning beyond IDS and firewalls, Tools, Banner Grabbing, Scanning Techniques, Network Diagrams, penetration testing. **Enumeration:** Concepts, Different types of enumeration: Netbios, SNMP, LDAP, NTP, SMTP, DNS, other enumeration techniques, Countermeasures, Penetration Testing	**12**	**CO1**
II	**Analysis of Vulnerability:** Concepts, Assessment Solutions, Scoring Systems, Assessment Tools, Assessment Reports. **Breaching System Security:** Concepts, Cracking passwords, Escalating privileges, Executing Applications, Hiding files, covering tracks, penetration testing. **Threats due to malware:** Concepts, Malware Analysis, Trojan concepts, countermeasures, Virus and worm concepts, anti-malware software, penetration testing. **Network Sniffing:** Concepts, countermeasures, sniffing techniques, detection techniques, tools, penetration testing.	**12**	**CO2**

III	**Social Engineering:** Concepts, Impersonation on networking sites, Techniques, Identity theft, Insider threats, countermeasures, Pen testing. **Denial of Service and Distributed Denial of service:** Concepts, techniques, botnets, attack tools, countermeasures, protection tools, penetration testing. **Hijacking an active session:** Concepts, tools, application level session hijacking, countermeasures, network level session hijacking, penetration testing. **Evasion of IDS, Firewalls and Honeypots:** Introduction and concepts, detecting honeypots, evading IDS, IDS and Firewall evasion countermeasures, evading firewalls, penetration testing.	**12**	**CO3**
IV	**Compromising Web Servers:** Concepts, attacks, attack methodology, attack tools, countermeasures, patch management, web server security tools, penetration testing. **Compromising Web Applications:** Concepts**,** threats, methods, tools, countermeasures, testing tools, penetration testing. **Performing SQL Injection:** Concepts, types, methodology, tools, techniques, countermeasures. **Compromising Wireless Networks:** Concepts, wireless encryption, threats, methodology, tools, compromising Bluetooth, countermeasures, wireless security tools, penetration testing.	**12**	**CO4**
V	**Compromising Mobile Platforms:** Attack vectors, Compromising Android OS, Compromising iOS, Mobile spyware, Mobile Device Management, Mobile security, penetration testing. **Compromising IoT:** Concepts, attacks, compromising methodology, tools, countermeasures, penetration testing. **Cloud Security:** Concepts, Security, threats, attacks, tools, penetration testing. **Cryptography:** Concepts, email encryption, algorithms, disk encryption, tools, cryptanalysis, Public key infrastructure, countermeasures.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	CEHv10, Certified Ethical Hacker Study Guide	Ric Messier	Sybex - Wiley	-	2019
2.	All in One, Certified Ethical Hacker	Matt Walker	Tata McGraw Hill	-	2012
3.	CEH V10: EC-Council Certified Ethical Hacker Complete Training Guide	I.P. Specialist	IPSPECIALIST	-	2018

M. Sc (Information Technology)		Semester – III	
Course Name: Security Breaches and Countermeasures Practical		**Course Code: PSIT3P3d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcome:
CO1: The student should be able to identify the different security breaches that can occur. The student should be able to evaluate the security of an organization and identify the loopholes. The student should be able to perform enumeration and network scanning.

CO2: The student should be able to identify the vulnerability in the systems, breach the security of the system, identify the threats due to malware and sniff the network. The student should be able to do the penetration testing to check the vulnerability of the system towards malware and network sniffing.

CO3: The student should be able to perform social engineering and educate people to be careful from attacks due to social engineering, understand and launch DoS and DDoS attacks, hijack and active session and evade IDS and Firewalls. This should help the students to make the organization understand the threats in their systems and build robust systems.

CO4: The student should be able to identify the vulnerabilities in the Web Servers, Web Applications, perform SQL injection and get into the wireless networks. The student should be able to help the organization aware about these vulnerabilities in their systems.

CO5: The student should be able to identify the vulnerabilities in the newer technologies like mobiles, IoT and cloud computing. The student should be able to use different methods of cryptography.

PSIT303a: Machine Learning

M. Sc (Information Technology)		**Semester – III**	
Course Name: Machine Learning		**Course Code: PSIT303a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understanding Human learning aspects.
- Understanding primitives in learning process by computer.
- Understanding nature of problems solved with Machine Learning

Unit	Details	Lectures	Outcome
I	**Introduction:** Machine learning, Examples of Machine Learning Problems, Structure of Learning, learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, Machine learning Models: Geometric Models, Logical Models, Probabilistic Models. Features: Feature types, Feature Construction and Transformation, Feature Selection.	**12**	**CO1**
II	**Classification and Regression: Classification:** Binary Classification- Assessing Classification performance, Class probability Estimation Assessing class probability Estimates, Multiclass Classification. **Regression**: Assessing performance of Regression- Error measures, Overfitting- Catalysts for Overfitting, Case study of Polynomial Regression. **Theory of Generalization:** Effective number of hypothesis, Bounding the Growth function, VC Dimensions, Regularization theory.	**12**	**CO2**
III	**Linear Models:** Least Squares method, Multivariate Linear Regression, Regularized Regression, Using Least Square regression for Classification. Perceptron, Support Vector Machines, Soft Margin SVM, Obtaining probabilities from Linear classifiers, Kernel methods for non-Linearity.	**12**	**CO2 CO3**
IV	**Logic Based and Algebraic Model: Distance Based Models:** Neighbours and Examples, Nearest Neighbours Classification, Distance based clustering-K means Algorithm, Hierarchical clustering, **Rule Based Models:** Rule learning for subgroup discovery, Association rule mining. **Tree Based Models:** Decision Trees, Ranking and Probability estimation Trees, Regression trees, Clustering Trees.	**12**	**CO2 CO3 CO4**

V	Probabilistic Model: Normal Distribution and Its Geometric Interpretations, Naïve Bayes Classifier, Discriminative learning with Maximum likelihood, Probabilistic Models with Hidden variables: Estimation-Maximization Methods, Gaussian Mixtures, and Compression based Models. **Trends In Machine Learning :** Model and Symbols-Bagging and Boosting, Multitask learning, Online learning and Sequence Prediction, Data Streams and Active Learning, Deep Learning, Reinforcement Learning.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Machine Learning: The Art and Science of Algorithms that Make Sense of Data	Peter Flach	Cambridge University Press		2012
2.	Introduction to Statistical Machine Learning with Applications in R	Hastie, Tibshirani, Friedman	Springer	2nd	2012
3.	Introduction to Machine Learning	Ethem Alpaydin	PHI	2nd	2013

M. Sc (Information Technology)		**Semester – III**	
Course Name: Machine Learning Practical		**Course Code: PSIT3P3a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Understand the key issues in Machine Learning and its associated applications in intelligent business and scientific computing.
CO2: Acquire the knowledge about classification and regression techniques where a learner will be able to explore his skill to generate data base knowledge using the prescribed techniques.
CO3: Understand and implement the techniques for extracting the knowledge using machine learning methods.
CO4: Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.
CO5: Understand the statistical approach related to machine learning. He will also Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

PSIT303b: Biomedical Image Processing

M. Sc (Information Technology)		**Semester – III**	
Course Name: Biomedical Image Processing		**Course Code: PSIT303b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To design intelligent systems that can analyze biomedical images.
- To understand different scientific approaches in biomedical image processing.
- To understand the structure of biomedical images and how to correlate it with different biological data.
- To design systems to identify different physical conditions on the basis of biomedical data.

Unit	Details	Lectures	Outcome
I	**Introduction:** Biosignals, Biosignal Measurement Systems, Transducers, Amplifier/Detector, Analog Signal Processing and Filters, ADC Conversion, Data Banks **Bio signal Measurements, Noise, and Analysis:** Biosignals, Noise, Signal Analysis: Data Functions and Transforms **Spectral Analysis: Classical Methods :** Fourier Series Analysis, Power Spectrum, Spectral Averaging: Welch's Method **Noise Reduction and Digital Filters :** Noise Reduction, Noise Reduction through Ensemble Averaging, Z-Transform, Finite Impulse Response Filters, Infinite Impulse Response Filters	**12**	**CO1**
II	**Modern Spectral Analysis: The Search for Narrowband Signals:** Parametric Methods, Nonparametric Analysis: Eigen analysis Frequency Estimation **Time Frequency Analysis:** Basic Approaches, The Short-Term Fourier Transform: The Spectrogram, The Wigner Ville Distribution: A Special Case of Cohen's Class, Cohen's Class Distributions **Wavelet Analysis:** Continuous Wavelet Transform, Discrete Wavelet Transform, Feature Detection: Wavelet Packets **Optimal and Adaptive Filters:** Optimal Signal Processing: Wiener Filters, Adaptive Signal Processing, Phase-Sensitive Detection	**12**	**CO2**

III	Multivariate Analyses: Principal Component Analysis and Independent Component Analysis : Linear Transformations, Principal Component Analysis, Independent Component Analysis **Chaos and Nonlinear Dynamics :** Nonlinear Systems, Phase Space, Estimating the Embedding Parameters, Quantifying Trajectories in Phase Space: The Lyapunov Exponent, Nonlinear Analysis: The Correlation Dimension, Tests for Nonlinearity: Surrogate Data Analysis **Nonlinearity Detection: Information-Based Methods :** Information and Regularity, Mutual Information Function, Spectral Entropy, Phase-Space-Based Entropy Methods, Detrended Fluctuation Analysis	**12**	**CO3**
IV	**Image Processing: Filters, Transformations, and Registration :** Two-Dimensional Fourier Transform, Linear Filtering, Spatial Transformations, Image Registration **Image Segmentation :** Pixel-Based Methods, Continuity-Based Methods, Multi thresholding Morphological Operations, Edge-Based Segmentation **Image Acquisition and Reconstruction :** Imaging Modalities, CT, PET, and SPECT, Magnetic Resonance Imaging, Functional MRI	**12**	**CO4**
V	**Classification I: Linear Discriminant Analysis and Support Vector Machines :** Linear Discriminators, Evaluating Classifier Performance, Higher Dimensions: Kernel Machines Support Vector Machines, Machine Capacity: Overfitting or "Less Is More", Extending the Number of Variables and Classes, Cluster Analysis **Classification II: Adaptive Neural Nets :** Training the McCullough Pitts Neuron, The Gradient Decent Method or Delta Rule, Two-Layer Nets: Back Projection, Three-Layer Nets, Training Strategies, Multiple Classifications, Multiple Input Variables	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Biosignal and Medical Image Processing	John L. Semmlow, Benjamin Griffel	CRC Press	3rd	2014
2.	Biomedical Signal and Image Processing	Kayvan Najarian Robert Splinter	CRC Press	2nd	2012
3.	Introduction to Biomedical Imaging	Andrew Webb	Wiley-Interscience		2003

M. Sc (Information Technology)		Semester – III	
Course Name: Biomedical Image Processing Practical		**Course Code: PSIT3P3b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand basics of Bio signals and various classical techniques of bio signal processing.

CO2: Understand various modern spectral analysis techniques.

CO3: Understand and apply various multivariate analysis techniques on bio signals.

CO4: Understand and apply various transformations filters to images, and different techniques for image acquisition and construction.

CO5: Understand the AI perspective in biological image processing using SVM and Neural Networks.

PSIT303c: Cloud Management

M. Sc (Information Technology)		Semester – III	
Course Name: Cloud Management		**Course Code: PSIT303c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To Understand the Fundamental Ideas Behind Cloud Computing, The Evolution Of The Paradigm, Its Applicability; Benefits, As Well As Current And Future Challenges;
- The Basic ideas And Principles In Data Center Design; Cloud Management Techniques And Cloud Software Deployment Considerations;
- Different CPU, Memory And I/O Virtualization Techniques That Serve In Offering Software, Computation
- And Storage Services On The Cloud; Software Defined Networks (SDN) And Software Defined Storage (SDS);
- Cloud Storage Technologies And Relevant Distributed File Systems, Nosql Databases And Object Storage;
- The Variety Of Programming Models And Develop Working Experience In Several Of Them.

Unit	Details	Lectures	Outcome
I	What is VMM? What's new in VMM Get Started Release notes - VMM Turn telemetry data on/off Deploy a VMM cloud Create a VMM cloud Manage a VMM cloud Deploy a guarded host fabric Deploy guarded hosts Configure fallback HGS settings Deploy a shielded VHDX and VM template Deploy a shielded VM Deploy a shielded Linux VM Deploy and manage a software defined network (SDN) infrastructure Deploy an SDN network controller Deploy an SDN SLB Deploy an SDN RAS gateway Deploy SDN using PowerShell Set up a VM network in SDN Encrypt VM networks in SDN Allow and block VM traffic with SDN port ACLs Control SDN virtual network bandwidth with QoS Load balance network traffic Set up NAT for traffic forwarding in an SDN Route traffic across networks in the SDN infrastructure Configure SDN guest clusters Update the NC server certificate Set up SDN SLB VIPs Back up and restore the SDN infrastructure Remove an SDN from VMM Manage SDN resources in the VMM fabric Deploy and manage Storage Spaces	**12**	**CO1**

	Direct Set up a hyper-converged Storage Spaces Direct cluster Set up a disaggregated Storage Spaces Direct cluster Manage Storage Spaces Direct clusters Assign storage QoS policies for Clusters How To Plan System requirements – VMM Plan VMM installation Plan a VMM high availability deployment Identify VMM ports and protocols Plan the VMM compute fabric Plan the VMM networking fabric Identify supported storage arrays Upgrade and install Upgrade VMM Install VMM Install the VMM console Enable enhanced console session Deploy VMM for high availability Deploy a highly available VMM management server Deploy a highly available SQL Server database for VMM Deploy a highly available VMM library Set up TLS 1.2 Deploy update rollups Back up and restore VMM Manage the VMM library Library overview Add file-based resources to the VMM library Add profiles to the VMM library Add VM templates to the VMM library Add service templates to the VMM library Manage VMM library resources Manage virtualization servers Manage VMM host groups Add existing Hyper-V hosts and clusters to the fabric Add a Nano server as a Hyper-V host or cluster Run a script on host Create a cluster from standalone Hyper-V hosts Provision a Hyper-V host or cluster from bare-metal Create a guest Hyper-V cluster from a service template Set up networking for Hyper-V hosts and clusters Set up storage for Hyper-V hosts and clusters Manage MPIO for Hyper-V hosts and clusters Manage Hyper-V extended port ACLs Manage Hyper-V clusters Update Hyper-V hosts and clusters Run a rolling upgrade of Hyper-V clusters Service Hyper-V hosts for maintenance Manage VMware servers Manage management servers Manage infrastructure servers Manage update servers Manage networking Network fabric overview Set up logical networks Set up logical networks in UR1 Set up VM networks Set up IP address pools Add a network gateway Set up port profiles Set up logical switches Set up MAC address pools Integrate NLB with service templates Set up an IPAM server Manage storage Set up storage fabric Set up storage classifications Add storage devices Allocate storage to host groups Set up a Microsoft iSCSI Target Server Set up a Virtual Fibre Channel Set up file storage Set up Storage Replica in VMM		

II	Service Manager What's new in Service Manager Get started Evaluation and activation of Service Manager Service Manager components Supported configurations System requirements - Service Manager Release notes - Service Manager Enable service log on Manage telemetry settings How to Plan Planning for Service Manager Plan for deployment Service Manager editions Recommended deployment topologies Operations Manager considerations Service Manager databases Port assignments Prepare for deployment Service Manager performance Plan for performance and scalability Plan for hardware performance Deploy Deploy Service Manager Deployment scenarios Install on a single computer Install on two computers Install on four computers Set up remote SQL Server Reporting Services Use SQL Server AlwaysOn availability groups for failover Create and deploy server images Install on VMs Configure PowerShell Register with the data warehouse to enable reporting Deploy additional management servers Deployment considerations with a disjointed namespace Learn about the new Self Service portal Deploy the Self-Service portal Set up load balancing Back up the encryption key Index non-English knowledge articles Troubleshoot deployment issues Deploy from a command line Move databases Upgrade Upgrade Service Manager Upgrade the self-service portal to Service Manager 2016 Upgrade SQL Server Reporting Services Set up a lab environment for upgrade Prepare the production environment Prepare the lab environment Run an upgrade Complete tasks after upgrade Troubleshoot upgrade issues Administer Use management packs to add functionality Use connectors to import data Import data from Active Directory Domain Services Import data and alerts from Operations Manager Import data from Configuration Manager Import runbooks from Orchestrator Import data from VMM Use a CSV file to import data Optionally disable ECL logging for faster connector synchronization Configuration items Configure incident management Configure service level management Configure workflows Configure change and activity management Configure release management Configure Desired Configuration Management to generate incidents Configure notifications Use the service catalog to offer services Use groups, queues, and lists in Service Manager	**12**	**CO2**

	Use runbooks to automate procedures User interface customization Manage user roles Manage Run As accounts Manage knowledge articles Configure and use Service Manager cmdlets Manage the data warehouse Register source systems to the data warehouse Troubleshoot computer problems with tasks Configure your preference for sharing diagnostic and usage data Operate Search for information Manage incidents and problems Manage changes and activities Manage service requests Manage release records Data warehouse reporting and analytics Use and manage standard reports		
III	What is Configuration Manager? Microsoft Endpoint Configuration Manager FAQ What happened to SCCM? Introduction Find help for Configuration Manager How to use the docs How to use the console Accessibility features Software Center user guide Fundamentals Configuration Manager fundamentals Sites and hierarchies About upgrade, update, and install Manage devices Client management Security Role-based administration Configuration Manager and Windows as a Service Plan and design Get ready for Configuration Manager Product changes Features and capabilities Security and privacy for Configuration Manager Security and privacy overview Plan for security Security best practices and privacy information Privacy statement - Configuration Manager Cmdlet Library Additional privacy information Configure security Cryptographic controls technical reference Enable TLS About enabling TLS Enable TLS on clients Enable TLS on site servers and remote site systems Common issues when enabling TLS 1Migrate data between hierarchies Migration overview Plan for migration Planning for migration Prerequisites for migration Checklists for migration Determine whether to migrate data Planning the source hierarchy Planning migration jobs Planning client migration Planning for content deployment Planning to migrate objects Planning to monitor migration Planning to complete migration Configure source hierarchies and source sites Operations for migrating Security and privacy for migration Deploy servers and roles Deploy servers and roles Install infrastructure Get installation media Before you run setup Setup reference Setup downloader Prerequisite checker	**12**	**CO3**

	Prerequisite checks Installing sites Prepare to install sites overview Prepare to install sites Prerequisites for installing sites Use the setup wizard Use a command-line Command-line overview Command-line options Install consoles Upgrade an evaluation install Upgrade to Configuration Manager Scenarios to streamline your installation Configure sites and hierarchies Configure sites and hierarchies overview Add site system roles Add site system roles overview Install site system roles Install cloud-based distribution points About the service connection point Configuration options for site system roles Database replicas for management points Site components Publish site data Manage content and content infrastructure Content infrastructure overview Install and configure distribution points Deploy and manage content Monitor content Microsoft Connected Cache Troubleshoot Microsoft Connected Cache Run discovery Discovery methods overview About discovery methods Select discovery methods Configure discovery methods Site boundaries and boundary groups Site boundaries and boundary groups overview Boundaries Boundary groups Procedures for boundary groups High availability High availability options Site server high availability Flowchart - Passive site server setup Flowchart - Promote site server (planned) Flowchart - Promote site server (unplanned) Prepare to use SQL Server Always On Configure SQL Server Always On Use a SQL Server cluster Custom locations for database files Configure role-based administration		
IV	What's new in Orchestrator Automate with runbooks Get started Install Orchestrator Work with runbooks in the Orchestrator console Example runbook: Creating a runbook to monitor a folder Release notes – Orchestrator Turn on/off telemetry How To Plan Database sizing and performance Feature performance considerations System requirements – Orchestrator Design a runbook Deploy Upgrade Orchestrator Deploy runbooks Configure Orchestrator database connections Migrate Orchestrator between environments Change the Orchestrator database Manage Runbooks Design and build runbooks Create and test a sample runbook Control runbook activities Monitor activities Runbook properties Track runbooks Install TLS Install and enable TLS 1.2 Manage Orchestrator Servers Runbook permissions Back up Orchestrator	**12**	**CO4**

	Bench mark Optimize performance of .Net activities Configure runbook throttling Recover a database Recover web components Add an integration pack View Orchestrator data with PowerPivot Change Orchestrator user groups Common activity properties Computer groups Standard Activities Orchestrator standard activities Alphabetical list of Standard Activities Ports and protocols of Standard Activities System Run Program Run .NET Script End Process Start/Stop Service Restart System Save Event Log Query WMI Run SSH Command Get SNMP Variable Monitor SNMP Trap Send SNMP Trap Set SNMP Variable Scheduling Monitor Date/Time Check Schedule Monitoring Monitor Event Log Monitor Service Get Service Status Monitor Process Get Process Status Monitor Computer/IP Get Computer/IP Status Monitor Disk Space Get Disk Space Status Monitor Internet Application Get Internet Application Status Monitor WMI File Management Compress File Copy File Create Folder Decompress File Delete File Delete Folder Get File Status Monitor File Monitor Folder Move File Move Folder PGP Decrypt File PGP Encrypt File Print File Rename File Email Send Email Notification Send Event Log Message Send Syslog Message Send Platform Event Utilities Apply XSLT Query XML Map Published Data Compare Values Write Web Pages Read Text Log Write to Database Query Database Monitor Counter Get Counter Value Modify Counter Invoke Web Services Format Date/Time Generate Random Text Map Network Path Disconnect Network Path Get Dial-up Status Connect/Disconnect Dial-up Text File Management Append Line Delete Line Find Text Get Lines Insert Line Read Line Search and Replace Text Runbook Control Invoke Runbook Initialize Data Junction Return Data Orchestrator Integration Toolkit Overview of Orchestrator Integration Toolkit Installation Command Line Activity Wizard Integration Pack Wizard Integration Packs Active Directory Active Directory activities Add Computer To Group Add Group To Group Add User To Group Create Computer Create Group Create User Delete Computer Delete Group Delete User Disable Computer Disable User Enable Computer Enable User		

	Get Computer Get Group Get Organizational Unit Get User Move Computer Move Group Move User Remove Computer From Group Remove Group From Group Remove User From Group Rename Group Rename User Reset User Password Unlock User Update Computer Update Group Update User		
V	Data Protection Manager How does DPM work? What can DPM back up? DPM-compatible tape libraries Get Started DPM build versions DPM release notes What's new in DPM What DPM supports How To Plan Your DPM Environment Get ready to deploy DPM servers Prepare your environment for DPM Prepare data storage Identify compatible tape libraries Identify data sources you want to protect Install or Upgrade DPM Install DPM Upgrade your DPM installation Add Modern Backup storage Deduplicate DPM storage Deploy DPM Deploy the DPM protection agent Deploy protection groups Configure firewall settings Offline backup Using own disk Protect Workloads Back up Hyper-V virtual machines Back up Exchange with DPM Back up SharePoint with DPM Back up SQL Server with DPM Back up client computers with DPM Back up file data with DPM Back up system state and bare metal Back up and restore VMware servers Back up and restore VMM servers Prepare to back up a generic data source Prepare machines in workgroups and untrusted domains for backup Back up the DPM server Monitor and Manage Monitor DPM Set up DPM logging Generate DPM reports Use SCOM to manage and monitor DPM servers Improve replication performance Use central console to manage DPM servers	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Microsoft SCVMM 2019	Whitepaper	Microsoft		2019
2.	Microsoft Endpoint Manager 2019	Whitepaper	Microsoft		2019
3.	Microsoft SCO 2019	Whitepaper	Microsoft		2019
4.	Microsoft SCOM 2019	Whitepaper	Microsoft		2019
5.	Microsoft SCSM 2019	Whitepaper	Microsoft		2019
6.	Microsoft DPM 2019	Whitepaper	Microsoft		2019
7.	Introducing Microsoft System Center 2012	Mitch Tulloch with Symon Perriman and the System Center Team	Microsoft Press		2012

M. Sc (Information Technology)		Semester – III	
Course Name: Cloud Management Practical		**Course Code: PSIT3P3c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:

CO1: Understand the concepts of VMM, SDN, NAS , HyperV etc.
CO2: Understand and demonstrate the use of Service manager with various deployments that can be performed using it.
CO3: Understand SCCM and Demonstrate the use of Configuration Manager
CO4: Understand automation with runbooks and demonstrate the use of Windows Orchestrator
CO5: Understand and demonstrate the use of Data Protection Manager

PSIT303d: Malware Analysis

M. Sc (Information Technology)		Semester – III	
Course Name: Malware Analysis		**Course Code: PSIT303d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Possess the skills necessary to carry out independent analysis of modern malware samples using both static and dynamic analysis techniques.
- Have an intimate understanding of executable formats, Windows internals and API, and analysis techniques.
- Extract investigative leads from host and network-based indicators associated with a malicious program.
- Apply techniques and concepts to unpack, extract, decrypt, or bypass new anti-analysis techniques in future malware samples.
- Achieve proficiency with industry standard tools including IDA Pro, OllyDbg, WinDBG, PE Explorer, ProcMon etc.

Unit	Details	Lectures	Outcome
I	**Malware Analysis:** Introduction, Techniques, Types of malware, General rules for Malware Analysis. **Basic Static Techniques:** Antivirus Scanning, Hashing, Finding Strings, Packed and Obfuscated Malware, Portable Executable Malware, Portable executable File Format, Linked Libraries and Functions, Static Analysis, The PE file headers and sections. **Malware Analysis in Virtual Machines:** Structure of VM, Creating and using Malware Analysis machine, Risks of using VMware for malware analysis, Record/Replay. **Basic Dynamic Analysis:** Sandboxes, Running Malware, Monitoring with process monitor, Viewing processes with process explorer, Comparing registry snapshots with regshot, Faking a network, Packet sniffing with Wireshark, Using INetSim, Basic Dynamic Tools. x86 Disassembly	**12**	**CO1**
II	**IDA PRO:** Loading an executable, IDA Pro Interface, Using cross references, Analysing functions, Using graphing options, Enhancing disassembly, Extending IDA with plug-ins. **Recognising C Code constructs in assembly:** Global v/s local variables, Disassembling arithmetic operations, recognizing if statements, recognizing loops, function call conventions, Analysing switch statements, Disassembling arrays, Identifying structs, Analysing linked list traversal. **Analysing Malicious Windows Programs:** The windows API, The Windows Registry, Networking APIs,	**12**	**CO2**

	Understanding running malware. Kernel v/s user mode, Native API. **Advanced Dynamic Analysis – Debugging:** Source-level v/s Assembly-level debugging, kernel v/s user mode debugging, Using a debugger, Exceptions, Modifying execution with a debugger, modifying program execution.		
III	**Advanced Dynamic Analysis – OLLYDBG:** Loading Malware, The Ollydbg Interface, Memory Map, Viewing threads and Stacks, Executing code, Breakpoints, Loading DLLs, Tracing, Exception handling, Patching, Analysing shell code, Assistance features, Plug-ins, Scriptable debugging. **Kernel Debugging with WINDBG:** Drivers and kernel code, Using WinDbg, Microsoft Symbols, kernel debugging and using it, Rootkits, Loading drivers, kernel issues with windows. **Malware Functionality – Malware Behavior:** Downloaders and launchers, Backdoors, Credential stealers, Persistence mechanisms, Privilege escalation, covering the tracks. **Covert Malware Launching:** Launchers, Process injection, Process replacement, Hook injection, detours, APC injection.	**12**	**CO3**
IV	**Data Encoding:** Goal of Analysing algorithms, Simple ciphers, Common cryptographic algorithms, Custom encoding, decoding. **Malware – focused network signatures:** Network countermeasures**,** Safely investigating attacker online, Content-Based Network Countermeasures, Combining Dynamic and Static Analysis Techniques, Understanding the Attacker's Perspective**.** **Anti-disassembly:** Concepts, Defeating disassembly algorithms, anti-disassembly techniques, Obscuring flow control, Thwarting stack-frame analysis. **Anti-debugging:** Windows debugger detection, debugger behavior, Interfering with debugger functionality, Debugger vulnerabilities.	**12**	**CO4**
V	**Anti-virtual machine techniques:** VMWare artifacts, Vulnerable functions, Tweaking settings, Escaping the virtual machine. **Packers and unpacking:** Packer anatomy, Identifying Packed Programs, Unpacking options, Automated Unpacking, Manual Unpacking, Common packers, Analysing without unpacking, Packed DLLs, **Shellcode Analysis:** Loading shellcode for analysis, Position-independent Code, Identifying Execution Location, Manual Symbol Resolution, Shellcode encoding, NOP Sleds, Finding Shellcode. **C++ Analysis:** OOP, Virtual and Non-virtual functions, Creating and destroying objects.	**12**	**CO5**

	64-bit Malware: Why 64-bit malware? Differences in x64 architecture, Windows 32-bit on Windows 64-bit, 64-bit hints at malware functionality.		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Practical Malware Analysis – The Hands-On Guide to Dissecting Malicious Software	Michael Sikorski, Andrew Honig	No Scratch Press	-	2013
2.	Mastering Malware Analysis	Alexey Kleymenov, Amr Thabet	Packt Publishing	-	2019
3.	Windows Malware Analysis Essentials	Victor Marak	Packt Publishing		2015

M. Sc (Information Technology)		**Semester – III**	
Course Name: Malware Analysis Practical		**Course Code: PSIT3P3d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Understand various introductory techniques of malware analysis and creating the testing environment
CO2: Perform advanced dynamic analysis and recognize constructs in assembly code.
CO3: Perform Reverse Engineering using OLLYDBG and WINDBG and study the behaviours and functions of malware
CO4: Understand data encoding, various techniques for anti-disassembly and anti-debugging
CO5: Understand various anti virtual machine techniques and perform shellcode analysis of various languages along with x64 architecture.

PSIT304a: Robotic Process Automation

M. Sc (Information Technology)		Semester – III	
Course Name: Robotic Process Automation		**Course Code: PSIT304a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To make the students aware about the automation today in the industry.
- To make the students aware about the tools used for automation.
- To help the students automate a complete process

Unit	Details	Lectures	Outcome
I	**Robotic Process Automation:** Scope and techniques of automation, About UiPath **Record and Play:** UiPath stack, Downloading and installing UiPath Studio, Learning UiPath Studio, Task recorder, Step-by-step examples using the recorder.	**12**	**CO1**
II	**Sequence, Flowchart, and Control Flow:** Sequencing the workflow, Activities, Control flow, various types of loops, and decision making, Step-by-step example using Sequence and Flowchart, Step-by-step example using Sequence and Control flow **Data Manipulation:** Variables and scope, Collections, Arguments – Purpose and use, Data table usage with examples, Clipboard management, File operation with step-by-step example, CSV/Excel to data table and vice versa (with a step-by-step example)	**12**	**CO2**
III	**Taking Control of the Controls :** Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls – mouse and keyboard activities, Working with UiExplorer, Handling events, Revisit recorder, Screen Scraping, When to use OCR, Types of OCR available, How to use OCR, Avoiding typical failure points **Tame that Application with Plugins and Extensions:** Terminal plugin, SAP automation, Java plugin, Citrix automation, Mail plugin, PDF plugin, Web integration, Excel and Word plugins, Credential management, Extensions – Java, Chrome, Firefox, and Silverlight	**12**	**CO3**
IV	**Handling User Events and Assistant Bots:** What are assistant bots?, Monitoring system event triggers, Hotkey trigger, Mouse trigger, System trigger ,Monitoring image and element triggers, An example of	**12**	**CO4**

	monitoring email, Example of monitoring a copying event and blocking it, Launching an assistant bot on a keyboard event **Exception Handling, Debugging, and Logging:** Exception handling, Common exceptions and ways to handle them, Logging and taking screenshots, Debugging techniques, Collecting crash dumps, Error reporting		
V	**Managing and Maintaining the Code:** Project organization, Nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines, or Sequences, Using config files and examples of a config file, Integrating a TFS server **Deploying and Maintaining the Bot:** Publishing using publish utility, Overview of Orchestration Server, Using Orchestration Server to control bots, Using Orchestration Server to deploy bots, License management, Publishing and managing updates	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Learning Robotic Process Automation	Alok Mani Tripathi	Packt	1st	2018
2.	Robotic Process Automation Tools, Process Automation and their benefits: Understanding RPA and Intelligent Automation	Srikanth Merianda	Createspace Independent Publishing	1st	2018
3.	The Simple Implementation Guide to Robotic Process Automation (Rpa): How to Best Implement Rpa in an Organization	Kelly Wibbenmeyer	iUniverse	1st	2018

M. Sc (Information Technology)		**Semester – III**	
Course Name: Robotic Process Automation		**Course Code: PSIT3P4a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completing the course, a learner will be able to:

CO1: Understand the mechanism of business process and can provide the solution in an optimize way.

CO2: Understand the features use for interacting with database plugins.

CO3: Use the plug-ins and other controls used for process automation.

CO4: Use and handle the different events, debugging and managing the errors.

CO5: Test and deploy the automated process.

PSIT304b: Virtual Reality and Augmented Reality

M. Sc (Information Technology)		**Semester – III**	
Course Name: Virtual Reality and Augmented Reality		**Course Code: PSIT304b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To learn background of VR including a brief history of VR, different forms of VR and related technologies, and broad overview of some of the most important concepts
- To provide background in perception to educate VR creators on concepts and theories of how we perceive and interact with the world around us
- To make learner aware of high-level concepts for designing/building assets and how subtle design choices can influence user behavior
- To learn about art for VR and AR should be optimized for spatial displays with spatially aware input devices to interact with digital objects in true 3D
- Walkthrough of VRTK, an open source project meant to spur on cross-platform development

Unit	Details	Lectures	Outcome
I	Introduction: What Is Virtual Reality, A History of VR, An Overview of Various Realities, Immersion, Presence, and Reality Trade-Offs, The Basics: Design Guidelines, Objective and Subjective Reality, Perceptual Models and Processes, Perceptual Modalities	**12**	**CO1**
II	Perception of Space and Time, Perceptual Stability, Attention, and Action, Perception: Design Guidelines, Adverse Health Effects, Motion Sickness, Eye Strain, Seizures, and Aftereffects, Hardware Challenges, Latency, Measuring Sickness, Reducing Adverse Effects, Adverse Health Effects: Design Guidelines	**12**	**CO2**
III	Content Creation, Concepts of Content Creation, Environmental Design, Affecting Behavior, Transitioning to VR Content Creation, Content Creation: Design Guidelines, Interaction, Human-Centered Interaction, VR Interaction Concepts, Input Devices, Interaction Patterns and Techniques, Interaction: Design Guidelines	**12**	**CO3**
IV	Design and Art Across Digital Realities, Designing for Our Senses, Virtual Reality for Art, 3D Art Optimization, Computer Vision That Makes Augmented Reality Possible Works, Virtual Reality and Augmented Reality: Cross-Platform Theory	**12**	**CO4**
V	Virtual Reality Toolkit: Open Source Framework for the Community, Data and Machine Learning Visualization	**12**	**CO5**

	Design and Development in Spatial Computing, Character AI and Behaviors, The Virtual and Augmented Reality Health Technology Ecosystem		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	The VR Book, Human Centered Design for Virtual Reality	Jason Jerald	ACM Books	1st	2016
2.	Creating Augmented and Virtual Realities	Erin Pangilinan, Steve Lukas, Vasanth Mohan	O'Reilly	1st	2019
3.	Virtual reality with VRTK4	Rakesh Baruah	APress	1st	2020

M. Sc (Information Technology)		**Semester – III**	
Course Name: Virtual Reality and Augmented Reality Practical		**Course Code: PSIT3P4b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Apply the concepts of VR and AR in real life.
CO2: Reduce the greatest risk to VR.
CO3: Design the way users interact within the scenes they find themselves in.
CO4: be exposed to VR, AR and today's resources
CO5: Effectively use open source VR software.

PSIT304c: Data Centre Technologies

M. Sc (Information Technology)		Semester – III	
Course Name: Data Centre Technologies		**Course Code: PSIT304c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Identify important requirements to design and support a data center.
- Determine a data center environment's requirement including systems and network architecture as well as services.
- Evaluate options for server farms, network designs, high availability, load balancing, data center services, and trends that might affect data center designs.
- Assess threats, vulnerabilities and common attacks, and network security devices available to protect data centers.
- Design a data center infrastructure integrating features that address security, performance, and availability.
- Measure data center traffic patterns and performance metrics.

Unit	Details	Lectures	Outcome
I	Virtualization History and Definitions Data Center Essential Definitions Data Center Evolution Operational Areas and Data Center Architecture The Origins of Data Center Virtualization Virtual Memory Mainframe Virtualization Hot Standby Router Protocol Defining Virtualization Data Center Virtualization Timeline Classifying Virtualization Technologies A Virtualization Taxonomy Virtualization Scalability Technology Areas Classification Examples Summary Data Center Network Evolution Ethernet Protocol: Then and Now Ethernet Media Coaxial Cable Twisted-Pair Optical Fiber Direct-Attach Twinaxial Cables Ethernet Data Rate Timeline Data Center Network Topologies Data Center Network Layers Design Factors for Data Center Networks Physical Network Layout Considerations The ANSI/TIA-942 Standard Network Virtualization Benefits Network Logical Partitioning Network Simplification and Traffic Load Balancing Management Consolidation and Cabling Optimization Network Extension	**12**	**CO1**

	The Humble Beginnings of Network Virtualization Network Partitioning Concepts from the Bridging World Defining VLANs VLAN Trunks Two Common Misconceptions About VLANs Misconception Number 1: A VLAN Must Be Associated to an IP Subnet Misconception Number 2: Layer 3 VLANs Spanning Tree Protocol and VLANs Spanning Tree Protocol at Work Port States Spanning Tree Protocol Enhancements Spanning Tree Instances Private VLANs VLAN Specifics Native VLAN Reserved VLANs IDs Resource Sharing Control and Management Plane Concepts from the Routing World Overlapping Addresses in a Data Center Defining and Configuring VRFs VRFs and Routing Protocols VRFs and the Management Plane VRF-Awareness VRF Resource Allocation Control		
II	An Army of One: ACE Virtual Contexts Application Networking Services The Use of Load Balancers Load-Balancing Concepts Layer 4 Switching Versus Layer 7 Switching Connection Management Address Translation and Load Balancing Server NAT Dual NAT Port Redirection Transparent Mode Other Load-Balancing Applications Firewall Load Balancing Reverse Proxy Load Balancing Offloading Servers SSL Offload TCP Offload HTTP Compression Load Balancer Proliferation in the Data Center Load Balancer Performance Security Policies Suboptimal Traffic Application Environment Independency ACE Virtual Contexts Application Control Engine Physical Connections Connecting an ACE Appliance Connecting an ACE Module Creating and Allocating Resources to Virtual Contexts Integrating ACE Virtual Contexts to the Data Center Network Routed Design Bridged Design One-Armed Design Managing and Configuring ACE Virtual Contexts Allowing Management Traffic to a Virtual Context Allowing Load Balancing Traffic Through a Virtual Context Controlling Management Access to Virtual Contexts ACE Virtual Context Additional Characteristics Sharing VLANs Among Contexts Virtual Context Fault Tolerance Instant Switches: Virtual Device Contexts Extending Device Virtualization Why Use VDCs? VDCs in Detail Creating and Configuring VDCs VDC Names	**12**	**CO2**

	and CLI Prompts Virtualization Nesting Allocating Resources to VDCs Using Resource Templates Managing VDCs VDC Operations Processes Failures and VDCs VDC Out-of-Band Management Role-Based Access Control and VDCs Global Resources Fooling Spanning Tree Spanning Tree Protocol and Link Utilization Link Aggregation Server Connectivity and NIC Teaming Cross-Switch PortChannels Virtual PortChannels Virtual PortChannel Definitions Configuring Virtual PortChannels Step 1: Defining the Domain Step 2: Establishing Peer Keepalive Connectivity Step 3: Creating the Peer Link Step 4: Creating the Virtual PortChannel Spanning Tree Protocol and Virtual Port Channels Peer Link Failure and Orphan Ports First-Hop Routing Protocols and Virtual Port Channels Layer 2 Multipathing and vPC+ FabricPath Data Plane FabricPath Control Plane FabricPath and Spanning Tree Protocol Virtual PortChannel Plus Virtualized Chassis with Fabric Extenders Server Access Models Understanding Fabric Extenders Fabric Extender Options Connecting a Fabric Extender to a Parent Switch Fabric Extended Interfaces and Spanning Tree Protocol Fabric Interfaces Redundancy Fabric Extender Topologies Straight-Through Topologies Dual-Homed Topologies		
III	Virtualized Chassis with Fabric Extenders Server Access Models Understanding Fabric Extenders Fabric Extender Options Connecting a Fabric Extender to a Parent Switch Fabric Extended Interfaces and Spanning Tree Protocol Fabric Interfaces Redundancy Fabric Extender Topologies Straight-Through Topologies Dual-Homed Topologies Use Case: Mixed Access Data Center A Tale of Two Data Centers A Brief History of Distributed Data Centers The Cold Age (Mid-1970s to 1980s) The Hot Age (1990s to Mid-2000s) The Active-Active Age (Mid-2000s to Today) The Case for Layer 2 Extensions Challenges of Layer 2 Extensions Ethernet Extensions over Optical Connections Virtual PortChannels FabricPath Ethernet Extensions over MPLS MPLS Basic Concepts Ethernet over MPLS Virtual Private LAN Service Ethernet Extensions over IP MPLS over GRE	**12**	**CO3**

	Overlay Transport Virtualization OTV Terminology OTV Basic Configuration OTV Loop Avoidance and Multihoming Migration to OTV OTV Site Designs VLAN Identifiers and Layer 2 Extensions Internal Routing in Connected Data Centers Use Case: Active-Active Greenfield Data Centers Summary Storage Evolution Data Center Storage Devices Hard Disk Drives Disk Arrays Tape Drives and Libraries Accessing Data in Rest Block-Based Access *Small Computer Systems Interface Mainframe Storage Access* Advanced Technology Attachment File Access Network File System Common Internet File System Record Access Storage Virtualization Virtualizing Storage Devices Virtualizing LUNs Virtualizing File Systems Virtualizing SANs		
IV	Server Evolution Server Architectures Mainframes RISC Servers x86 Servers x86 Hardware Evolution CPU Evolution Memory Evolution Expansion Bus Evolution Physical Format Evolution Introducing x86 Server Virtualization Virtualization Unleashed Unified Computing Changing Personalities Server Provisioning Challenges Server Domain Operations Infrastructure Domain Operations Unified Computing and Service Profiles Building Service Profiles Identifying a Service Profile Storage Definitions Network Definitions Virtual Interface Placement Server Boot Order Maintenance Policy Server Assignment Operational Policies Configuration External IPMI Management Configuration Management IP Address *Additional Policies* Associating a Service Profile to a Server Installing an Operating System Verifying Stateless Computing Using Policies BIOS Setting Policies Firmware Policies Industrializing Server Provisioning Cloning Pools Service Profile Templates Server Pools Use Case: Seasonal Workloads	**12**	**CO4**
V	Moving Targets Virtual Network Services Definitions Virtual Network Services Data Path vPath-Enabled Virtual Network Services	**12**	**CO5**

	Cisco Virtual Security Gateway: Compute Virtual Firewall Installing Virtual Security Gateway Creating Security Policies, Sending Data Traffic to VSG Virtual Machine Attributes and Virtual Zones Application Acceleration, WAN Acceleration and Online Migration Routing in the Virtual World Site Selection and Server Virtualization Route Health Injection Global Server Load Balancing Location/ID Separation Protocol Use Case: Virtual Data Center The Virtual Data Center and Cloud Computing The Virtual Data Center Automation and Standardization What Is Cloud Computing? Cloud Implementation Example Journey to the Cloud Networking in the Clouds Software-Defined Networks Open Stack Network Overlays		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Data Center Virtualization Fundamentals	Gustavo Alessandro Andrade Santana	Cisco Press	1st	2014

M. Sc (Information Technology)		**Semester – III**	
Course Name: Data Centre Technologies Practical		**Course Code: PSIT3P4c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand basic concepts in Virtualization.
CO2: Understand concepts of Load Balancing and Aggregation /virtual switching
CO3: Understand Data center Migration and Fabric Building
CO4: Understand various Changes in Server Architecture
CO5: Understand the concepts of Cloud computing and how to move towards a cloud computing technology.

PSIT304d: Offensive Security

M. Sc (Information Technology)		Semester – III	
Course Name: Offensive Security		**Course Code: PSIT304d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understanding of security requirements within an organization
- How to inspect, protect assets from technical and managerial perspectives
- To Learn various offensive strategies to penetrate the organizations security.
- To learn various tools that aid in offensive security testing.

Unit	Details	Lectures	Outcome
I	Fault Tolerance and Resilience in Cloud Computing Environments, Securing Web Applications, Services, and Servers, Wireless Network Security, Wireless Sensor Network Security: The Internet of Things, Security for the Internet of Things, Cellular Network Security	**12**	**CO1**
II	Social Engineering Deceptions and Defenses, What Is Vulnerability Assessment, Risk Management, Insider Threat, Disaster Recovery, Security Policies and Plans Development	**12**	**CO2**
III	Introduction to Metasploit and Supporting Tools The importance of penetration testing Vulnerability assessment versus penetration testing The need for a penetration testing framework Introduction to Metasploit When to use Metasploit? Making Metasploit effective and powerful using supplementary tools Nessus NMAP w3af Armitage Setting up Your Environment Using the Kali Linux virtual machine - the easiest way Installing Metasploit on Windows Installing Metasploit on Linux Setting up exploitable targets in a virtual environment Metasploit Components and Environment Configuration Anatomy and structure of Metasploit Metasploit components Auxiliaries Exploits Encoders Payloads Post, Playing around with msfconsole Variables in Metasploit Updating the Metasploit Framework 55	**12**	**CO3**

IV	Information Gathering with Metasploit Information gathering and enumeration Transmission Control Protocol User Datagram Protocol File Transfer Protocol Server Message Block Hypertext Transfer Protocol Simple Mail Transfer Protocol Secure Shell Domain Name System Remote Desktop Protocol Password sniffing Advanced search with shodan Vulnerability Hunting with Metasploit Managing the database Work spaces Importing scans Backing up the database **NMAP** NMAP scanning approach **Nessus** Scanning using Nessus from msfconsole Vulnerability detection with Metasploit auxiliaries Auto exploitation with db_autopwn **Post exploitation** What is meterpreter? Searching for content Screen capture Keystroke logging Dumping the hashes and cracking with JTR Shell command Privilege escalation Client-side Attacks with Metasploit Need of client-side attacks What are client-side attacks? What is a Shellcode? What is a reverse shell? What is a bind shell? What is an encoder? **The msfvenom utility** Generating a payload with msfvenom Social Engineering with Metasploit Generating malicious PDF Creating infectious media drives	**12**	**CO4**
V	Approaching a Penetration Test Using Metasploit Organizing a penetration test Preinteractions Intelligence gathering/reconnaissance phase Predicting the test grounds Modeling threats Vulnerability analysis Exploitation and post-exploitation Reporting Mounting the environment Setting up Kali Linux in virtual environment The fundamentals of Metasploit Conducting a penetration test with Metasploit Recalling the basics of Metasploit Benefits of penetration testing using Metasploit Open source Support for testing large networks and easy naming conventions Smart payload generation and switching mechanism Cleaner exits The GUI environment	**12**	**CO5**

	Penetration testing an unknown network Assumptions Gathering intelligence Using databases in Metasploit Modeling threats Vulnerability analysis of VSFTPD backdoor The attack procedure The procedure of exploiting the vulnerability Exploitation and post exploitation Vulnerability analysis of PHP-CGI query string parameter vulnerability Exploitation and post exploitation Vulnerability analysis of HFS Exploitation and post exploitation Maintaining access Clearing tracks Revising the approach Reinventing Metasploit Ruby – the heart of Metasploit Creating your first Ruby program Interacting with the Ruby shell Defining methods in the shell Variables and data types in Ruby Working with strings Concatenating strings The substring function The split function Numbers and conversions in Ruby Conversions in Ruby Ranges in Ruby Arrays in Ruby Methods in Ruby Decision-making operators Loops in Ruby Regular expressions Wrapping up with Ruby basics **Developing custom modules** Building a module in a nutshell The architecture of the Metasploit framework Understanding the file structure The libraries layout Understanding the existing modules The format of a Metasploit module Disassembling existing HTTP server scanner module Libraries and the function Writing out a custom FTP scanner module Libraries and the function Using msftidy Writing out a custom SSH authentication brute forcer Rephrasing the equation Writing a drive disabler post exploitation module Writing a credential harvester post exploitation module **Breakthrough meterpreter scripting** Essentials of meterpreter scripting Pivoting the target network Setting up persistent access API calls and mixins Fabricating custom meterpreter scripts Working with RailGun Interactive Ruby shell basics Understanding RailGun and its scripting Manipulating Windows API calls Fabricating sophisticated RailGun scripts		

	The Exploit Formulation Process The absolute basics of exploitation The basics The architecture System organization basics Registers Exploiting stack-based buffer overflows with Metasploit Crashing the vulnerable application Building the exploit base Calculating the offset Using the pattern_create tool Using the pattern_offset tool Finding the JMP ESP address Using Immunity Debugger to find executable modules Using msfbinscan Stuffing the space Relevance of NOPs Determining bad characters Determining space limitations Writing the Metasploit exploit module Exploiting SEH-based buffer overflows with Metasploit Building the exploit base Calculating the offset Using pattern_create tool Using pattern_offset tool *Table of Contents* Finding the POP/POP/RET address The Mona script Using msfbinscan Writing the Metasploit SEH exploit module Using NASM shell for writing assembly instructions **Bypassing DEP in Metasploit modules** Using msfrop to find ROP gadgets Using Mona to create ROP chains Writing the Metasploit exploit module for DEP bypass		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer and Information Security Handbook	John R. Vacca	Morgan Kaufmann Publisher	3rd	2017
2.	Metasploit Revealed: Secrets of the Expert Pentester	Sagar Rahalkar	Packt Publishing		2017

M. Sc (Information Technology)		**Semester – III**	
Course Name: Offensive Security Practical		**Course Code: PSIT3P4d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:
CO1: Understand basic security issues in cloud, IoT etc.
CO2: Understand different security techniques and policies
CO3: Use Vulnerability assessment and exploitation tool
CO4: Analyze the network perform reconnaissance and enumerate the target to detect vulnerabilities
CO5: Perform offensive tests using Metasploit on various application, generating payloads etc.

SEMESTER IV

PSIT401: Blockchain

M. Sc (Information Technology)		Semester – IV	
Course Name: Blockchain		**Course Code: PSIT401**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To provide conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.
- To cover the technological underpinnings of blockchain operations as distributed data structures and decision-making systems, their functionality and different architecture types.
- To provide a critical evaluation of existing "smart contract" capabilities and platforms, and examine their future directions, opportunities, risks and challenges.

Unit	Details	Lectures	Outcome
I	**Blockchain:** Introduction, History, Centralised versus Decentralised systems, Layers of blockchain, Importance of blockchain, Blockchain uses and use cases. **Working of Blockchain:** Blockchain foundation, Cryptography, Game Theory, Computer Science Engineering, Properties of blockchain solutions, blockchain transactions, distributed consensus mechanisms, Blockchain mechanisms, Scaling blockchain **Working of Bitcoin:** Money, Bitcoin, Bitcoin blockchain, bitcoin network, bitcoin scripts, Full Nodes and SVPs, Bitcoin wallets.	**12**	**CO1**
II	**Ethereum:** three parts of blockchain, Ether as currency and commodity, Building trustless systems, Smart contracts, Ethereum Virtual Machine, The Mist browser, Wallets as a Computing Metaphor, The Bank Teller Metaphor, Breaking with Banking History, How Encryption Leads to Trust, System Requirements, Using Parity with Geth, Anonymity in Cryptocurrency, Central Bank Network, Virtual Machines, EVM Applications, State Machines, Guts of the EVM, Blocks, Mining's Place in the State Transition Function, Renting Time on the EVM, Gas, Working with Gas, Accounts, Transactions, and Messages, Transactions and Messages, Estimating Gas Fees for Operations, Opcodes in the EVM.	**12**	**CO2**

	Solidity Programming: Introduction, Global Banking Made Real, Complementary Currency, Programming the EVM, Design Rationale, Importance of Formal Proofs, Automated Proofs, Testing, Formatting Solidity Files, Reading Code, Statements and Expressions in Solidity, Value Types, Global Special Variables, Units, and Functions,		
III	**Hyperledger:** Overview, Fabric, composer, installing hyperledger fabric and composer, deploying, running the network, error troubleshooting. **Smart Contracts and Tokens:** EVM as Back End, Assets Backed by Anything, Cryptocurrency Is a Measure of Time, Function of Collectibles in Human Systems, Platforms for High-Value Digital Collectibles, Tokens as Category of Smart Contract, Creating a Token, Deploying the Contract, Playing with Contracts.	**12**	**CO3**
IV	**Mining Ether:** Why? Ether's Source, Defining Mining, Difficulty, Self-Regulation, and the Race for Profit, How Proof of Work Helps Regulate Block Time, DAG and Nonce, Faster Blocks, Stale Blocks, Difficulties, Ancestry of Blocks and Transactions, Ethereum and Bitcoin, Forking, Mining, Geth on Windows, Executing Commands in the EVM via the Geth Console, Launching Geth with Flags, Mining on the Testnet, GPU Mining Rigs, Mining on a Pool with Multiple GPUs. **Cryptoecnomics:** Introduction, Usefulness of cryptoeconomics, Speed of blocks, Ether Issuance scheme, Common Attack Scenarios.	**12**	**CO4**
V	**Blockchain Application Development:** Decentralized Applications, Blockchain Application Development, Interacting with the Bitcoin Blockchain, Interacting Programmatically with Ethereum—Sending Transactions, Creating a Smart Contract, Executing Smart Contract Functions, Public vs. Private Blockchains, Decentralized Application Architecture, **Building an Ethereum DApp:** The DApp, Setting Up a Private Ethereum Network, Creating the Smart Contract, Deploying the Smart Contract, Client Application, **DApp deployment:** Seven Ways to Think About Smart Contracts, Dapp Contract Data Models, EVM back-end and front-end communication, JSON-RPC, Web 3, JavaScript API, Using Meteor with the EVM, Executing Contracts in the Console, Recommendations for Prototyping, Third-Party Deployment Libraries, **Creating Private Chains.**	**12**	**CO5**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Beginning Blockchain A Beginner's Guide to Building Blockchain Solutions	Bikramaditya Singhal, Gautam Dhameja, Priyansu Sekhar Panda	Apress		2018
2.	Introducing Ethereum and Solidity	Chris Dannen	Apress		2017
3.	The Blockchain Developer	Elad Elrom	Apress		2019
4.	Mastering Ethereum	Andreas M. Antonopoulos Dr. Gavin Wood	O'Reilly	First	2018
5.	Blockchain Enabled Applications	Vikram Dhillon David Metcalf Max Hooper	Apress		2017

M. Sc (Information Technology)		**Semester – III**	
Course Name: Blockchain		**Course Code: PSIT**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:

CO1: The students would understand the structure of a blockchain and why/when it is better than a simple distributed database.

CO2: Analyze the incentive structure in a blockchain based system and critically assess its functions, benefits and vulnerabilities

CO3: Evaluate the setting where a blockchain based structure may be applied, its potential and its limitations

CO4: Understand what constitutes a "smart" contract, what are its legal implications and what it can and cannot do, now and in the near future

CO5: Develop blockchain DApps.

PSIT402a: Natural Language Processing

M. Sc (Information Technology)		Semester – IV	
Course Name: Natural Language Processing		**Course Code: PSIT402a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- The prime objective of this course is to introduce the students to the field of Language Computing and its applications ranging from classical era to modern context.
- To provide understanding of various NLP tasks and NLP abstractions such as Morphological analysis, POS tagging, concept of syntactic parsing, semantic analysis etc.
- To provide knowledge of different approaches/algorithms for carrying out NLP tasks.
- To highlight the concepts of Language grammar and grammar representation in Computational Linguistics.

Unit	Details	Lectures	Outcome
I	Introduction to NLP, brief history, NLP applications: Speech to Text(STT), Text to Speech(TTS), Story Understanding, NL Generation, QA system, Machine Translation, Text Summarization, Text classification, Sentiment Analysis, Grammar/Spell Checkers etc., challenges/Open Problems, NLP abstraction levels, Natural Language (NL) Characteristics and NL computing approaches/techniques and steps, NL tasks: Segmentation, Chunking, tagging, NER, Parsing, Word Sense Disambiguation, NL Generation, Web 2.0 Applications : Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).	**12**	**CO1**
II	Text Processing Challenges, Overview of Language Scripts and their representation on Machines using Character Sets, Language, Corpus and Application Dependence issues, Segmentation: word level(Tokenization), Sentence level. Regular Expression and Automata Morphology, Types, Survey of English and Indian Languages Morphology, Morphological parsing FSA and FST, Porter stemmer, Rule based and Paradigm based Morphology, Human Morphological Processing, Machine Learning approaches.	**12**	**CO2**
III	Word Classes ad Part-of-Speech tagging(POS), survey of POS tagsets, Rule based approaches (ENGTOWL), Stochastic approaches(Probabilistic, N-gram and HMM), TBL morphology, unknown word handling,	**12**	**CO3**

	evaluation metrics: Precision/Recall/F-measure, error analysis.		
IV	NL parsing basics, approaches: TopDown, BottomUp, Overview of Grammar Formalisms: constituency and dependency school, Grammar notations CFG, LFG, PCFG, LTAG, Feature- Unification, overview of English CFG, Indian Language Parsing in Paninian Karaka Theory, CFG parsing using Earley's and CYK algorithms, Probabilistic parsing, Dependency Parsing: Covington algorithm, MALT parser, MST parser.	**12**	**CO4**
V	Concepts and issues in NL, Theories and approaches for Semantic Analysis, Meaning Representation, word similarity, Lexical Semantics, word senses and relationships, WordNet (English and IndoWordnet), Word Sense Disambiguation: Lesk Algorithm Walker's algorithm, Coreferences Resolution:Anaphora, Cataphora.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Handbook of Natural Language Processing	Indurkhya, N., & Damerau, F. J.	CRC Press Taylor and Francis Group	2nd	2010
2.	Speech and Language Processing	Martin, J. H., & Jurafsky, D.	Pearson Education India	2nd	2013
3.	Foundations of Statistical Natural Language Processing	Manning, Christopher and Heinrich, Schutze	MIT Press	1st	1997
4.	Natural Language Processing With Python	Steven Bird, Edward Loper	O'Reilly Media	2nd	2016
5.	Video Links 1. http://www.nptelvideos.in/2012/11/natural-language-processing.html				

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Natural Language Processing Practical		**Course Code: PSIT4P2a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Students will get idea about know-hows, issues and challenge in Natural Language Processing and NLP applications and their relevance in the classical and modern context.

CO2: Student will get understanding of Computational techniques and approaches for solving NLP problems and develop modules for NLP tasks and tools such as Morph Analyzer, POS tagger, Chunker, Parser, WSD tool etc.

CO3: Students will also be introduced to various grammar formalisms, which they can apply in different fields of study.

CO4: Students can take up project work or work in R&D firms working in NLP and its allied areas.

CO5: Student will be able to understand applications in different sectors

PSIT402b: Digital Image Forensics

M. Sc (Information Technology)		Semester – IV	
Course Name: Digital Image Forensics		**Course Code: PSIT402b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To understand describe the origin of computer forensics and the relationship between law enforcement and industry.
- Describe electronic evidence and the computing investigation process.
- Extracting Digital Evidence from Images and establishing them in court of Law.
- Enhancing images for investigation and various techniques to enhance images.
- Interpret and present Evidences in Court of Law.

Unit	Details	Lectures	Outcome
I	History of Forensic Digital Enhancement, Establishing Integrity of Digital Images for Court,	**12**	**CO1**
II	Digital Still and Video Cameras, Color Modes and Channel Blending to Extract Detail	**12**	**CO2**
III	Multiple Image Techniques, Fast Fourier Transform (FFT) – Background Pattern Removal.	**12**	**CO3**
IV	Contrast Adjustment Techniques, Advanced Processing Techniques, Comparison and Measurement	**12**	**CO4**
V	The Approach – Developing Enhancement Strategies for Images Intended for Analysis, Digital Imaging in the Courts, Interpreting and Presenting Evidence	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Forensic Digital Image Processing: Optimization of Impression Evidence	Brian Dalrymple, Jill Smith	CRC Press		2018
2.	Forensic Uses of Digital Imaging	John C. Russ, Jens Rindel, P. Lord	Taylor & Francis Group	2nd	2016

M. Sc (Information Technology)		Semester – III	
Course Name: Digital Image Forensics Practical		**Course Code: PSIT4P2b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand the basics of image forensics and techniques to establish their integrity

CO2: Understand different techniques for extracting detail from images.

CO3: Understand and apply various advanced techniques in image processing and to compare and measure various parameters associated with them

CO4: Apply various enhancement strategies for digital images

CO5: Prepare the evidence to be acceptable in the court of law.

PSIT402c: Advanced IoT

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Advanced IoT		**Course Code: PSIT402c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To understand the latest developments in IoT
- To build smart IoT applications
- To leverage the applications of IoT in different technologies
- To build own IoT platform

Unit	Details	Lectures	Outcome
I	The Artificial Intelligence 2.0, IoT and Azure IoT Suite, Creating Smart IoT Application	**12**	**CO1**
II	Cognitive APIs, Consuming Microsoft Cognitive APIs, Building Smarter Application using Cognitive APIs.	**12**	**CO2**
III	Implementing Blockchain as a service, Capturing, Analysing and Visualizing real-time data, Making prediction with machine learning.	**12**	**CO3**
IV	IoT and Microservices, Service Fabric, Build your own IoT platform: Introduction, Building blocks for IoT solution, Essentials for building your own platform, Platform requirements, building the platform by initializing cloud instance, installing basic software stacks, securing instance and software, installing node.js and Node-RED, Message broker.	**12**	**CO4**
V	Building Critical components, configuring message broker, creating REST interface, Rule engine and authentication, documentation and testing, Introspection on what we build and deliverables.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	IoT, AI, and Blockchain for .NET- Building a Next-Generation Application from the Ground Up	Nishith Pathak Anurag Bhandari	Apress	--	2018
2.	Microservices, IoT and Azure	Bob Familiar	Apress	--	2015
3.	Build your own IoT Platform	Anand Tamboli	Apress	--	2019

4.	Internet of Things Architectures, Protocols and Standards	Simone Cirani Gianluigi Ferrari Marco Picone Luca Veltri	Wiley	1	2019

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Advanced IoT Practical		**Course Code: PSIT4P2c**	
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**50**
	Internal	**--**	**-**

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Build smart IoT applications on Azure.

CO2: Use Microsoft cognitive APIs to build IoT applications.

CO3: Implement Blockchain in IoT.

CO4: Install and use microservices in IoT.

CO5: Build own IoT platform and use it in a customised way.

PSIT402d: Cyber Forensics

M. Sc (Information Technology)		Semester – IV	
Course Name: Cyber Forensics		**Course Code: PSIT402d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Explain laws relevant to computer forensics
- Seize digital evidence from pc systems
- Recover data to be used as evidence
- Analyse data and reconstruct events
- Explain how data may be concealed or hidden

Unit	Details	Lectures	Outcome
I	Computer Forensics: The present Scenario, The Investigation Process, Computers – Searching and Seizing, Electronic Evidence, Procedures to be followed by the first responder.	**12**	**CO1**
II	Setting up a lab for Computer Forensics, Hard Disks and File Systems, Forensics on Windows Machine, Acquire and Duplicate Data	**12**	**CO2**
III	Recovery of deleted files and partitions, Using Access Data FTK and Encase for forensics Investigation, Forensic analysis of Steganography and Image files, Cracking Application passwords.	**12**	**CO3**
IV	Capturing logs and correlating to the events, Network Forensics – Investigating logs and Network traffic, Investigating Wireless and Web Attacks.	**12**	**CO4**
V	Email Tracking and Email Crime investigation. Mobile Forensics, Reports of Investigation, Become an expert witness.	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	EC-Council CHFIv10 Study Guide	--	EC-Council	--	2018
2.	The official CHFI Exam 312-49 study Guide	Dave Kleiman	SYNGRESS	--	2007
3.	Digital Forensics and Incident Response	Gerard Johansen	Packt Publishing	--	2020
4.	Practical Cyber Forensics	Niranjan Reddy	Apress	--	2019

M. Sc (Information Technology)		Semester – IV	
Course Name: Cyber Forensics Practical		**Course Code: PSIT4P2d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Investigate the cyber forensics with standard operating procedures.

CO2: Recover the data from the hard disk with legal procedure.

CO3: To recover and analyse the data using forensics tool

CO4: Acquire the knowledge of network analysis and use it for analysing the internet attacks.

CO5: Able to investigate internet frauds done through various gadgets like mobile, laptops, tablets and become a forensic investigator.

PSIT403a: Deep Learning

M. Sc (Information Technology)		Semester – IV	
Course Name: Deep Learning		**Course Code: PSIT403a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- To present the mathematical, statistical and computational challenges of building neural networks
- To study the concepts of deep learning
- To enable the students to know deep learning techniques to support real-time applications

Unit	Details	Lectures	Outcome
I	**Applied Math and Machine Learning Basics:** Linear Algebra: Scalars, Vectors, Matrices and Tensors , Multiplying Matrices and Vectors , Identity and Inverse Matrices, Linear Dependence and Span , norms, special matrices and vectors, eigen decompositions. **Numerical Computation:** Overflow and under flow, poor conditioning, Gradient Based Optimization, Constraint optimization.	**12**	**CO1**
II	**Deep Networks:** Deep feedforward network , regularization for deep learning , Optimization for Training deep models	**12**	**CO2**
III	Convolutional Networks, Sequence Modelling, Applications	**12**	**CO3**
IV	Deep Learning Research: Linear Factor Models, Autoencoders, representation learning	**12**	**CO4**
V	Approximate Inference, Deep Generative Models	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Deep Learning	Ian Goodfellow, Yoshua Bengio, Aaron Courvile	An MIT Press book	1st	2016
2.	Fundamentals of Deep Learning	Nikhil Buduma	O'Reilly	1st	2017
3.	Deep Learning: Methods and Applications	Deng & Yu	Now Publishers	1st	2013
4.	Deep Learning CookBook	Douwe Osinga	O'Reilly	1st	2017

M. Sc (Information Technology)		Semester – IV	
Course Name: Deep Learning Practical		**Course Code: PSIT4P3a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:
After completion of the course, a student should be able to:
CO1: Describes basics of mathematical foundation that will help the learner to understand the concepts of Deep Learning.
CO2: Understand and describe model of deep learning
CO3: Design and implement various deep supervised learning architectures for text & image data.
CO4: Design and implement various deep learning models and architectures.
CO5: Apply various deep learning techniques to design efficient algorithms for real-world applications.

PSIT403b: Remote Sensing

M. Sc (Information Technology)		Semester – IV	
Course Name: Remote Sensing Practical		**Course Code: PSIT403b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Attain a foundational knowledge and comprehension of the physical, computational, and perceptual basis for remote sensing.
- Gain familiarity with a variety of physical, biological, and human geographic applications of remote sensing.
- Gain basic experience in the hands-on application of remote sensing data through visual interpretation and digital image processing exercises.
- Analyze and synthesize understanding by identifying and developing a research and application proposal using remote sensing.

Unit	Details	Lectures	Outcome
I	Remote Sensing: Basic Principles Introduction, Electromagnetic Radiation and Its Properties, Terminology, Nature of Electromagnetic Radiation, The Electromagnetic Spectrum, Sources of Electromagnetic Radiation, Interactions with the Earth's Atmosphere, Interaction with Earth-Surface Materials, Spectral Reflectance of Earth Surface Materials Remote Sensing Platforms and Sensors Introduction, Characteristics of Imaging Remote Sensing Instruments, Spatial Resolution, Spectral Resolution, Radiometric Resolution, Optical, Near-infrared and Thermal Imaging Sensors, Along-Track Scanning Radiometer (ATSR), Advanced Very High Resolution Radiometer (AVHRR) and NPOESS VIIRS, MODIS, Ocean Observing Instruments, IRS LISS, Landsat Instruments, SPOT Sensors, Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), High-Resolution Commercial and Small Satellite Systems, Microwave Imaging Sensors, European Space Agency Synthetic Aperture Spaceborne Radars, Radarsat, TerraSAR-X and COSMO/Skymed, ALOS PALSAR	**12**	**CO1**
II	Hardware and Software Aspects of Digital Image Processing Introduction, Properties of Digital Remote Sensing Data, Digital Data, Data Formats, System Processing,	**12**	**CO2**

	Numerical Analysis and Software Accuracy, Some Remarks on Statistics, Preprocessing of Remotely-Sensed Data Introduction, Cosmetic Operations, Missing Scan Lines, Destriping Methods, Geometric Correction and Registration, Orbital Geometry Model, Transformation Based on Ground Control Points, Resampling Procedures, Image Registration, Other Geometric Correction Methods, Atmospheric Correction, Background, Image-Based Methods, Radiative Transfer Models, Empirical Line Method, Illumination and View Angle Effects, Sensor Calibration, Terrain Effects		
III	Image Enhancement Techniques Introduction, Human Visual System, Contrast Enhancement, Linear Contrast Stretch, Histogram Equalization, Gaussian Stretch, Pseudocolour Enhancement, Density Slicing, Pseudocolour Transform, Image Transforms Introduction, Arithmetic Operations, Image Addition, Image Subtraction, Image Multiplication, Image Division and Vegetation Indices, Empirically Based Image Transforms, Perpendicular Vegetation Index, Tasselled Cap (Kauth–Thomas) Transformation, Principal Components Analysis, Standard Principal Components Analysis, Noise-Adjusted PCA, Decorrelation Stretch, Hue-Saturation-Intensity (HSI) Transform, The Discrete Fourier Transform, Two-Dimensional Fourier Transform, Applications of the Fourier Transform, The Discrete Wavelet Transform, The One-Dimensional Discrete Wavelet Transform, The Two-Dimensional Discrete Wavelet Transform, Change Detection, Introduction, NDVI Difference Image, PCA, Canonical Correlation Change Analysis, Image Fusion, HSI Algorithm, PCA, Gram-Schmidt Orthogonalization, Wavelet-Based Methods, Evaluation – Subjective Methods, Evaluation – Objective Methods	**12**	**CO3**
IV	Filtering Techniques Spatial Domain Low-Pass (Smoothing) Filters, Moving Average Filter, Median Filter, Adaptive Filters, Spatial Domain High-Pass (Sharpening) Filters, Image Subtraction Method, Derivative-Based Methods, Spatial Domain Edge Detectors, Frequency Domain Filters **Classification :** Geometrical Basis of Classification, Unsupervised Classification, The *k*-Means Algorithm, ISODATA, A Modified *k*-Means Algorithm, Supervised Classification, Training Samples, Statistical Classifiers, Neural Classifiers, Subpixel Classification Techniques, The Linear Mixture Model, Spectral Angle Mapping, ICA, Fuzzy Classifiers, More Advanced Approaches to	**12**	**CO4**

	Image Classification, Support Vector Machines , Decision Trees , Other Methods of Classification, Incorporation of Non-spectral Features, Texture, Use of External Data, Contextual Information, Feature Selection, Classification Accuracy Advanced Topics Introduction, SAR Interferometry, Basic Principles, Interferometric Processing, Problems in SAR Interferometry, Applications of SAR Interferometry, Imaging Spectroscopy, Processing Imaging Spectroscopy Data, Lidar, Lidar Details, Lidar Applications		
V	**Environmental Geographical Information Systems**: A Remote Sensing Perspective, Definitions, The Synergy between Remote Sensing and GIS, Data Models, Data Structures and File Formats, Spatial Data Models, Data Structures, File Formats, Raster to Vector and Vector to Raster Conversion, Geodata Processing, Buffering, Overlay, Locational Analysis, Slope and Aspect, Proximity Analysis, Contiguity and Connectivity, Spatial Analysis, Point Patterns and Interpolation. **Relating Field and Remotely-Sensed Measurements**: Statistical Analysis, Exploratory Data Analysis and Data Mining, Environmental Modelling, Visualization, Multicriteria Decision Analysis of Groundwater Recharge Zones, Data Characteristics, Multicriteria Decision Analysis, Evaluation, Assessing Flash Flood Hazards by Classifying Wadi Deposits in Arid Environments, Water Resources in Arid Lands, Case Study from the Sinai Peninsula, Egypt, Optical and Microwave Data Fusion, Classification of Wadi Deposits, Correlation of Classification Results with Geology and Terrain Data, Remote Sensing and GIS in Archaeological Studies, Introduction, Homul (Guatemala) Case Study, Aksum (Ethiopia) Case Study	**12**	**CO5**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Computer Processing of Remotely-Sensed Images: An Introduction	Paul M. Mather, Magaly Koch	Wiley-Blackwell	4th	2011
2.	Remote Sensing for Geoscientists Image Analysis and Integration	Gary L. Prost	CRC Press	3rd	2014
3.	Remote Sensing: Models and Methods for Image Processing	Robert A. Schowengerdt	Elsevier	3rd	2007

4.	Introductory Digital Image Processing: A Remote Sensing Perspective	John R. Jensen	Pearson		2015

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Remote Sensing Practical		**Course Code: PSIT4P3b**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand the basics of remote sensing and its various applications

CO2: Understand the Hardware and Software aspects of Digital Image Processing and demonstrate various techniques in pre-processing data

CO3: Demonstrate various image enhancement and transformation techniques.
CO4: Understand and Demonstrate various filtering, classification techniques along with advanced functionalities.

CO5: Perform comparison of Field and Remotely sensed measurements using various techniques.

PSIT403c: Server Virtualization on VMWare Platform

M. Sc (Information Technology)		Semester – IV	
Course Name: Server Virtualization on VMWare Platform		**Course Code: PSIT403c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Identify the need for Server Virtualization
- Describe the components and features of vSphere 6.7 and ESXi
- Describe how VMware's products help solve business and technical challenges with regard to Server Virtualization

Unit	Details	Lectures	Outcome
I	**Introducing VMware vSphere 6.7:** Exploring VMware vSphere 6.7, Examining the Products in the vSphere Suite, Examining the Features in VMware vSphere, Licensing VMware vSphere, Why Choose vSphere? **Planning and Installing VMware ESXi:** VMware ESXi Architecture, Understanding the ESXi Hypervisor, Examining the ESXi Components, Planning a VMware vSphere Deployment, Choosing a Server Platform, Determining a Storage Architecture, Integrating with the Network Infrastructure, Deploying VMware ESXi, Installing VMware ESXi Interactively, Performing an Unattended Installation of VMware ESXi, Deploying VMware ESXi with vSphere Auto Deploy, Performing Post-installation Configuration, Reconfiguring the Management Network, Using the vSphere Host Client, Configuring Time Synchronization, Configuring Name Resolution, **Installing and Configuring vCenter Server:** Introducing vCenter Server, Centralizing User Authentication Using vCenter Single Sign-On, Understanding the Platform Services Controller, Using the vSphere Web Client for Administration, Providing an Extensible Framework, Choosing the Version of vCenter Server, Planning and Designing a vCenter Server Deployment, Sizing Hardware for vCenter Server, Planning for vCenter Server Availability, Running vCenter Server and Its Components as VMs, Installing vCenter Server and Its Components, Installing vCenter Server in an Enhanced Linked Mode Group, Exploring vCenter Server, The vSphere Web Client Home Screen,	**12**	**CO1**

	Using the Navigator, Creating and Managing a vCenter Server Inventory, Understanding Inventory Views and Objects, Creating and Adding Inventory Objects, Exploring vCenter Server's Management Features, Understanding Basic Host Management, Examining Basic Host Configuration, Using Scheduled Tasks, Using the Events and Events Consoles in vCenter Server, Working with Host Profiles, Tags and Custom Attributes, Managing vCenter Server Settings, General vCenter Server Settings, Licensing, Message of the Day, Advanced Settings, Auto Deploy, vCenter HA, Key Management Servers, Storage Providers, vSphere Web Client Administration, Roles, Licensing, vCenter Solutions Manager, System Configuration, VMware Appliance Management Administration, Summary, Monitor, Access, Networking, Time, Services, Update, Administration, Syslog, Backup.		
II	vSphere Update Manager and the vCenter Support Tools: vSphere Update Manager, vSphere Update Manager and the vCenter Server Appliance, Installing the Update Manager Download Service, The vSphere Update Manager Plug-in Contents, Reconfiguring the VUM or UMDS, Installation with the Update Manager Utility, Upgrading VUM from a Previous Version, Configuring vSphere Update Manager, Creating Baselines Routine Updates, Attaching and Detaching Baselines or Baseline Groups, Performing a Scan, Staging Patches, Remediating Hosts, Upgrading VMware Tools, Upgrading Host Extensions, Upgrading Hosts with vSphere Update Manager, Importing an ESXi Image and Creating the Host Upgrade Baseline, Upgrading a Host, Upgrading VM Hardware, Performing an Orchestrated Upgrade, Investigating Alternative Update Options, Using vSphere Update Manager PowerCLI, Upgrading and Patching without vSphere Update Manager, vSphere Auto Deploy, Deploying Hosts with Auto Deploy, vCenter Support Tools, ESXi Dump Collector, Other vCenter Support Tools. **Creating and Configuring a vSphere Network:** Putting Together a vSphere Network, Working with vSphere Standard Switches, Comparing Virtual Switches and Physical Switches, Understanding Ports and Port Groups, Understanding Uplinks, Configuring the Management Network, Configuring VMkernel Networking, Enabling Enhanced Multicast Functions, Configuring TCP/IP Stacks, Configuring Virtual Machine Networking, Configuring VLANs, Configuring NIC Teaming, Using and Configuring Traffic Shaping, Bringing It All Together, Working with vSphere Distributed Switches,	**12**	**CO2**

	Creating a vSphere Distributed Switch, Removing an ESXi Host from a Distributed Switch, Removing a Distributed Switch, Managing Distributed Switches, Working with Distributed Port Groups, Managing VMkernel Adapters, Using NetFlow on vSphere Distributed Switches, Enabling Switch Discovery Protocols, Enabling Enhanced Multicast Functions, Setting Up Private VLANs, Configuring LACP, Configuring Virtual Switch Security, Understanding and Using Promiscuous Mode, Allowing MAC Address Changes and Forged Transmits.		
III	**Creating and Configuring Storage Devices:** Reviewing the Importance of Storage Design, Examining Shared Storage Fundamentals, Comparing Local Storage with Shared Storage, Defining Common Storage Array Architectures, Explaining RAID, Understanding vSAN, Understanding Midrange and External Enterprise Storage Array Design, Choosing a Storage Protocol, Making Basic Storage Choices, Implementing vSphere Storage Fundamentals, Reviewing Core vSphere Storage Concepts, Understanding Virtual Volumes, SCs vs LUNs, Storage Policies, Virtual Volumes, Working with VMFS Datastores, Working with Raw Device Mappings, Working with NFS Datastores, Working with vSAN, Working with Virtual Machine–Level Storage, Configuration, Leveraging SAN and NAS Best Practices **Ensuring High Availability and Business Continuity:** Understanding the Layers of High Availability, Clustering VMs, Introducing Network Load Balancing Clustering, Introducing Windows Server Failover Clustering, Implementing vSphere High Availability, Understanding vSphere High Availability Clusters. Understanding vSphere High Availability's Core Components, Enabling vSphere HA, Configuring vSphere High Availability, Configuring vSphere HA Groups, Rules, Overrides, and Orchestrated VM Restart, Managing vSphere High Availability, Introducing vSphere SMP Fault Tolerance, Using vSphere SMP Fault Tolerance with vSphere High Availability, Examining vSphere Fault Tolerance, Use Cases, Planning for Business Continuity, Providing Data Protection, Recovering from Disasters, Using vSphere Replication. **Securing VMware vSphere:** Overview of vSphere Security, Securing ESXi Hosts, Working with ESXi Authentication, Controlling Access to ESXi Hosts, Keeping ESXi Hosts Patched, Managing ESXi Host Permissions, Configuring ESXi Host Logging, Securing the ESXi Boot Process, Reviewing Other ESXi Security Recommendations, Securing vCenter Server,	**12**	**CO3**

	Managing vSphere Certificates, Working with Certificate Stores, Getting Started with Certificate Management, Authenticating Users with Single Sign-On, Understanding the vpxuser Account, Managing vCenter Server Permissions, Configuring vCenter Server Appliance Logging, Securing Virtual Machines, Configuring a Key Management Server for VM and VSAN Encryption, Virtual Trusted Platform Module, Configuring Network Security Policies, Keeping VMs Patched.		
IV	**Creating and Managing Virtual Machines:** Understanding Virtual Machines, Examining Virtual Machines from the Inside, Examining Virtual Machines from the Outside, Creating a Virtual Machine, Choosing Values for Your New Virtual Machine, Sizing Virtual Machines, Naming Virtual Machines, Sizing Virtual Machine Hard Disks, Virtual Machine Graphics, Installing a Guest Operating System, Working with Installation Media, Using the Installation Media, Working in the Virtual Machine Console, Installing VMware Tools, Installing VMware Tools in Windows, Installing VMware Tools in Linux, Managing Virtual Machines, Adding or Registering Existing VMs, Changing VM Power States, Removing VMs, Deleting VMs, Modifying Virtual Machines, Changing Virtual Machine Hardware, Using Virtual Machine Snapshots. **Using Templates and vApps:** Cloning VMs, Creating a Customization Specification, Cloning a Virtual Machine, Introducing vSphere Instant Cloning, Creating Templates and Deploying Virtual Machines, Cloning a Virtual Machine to a Template, Deploying a Virtual Machine from a Template, Using OVF Templates, Deploying a VM from an OVF Template, Exporting a VM as an OVF Template, Examining OVF Templates, Using Content Libraries, Content Library Data and Storage, Content Library Synchronization, Creating and Publishing a Content Library, Subscribing to a Content Library, Operating Content Libraries, Working with vApps, Creating a vApp, Editing a vApp, Changing a vApp's Power State, Cloning a vApp, Importing Machines from Other Environments, **Managing Resource Allocation:** Reviewing Virtual Machine, Resource Allocation, Working with Virtual Machine Memory, Understanding ESXi Advanced Memory Technologies, Controlling Memory Allocation, Managing Virtual Machine CPU Utilization, Default CPU Allocation, Setting CPU Affinity, Using CPU Reservations, Using CPU Limits, Using CPU Shares, Summarizing How Reservations, Limits, and Shares Work with CPUs, Using Resource Pools, Configuring	**12**	**CO4**

	Resource Pools, Understanding Resource Allocation with Resource Pools, Regulating Network I/O Utilization, Controlling Storage I/O Utilization, Enabling Storage I/O Control, Configuring Storage Resource Settings for a Virtual Machine, Using Flash Storage.		
V	**Balancing Resource Utilization:** Comparing Utilization with Allocation, Exploring vMotion, Examining vMotion Requirements, Performing a vMotion Migration Within a Cluster, Ensuring vMotion Compatibility, Using Per-Virtual-Machine CPU Masking, Using Enhanced vMotion Compatibility, Using Storage vMotion, Combining vMotion with Storage vMotion, Cross-vCenter vMotion, Examining Cross-vCenter vMotion Requirements, Performing a Cross-vCenter Motion, Exploring vSphere Distributed Resource Scheduler, Understanding Manual Automation Behavior, Reviewing Partially Automated Behavior, Examining Fully Automated Behavior, Working with Distributed Resource Scheduler Rules, Working with Storage DRS, Creating and Working with Datastore Clusters , Configuring Storage DRS. **Monitoring VMware vSphere Performance:** Overview of Performance Monitoring, Using Alarms Understanding Alarm Scopes, Creating Alarms, Managing Alarms, Working with Performance Charts, Overview Layout, Advanced Layout, Working with *esxtop,* Monitoring CPU Usage, Monitoring Memory Usage, Monitoring Network Usage, Monitoring Disk Usage. **Automating VMware vSphere:** Why Use Automation? vSphere Automation Automating with PowerCLI, PowerShell and PowerCLI, What's New in PowerCLI, Installing and Configuring PowerCLI on Windows, Installing and Configuring PowerCLI on macOS, Installing and Configuring PowerCLI on Linux, Additional PowerCLI Capabilities Getting Started with PowerCLI, Building PowerCLI Scripts, PowerCLI Advanced Capabilities, Additional Resources.	**12**	**CO5**

Books and References:					
Sr No	Title	Author/s	Publisher	Edition	Year
1.	Mastering VMware vSphere 67	Nick Marshall, Mike Brown, G Blair Fritz, Ryan Johnson	Sybex, Wiley	--	2019
2.	Mastering VMware vSphere 67	Martin Gavanda, Andrea Mauro, Paolo Valsecchi, Karel Novak	Packt	--	2019

M Sc (Information Technology)		Semester – IV	
Course Name: Server Virtualization on VMWare Platform Practical		**Course Code: PSIT4P3c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

List of Practical:
10 practicals covering the entire syllabus must be performed The detailed list of practical will be circulated later in the official workshop

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand VMWare VSphere 67, Install ESXi and Configure VSphere Centre

CO2: Demonstrate the use of VSphere Update Manager and Create a VSphere Network

CO3: Understand VSphere Security, Create and configure storage devices and Perform configurations to ensure business continuity
CO4: Demonstrate Resource allocation, Creating and managing virtual machine and the use of templates

CO5: Understand automation of vSphere and manage resource allocation

PSIT403d: Security Operations Centre

M. Sc (Information Technology)		Semester – IV	
Course Name: Security Operations Centre		**Course Code: PSIT403d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- The SOC (Security Operations Centre) allows an organization to enforce and test its security policies, processes, procedures and activities through one central platform that monitors and evaluates the effectiveness of the individual elements and the overall security system of the organization.
- This will also allow the learners to configure various use cases and detect various attacks across the network and report them in real time and also take appropriate actions.
- This course will cover the design, deployment and operation of the SOC.
- Once this course is completed, students will have the skills to perform your SOC responsibilities effectively.

Unit	Details	Lectures	Outcome
I	**Introduction to Security Operations Management** Foundation Topics Introduction to Identity and Access Management Phases of the Identity and Access Lifecycle Registration and Identity Validation Privileges Provisioning Access Review Access Revocation Password Management Password Creation Password Storage and Transmission Password Reset Password Synchronization Directory Management Single Sign-On Kerberos Federated SSO Security Assertion Markup Language OAuth OpenID Connect Security Events and Logs Management Logs Collection, Analysis, and Disposal Syslog Security Information and Event Manager Assets Management Assets Inventory Assets Ownership Assets Acceptable Use and Return Policies Assets Classification Assets Labeling Assets and Information Handling Media Management Introduction to Enterprise Mobility Management Mobile Device Management Configuration and Change Management Configuration Management Change Management Vulnerability Management	**12**	**CO1**

	Vulnerability Identification Finding Information about a Vulnerability Vulnerability Scan Penetration Assessment Product Vulnerability Management Vulnerability Analysis and Prioritization Vulnerability Remediation Patch Management References and Additional Readings **Fundamentals of Cryptography and Public Key Infrastructure** (PKI) Cryptography Ciphers and Keys Ciphers Keys Block and Stream Ciphers Symmetric and Asymmetric Algorithms Symmetric Algorithms Asymmetric Algorithms Hashes Hashed Message Authentication Code Digital Signatures Digital Signatures in Action Key Management Next-Generation Encryption Protocols IPsec and SSL IPsec SSL Fundamentals of PKI Public and Private Key Pairs RSA Algorithm, the Keys, and Digital Certificates Certificate Authorities Root and Identity Certificates Root Certificate Identity Certificate X.500 and X.509v3 Certificates Authenticating and Enrolling with the CA Public Key Cryptography Standards Simple Certificate Enrollment Protocol Revoking Digital Certificates Using Digital Certificates PKI Topologies Single Root CA Hierarchical CA with Subordinate CAs Cross-certifying CAs Exam Preparation Tasks Review All Key Topics Complete Tables and Lists from Memory **Introduction to Virtual Private Networks (VPNs)** What Are VPNs? Site-to-site vs. Remote-Access VPNs An Overview of IPsec IKEv1 Phase 1 IKEv1 Phase 2 IKEv2 SSL VPNs SSL VPN Design Considerations User Connectivity VPN Device Feature Set Infrastructure Planning Implementation Scope		
II	**Windows-Based Analysis** Process and Threads Memory Allocation Windows Registration Windows Management Instrumentation Handles Services Windows Event Logs Exam Preparation Tasks **Linux- and Mac OS X–Based Analysis** Processes Forks Permissions Symlinks Daemons UNIX-Based Syslog Apache Access Logs **Endpoint Security Technologies** Antimalware and Antivirus Software	**12**	**CO2**

	Host-Based Firewalls and Host-Based Intrusion Prevention Application-Level Whitelisting and Blacklisting System-Based Sandboxing		
III	**Threat Analysis** What Is the CIA Triad: Confidentiality, Integrity, and Availability? Confidentiality Integrity Availability Threat Modeling Defining and Analyzing the Attack Vector Understanding the Attack Complexity Privileges and User Interaction The Attack Scope Exam Preparation Tasks **Forensics** Introduction to Cybersecurity Forensics The Role of Attribution in a Cybersecurity Investigation The Use of Digital Evidence Defining Digital Forensic Evidence Understanding Best, Corroborating, and Indirect or Circumstantial Evidence Collecting Evidence from Endpoints and Servers Collecting Evidence from Mobile Devices Collecting Evidence from Network Infrastructure Devices Chain of Custody Fundamentals of Microsoft Windows Forensics Processes, Threads, and Services Memory Management Windows Registry The Windows File System Master Boot Record (MBR) The Master File Table (MFT) Data Area and Free Space FAT NTFS MFT Timestamps, MACE, and Alternate Data Streams EFI Fundamentals of Linux Forensics Linux Processes Ext4 Journaling Linux MBR and Swap File System Exam Preparation Tasks **Fundamentals of Intrusion Analysis** Common Artifact Elements and Sources of Security Events False Positives, False Negatives, True Positives, and True Negatives Understanding Regular Expressions Protocols, Protocol Headers, and Intrusion Analysis Using Packet Captures for Intrusion Analysis Mapping Security Event Types to Source Technologies	**12**	**CO3**
IV	**Introduction to Incident Response and the Incident Handling Process** **Introduction to Incident Response** What Are Events and Incidents? The Incident Response Plan The Incident Response Process The Preparation Phase The Detection and Analysis Phase Containment, Eradication, and Recovery Post-Incident Activity (Postmortem) Information Sharing and	**12**	**CO4**

	Coordination Incident Response Team Structure The Vocabulary for Event Recording and Incident Sharing (VERIS) **Incident Response Teams** Computer Security Incident Response Teams (CSIRTs) Product Security Incident Response Teams (PSIRTs) Security Vulnerabilities and Their Severity Vulnerability Chaining Role in Fixing Prioritization Fixing Theoretical Vulnerabilities Internally Versus Externally Found Vulnerabilities National CSIRTs and Computer Emergency Response Teams (CERTs) Coordination Centers Incident Response Providers and Managed Security Service Providers (MSSPs) **Compliance Frameworks** Payment Card Industry Data Security Standard (PCI DSS) PCI DSS Data Health Insurance Portability and Accountability Act (HIPAA) HIPAA Security Rule HIPAA Safeguards Administrative Safeguards Physical Safeguards Technical Safeguards Sarbanes-Oxley (SOX) Section 302 Section 404 Section 409 SOX Auditing Internal Controls **Network and Host Profiling** Network Profiling Throughput Measuring Throughput Used Ports Session Duration Critical Asset Address Space Host Profiling Listening Ports Logged-in Users/Service Accounts Running Processes Applications		
V	**The Art of Data and Event Analysis** Normalizing Data Interpreting Common Data Values into a Universal Format Using the 5-Tuple Correlation to Respond to Security Incidents Retrospective Analysis and Identifying Malicious Files Identifying a Malicious File Mapping Threat Intelligence with DNS and Other Artifacts Deterministic Versus Probabilistic Analysis **Intrusion Event Categories** Diamond Model of Intrusion Cyber Kill Chain Model Reconnaissance Weaponization Delivery Exploitation Installation Command and Control Action and Objectives **Types of Attacks and Vulnerabilities** Types of Attacks Reconnaissance Attacks Social Engineering Privilege Escalation Attacks Backdoors Code Execution Man-in-the Middle Attacks Denial-of-Service Attacks Direct DDoS Botnets Participating in DDoS Attacks Reflected DDoS Attacks	**12**	**CO5**

	Attack Methods for Data Exfiltration ARP Cache Poisoning Spoofing Attacks Route Manipulation Attacks Password Attacks Wireless Attacks Types of Vulnerabilities **Security Evasion Techniques** Key Encryption and Tunneling Concepts Resource Exhaustion Traffic Fragmentation Protocol-Level Misinterpretation Traffic Timing, Substitution, and Insertion Pivoting		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	CCNA Cyber Ops SECOPS 210-255 Official Cert Guide	Omar Santos, Joseph Muniz	CISCO	1st	2017
2.	CCNA Cyber Ops SECFND 210-250 Official Cert Guide	Omar Santos, Joseph Muniz	CISCO	1st	2017
3.	CCNA Cyber security Operations Companion Guide		CISCO	1st	2018

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Security Operations Centre Practical		**Course Code: PSIT4P3d**	
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2**	**50**
	Internal	**--**	**-**

List of Practical:
10 practicals covering the entire syllabus must be performed. The detailed list of practical will be circulated later in the official workshop.

Course Outcomes:

After completion of the course, a student should be able to:
CO1: Understanding basics of SOC, Cryptography and managing and deploying VPNs.

CO2: Analyse Windows and Linux based logs along with logs generated by endpoints.

CO3: Understand and analyze various forms of intrusions, threats and perform forensic analysis on them.

CO4: Understand the incident response process and handle incidents by adhering to compliance policies and standards set by the organization.

CO5: Understand the various types of attacks and vulnerabilities, categorize events and perform incident analysis.

PSIT404a: Human Computer Interaction

M. Sc (Information Technology)		Semester – IV	
Course Name: Human Computer Interaction		**Course Code: PSIT404a**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understand the important aspects of implementation of human-computer interfaces.
- Identify the various tools and techniques for interface analysis, design, and evaluation.
- Identify the impact of usable interfaces in the acceptance and performance utilization of information systems

Unit	Details	Lectures	Outcome
I	**The Interaction:** Models of interaction, Design Focus, Frameworks and HCI, Ergonomics, Interaction styles, Elements of the WIMP interface,Interactivity **Paradigms:** Introduction, Paradigms for interaction **Interaction design basics:** What is design?, The process of design, User focus, Cultural probes, Navigation design, the big button trap, Modes, Screen design and layout, Alignment and layout matters, Checking screen colors, Iteration and prototyping **HCI in the software process**: The software life cycle, Usability engineering , Iterative design and prototyping, Prototyping in practice, Design rationale	**12**	**CO1**
II	**Design**: Principles to support usability, Standards, Guidelines, Golden rules and heuristics, HCI patterns **Implementation support:** Elements of windowing systems, Programming the application, Going with the grain, Using toolkits, User interface management systems **Evaluation techniques:** What is evaluation?, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method	**12**	**CO2**
III	**Universal design:** Universal design principles, Multi-modal interaction, Designing websites for screen readers, Choosing the right kind of speech, Designing for diversity **User support:** Requirements of user support, Approaches to user support, Adaptive help systems, Designing user support systems **Cognitive models:** Goal and task hierarchies, Linguistic	**12**	**CO3**

	models, The challenge of display-based systems, Physical and device models, Cognitive architectures		
IV	**Socio-organizational issues and stakeholder requirements:** Organizational issues, Capturing requirements **Communication and collaboration models:** Face-to-face communication, Conversation, Text-based communication, Group working **Task analysis:** Differences between task analysis and other techniques, Task decomposition, Knowledge-based analysis, Entity–relationship-based techniques, Sources of information and data collection, Uses of task analysis	**12**	**CO4**
V	**Dialog notations and design:** What is dialog?, Dialog design notations, Diagrammatic notations, Textual dialog notations, Dialog semantics, Dialog analysis and design **Models of the system:** Standard formalisms, Interaction models, Continuous behavior **Modeling rich interaction:** Status–event analysis, Rich contexts, Low intention and sensor-based interaction	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Human Computer Interaction	Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale	Pearson Education	3rd	
2.	Designing the User Interface	Shneiderman B., Plaisant C., Cohen M., Jacobs S.	Pearson	5th	2013

Course Outcomes:

After completion of the course, a student should be able to:

CO1: have a clear understanding of HCI principles that influence a system's interface design, before writing any code.
CO2: understand the evaluation techniques used for any of the proposed system.
CO3: understand the cognitive models and its design.
CO4: able to understand how to manage the system resources and do the task analysis.
CO5: able to design and implement a complete system.

PSIT404b: Advanced IoT

M. Sc (Information Technology)		Semester – IV	
Course Name: Advanced IoT		**Course Code: PSIT404b**	
Periods per week (1 Period is 60 minutes)		**4**	
Credits		**4**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2½**	**60**
	Internal	**--**	**40**

Course Objectives:

- To understand the applications on image processing in different disciplines.
- To apply the concepts to new areas of research in Image processing.

Unit	Details	Lectures	Outcome
I	Fuzzy Approaches and Analysis in Image Processing, Text information extraction from images, Image and Video steganography based on DCT and wavelet transform.	**12**	**CO1**
II	Zernike-Moments-Based Shape Descriptors for Pattern Recognition and Classification Applications, An Image De-Noising Method Based on Intensity Histogram Equalization Technique for Image Enhancement, A New Image Encryption Method Based on Improved Cipher Block Chaining with Optimization Technique	**12**	**CO2**
III	A Technique to Approximate Digital Planar Curve with Polygon, Shape Determination of Aspired Foreign Body on Pediatric Radiography Images Using Rule-Based Approach, Evaluation of Image Detection and Description Algorithms for Application in Monocular SLAM, Diophantine Equations for Enhanced Security in Watermarking Scheme for Image Authentication	**12**	**CO3**
IV	Design, Construction, and Programming of a Mobile Robot Controlled by Artificial Vision, Review and Applications of Multimodal Biometrics for Secured Systems, Background Subtraction and Object Tracking via Key Frame-Based Rotational Symmetry Dynamic Texture, A Novel Approach of Human Tracking Mechanism in Wireless Camera Networks	**12**	**CO4**
V	Digital Image Steganography: Survey, Analysis, and Application, Vegetation Index: Ideas, Methods, Influences, and Trends, Expert System through GIS-Based Cloud	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Advanced Image Processing Techniques and Applications	N. Suresh Kumar, Arun Kumar Sangaiah, M. Arun, S. Anand	IGI global	--	2017

Course Outcomes:

After completion of the course, a student should be able to:

CO01: Understand the advanced applications of Image processing.

CO02: Understand the application of image processing pattern recognition, encryption and image enhancement.

CO03: Understand and apply the image processing techniques in identification of foreign body using radiography, watermarking techniques.

CO04: Apply the image processing techniques to robot vision, biometrics, human tracking using wireless camera.

CO05: Apply image processing in steganography, expert systems through GIS based cloud.

PSIT404c: Storage as a Service

M. Sc (Information Technology)		Semester – IV	
Course Name: Storage as a Service		**Course Code: PSIT404c**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understand the need for Storage Area Network and Data protection to satisfy the information explosion requirements.
- Study storage technologies: SAN, NAS, IP storage etc., which will bridge the gap between the emerging trends in industry and academics.
- To get an insight of Storage area network architecture, protocols and its infrastructure.
- To study and discuss the applications of SAN to fulfill the needs of the storage management in the heterogeneous environment.
- Study and understand the management of Storage Networks
- To understand different techniques of managing store.

Unit	Details	Lectures	Outcome
I	Introduction to Information Storage Information Storage Data Types of Data Big Data Information Storage Evolution of Storage Architecture Data Center Infrastructure Core Elements of a Data Center Key Characteristics of a Data Center Managing a Data Center Virtualization and Cloud Computing Data Center Environment Application Database Management System (DBMS) Host (Compute) Operating System Memory Virtualization Device Driver 20 Volume Manager File System Compute Virtualization Connectivity Physical Components of Connectivity Interface Protocols IDE/ATA and Serial ATA 28 SCSI and Serial SCSI Fiber Channel Internet Protocol (IP) Storage Disk Drive Components Platter Spindle Read/Write Head Actuator Arm Assembly Drive Controller Board Physical Disk Structure Zoned Bit Recording Logical Block Addressing Disk Drive Performance Disk Service Time Seek Time Rotational Latency Data Transfer Rate Disk I/O Controller Utilization Host Access to Data Direct-Attached Storage DAS Benefit and Limitations Storage Design Based on Application Requirements and Disk Performance Disk Native Command Queuing	**12**	**CO1**

	Introduction to Flash Drives Components and Architecture of Flash Drives Features of Enterprise Flash Drives Concept in Practice: VMware ESXi Data Protection: RAID RAID Implementation Methods Software RAID Hardware RAID Array Components RAID Techniques Striping Mirroring Parity RAID Levels RAID 0 RAID 1 Nested RAID RAID 3 RAID 4 RAID 5 RAID 6 RAID Impact on Disk Performance Application IOPS and RAID Configurations RAID Comparison Hot Spares		
II	**Intelligent Storage Systems** Components of an Intelligent Storage System Front End Cache Structure of Cache Read Operation with Cache Write Operation with Cache Implementation Cache Management Cache Data Protection Back End Physical Disk Storage Provisioning Traditional Storage Provisioning LUN Expansion: MetaLUN Virtual Storage Provisioning 82 Comparison between Virtual and Traditional Storage Provisioning Use Cases for Thin and Traditional LUNs LUN Masking Types of Intelligent Storage Systems High-End Storage Systems Midrange Storage Systems **Fiber Channel Storage Area Networks** Fiber Channel: Overview The SAN and Its Evolution Components of FC SAN Node Ports Cables and Connectors Contents Interconnect Devices SAN Management Software FC Connectivity Point-to-Point Fiber Channel Arbitrated Loop Fiber Channel Switched Fabric FC-SW Transmission Switched Fabric Ports Fiber Channel Architecture Fiber Channel Protocol Stack FC-4 Layer FC-2 Layer FC-1 Layer FC-0 Layer Fiber Channel Addressing World Wide Names FC Frame 110. Structure and Organization of FC Data Flow Control BB_Credit EE_Credit Classes of Service Fabric Services Switched Fabric Login Types Zoning Types of Zoning FC SAN Topologies Mesh Topology Core-Edge Fabric Benefits and Limitations of Core-Edge Fabric Virtualization in SAN Block-level Storage Virtualization Virtual SAN (VSAN) **IP SAN and FCoE** iSCSI Components of iSCSI iSCSI Host Connectivity iSCSI Topologies Native iSCSI Connectivity Bridged iSCSI Connectivity Combining FC and Native iSCSI Connectivity iSCSI Protocol Stack iSCSI PDU 6 iSCSI Discovery iSCSI Names iSCSI Session iSCSI Command Sequencing FCIP FCIP Protocol Stack FCIP Topology FCIP Performance and Security FCoE I/O	**12**	**CO2**

	Consolidation Using FCoE Components of an FCoE Network Converged Network Adapter Cables FCoE Switches FCoE Frame Structure FCoE Frame Mapping FCoE Enabling Technologies Priority-Based Flow Control (PFC) Enhanced Transmission Selection (ETS Congestion Notification (CN) Data Center Bridging Exchange Protocol (DCBX) 1		
III	**Network-Attached Storage** General-Purpose Servers versus NAS Devices Benefits of NAS File Systems and Network File Sharing Accessing a File System Network File Sharing Components of NAS NAS I/O Operation NAS Implementations Unifi ed NAS Unifi ed NAS Connectivity 164 Gateway NAS Gateway NAS Connectivity Scale-Out NAS Scale-Out NAS Connectivity NAS File-Sharing Protocols NFS CIFS Factors Affecting NAS Performance File-Level Virtualization Object-Based and Unified Storage Object-Based Storage Devices Object-Based Storage Architecture Components of OSD Object Storage and Retrieval in OSD Benefits of Object-Based Storage Common Use Cases for Object-Based Storage Content-Addressed Storage CAS Use Cases Healthcare Solution: Storing Patient Studies Finance Solution: Storing Financial Records Unified Storage Components of Unifi ed Storage Data Access from Unified Storage Introduction to Business Continuity Information Availability Causes of Information Unavailability Consequences of Downtime Measuring Information Availability BC Terminology BC Planning Life Cycle Failure Analysis Single Point of Failure Resolving Single Points of Failure Multipathing Software Business Impact Analysis BC Technology Solutions I/O Operation without PowerPath I/O Operation with PowerPath Automatic Path Failover Path Failure without PowerPath Path Failover with PowerPath: Active-Active Array Path Failover with PowerPath: Active-Passive Array Backup and Archive Backup Purpose Disaster Recovery Operational Recovery Archival Backup Considerations Backup	**12**	**CO3**

	Granularity Recovery Considerations Backup Methods 6 Backup Architecture Backup and Restore Operations Backup Topologies Backup in NAS Environments Server-Based and Serverless Backup NDMP-Based Backup Backup Targets Backup to Tape Physical Tape Library Limitations of Tape 2 Backup to Disk Backup to Virtual Tape Virtual Tape Library Data Deduplication for Backup Data Deduplication Methods Data Deduplication Implementation Source-Based Data Deduplication Target-Based Data Deduplication Backup in Virtualized Environments Data Archive Archiving Solution Architecture Use Case: E-mail Archiving Use Case: File Archiving		
IV	Local Replication Replication Terminology Uses of Local Replicas Replica Consistency Consistency of a Replicated File System Consistency of a Replicated Database Local Replication Technologies Host-Based Local Replication LVM-Based Replication Advantages of LVM-Based Replication Limitations of LVM-Based Replication File System Snapshot Storage Array-Based Local Replication Full-Volume Mirroring Pointer-Based, Full-Volume Replication Pointer-Based Virtual Replication Network-Based Local Replication Continuous Data Protection CDP Local Replication Operation Tracking Changes to Source and Replica Restore and Restart Considerations Creating Multiple Replicas Local Replication in a Virtualized Environment Remote Replication Modes of Remote Replication Remote Replication Technologies Host-Based Remote Replication LVM-Based Remote Replication Host-Based Log Shipping Storage Array-Based Remote Replication Synchronous Replication Mode Asynchronous Replication Mode Disk-Buffered Replication Mode Network-Based Remote Replication CDP Remote Replication Three-Site Replication Three-Site Replication — Cascade/Multihop Synchronous + Asynchronous Synchronous + Disk Buffered Three-Site Replication — Triangle/Multitarget Data Migration Solutions Remote Replication and Migration in aVirtualized Environment Cloud Computing Cloud Enabling Technologies Characteristics of Cloud Computing Benefits of Cloud Computing	**12**	**CO4**

	Cloud Service Models Infrastructure-as-a-Service Platform-as-a-Service Software-as-a-Service Cloud Deployment Models Public Cloud Private Cloud Community Cloud Hybrid Cloud Cloud Computing Infrastructure Physical Infrastructure Virtual Infrastructure Applications and Platform Software Cloud Management and Service Creation Tools Cloud Challenges Challenges for Consumers Challenges for Providers Cloud Adoption Considerations		
V	Securing the Storage Infrastructure Information Security Framework Risk Triad Assets Threats Vulnerability Storage Security Domains Securing the Application Access Domain Controlling User Access to Data Protecting the Storage Infrastructure 341 Data Encryption Securing the Management Access Domain Controlling Administrative Access Protecting the Management Infrastructure Securing Backup, Replication, and Archive Security Implementations in Storage Networking FC SAN FC SAN Security Architecture Basic SAN Security Mechanisms LUN Masking and Zoning Securing Switch Ports Switch-Wide and Fabric-Wide Access Control Logical Partitioning of a Fabric: Virtual SAN NAS NAS File Sharing: Windows ACLs NAS File Sharing: UNIX Permissions NAS File Sharing: Authentication and Authorization Kerberos Network-Layer Firewalls IP SAN Securing Storage Infrastructure in Virtualized and Cloud Environments Security Concerns Security Measures Security at the Compute Level Security at the Network Level Security at the Storage Level Concepts in Practice: RSA and VMware Security Products RSA Secure ID RSA Identity and Access Management RSA Data Protection Manager VMware vShield Managing the Storage Infrastructure Monitoring the Storage Infrastructure Monitoring Parameters Components Monitored Hosts Storage Network Storage Monitoring Examples Accessibility Monitoring Capacity Monitoring Performance Monitoring Security Monitoring Alerts Storage Infrastructure Management Activities Availability Management Capacity Management Performance Management Security Management Reporting Storage Infrastructure Management in a	**12**	**CO5**

	Virtualized Environment Storage Management Examples Storage Allocation to a New Server/Host File System Space Management Chargeback Report Storage Infrastructure Management Challenges Developing an Ideal Solution 384Storage Management Initiative Enterprise Management Platform Information Lifecycle Management Storage Tiering Intra-Array Storage Tiering Inter-Array Storage Tiering		

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Information Storage and Management: Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments	EMC	John Wiley & Sons	2nd	2012

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand different techniques of storage and RAID Technologies
CO2: Understand different intelligent storage technologies. Also, understand the benefits of Fibre Channel Storage Networks along with iSCSI.
CO3: Understand the architecture of NAS and deployment along with Object based and unified storage technologies. Also, the learner will be able to configure the storage devices to maintain highest level of availability
CO4: Understand Replication and Migration techniques and implement them.
CO5: Understand Different techniques for managing and securing storage infrastructure.

PSIT404d: Information Security Auditing

M. Sc (Information Technology)		Semester – IV	
Course Name: Information Security Auditing		**Course Code: PSIT404d**	
Periods per week (1 Period is 60 minutes)		4	
Credits		4	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	60
	Internal	--	40

Course Objectives:

- Understand various information security policies in place.
- Assess an organization based on the needs and suggest the requisite information security policies to be deployed.
- Audit the organization across relevant policies and assist the organization in implementing such policies along with suggesting improvements.

Unit	Details	Lectures	Outcome
I	Secrets of a Successful Auditor Understanding the Demand for IS Audits Understanding Policies, Standards, Guidelines, and Procedures Understanding Professional Ethics Understanding the Purpose of an Audit Differentiating between Auditor and Auditee Roles Implementing Audit Standards Auditor Is an Executive Position Understanding the Corporate Organizational Structure Governance Strategy Planning for Organizational Control Overview of Tactical Management Planning and Performance Overview of Business Process Reengineering Operations Management Summary Audit Process Understanding the Audit Program Establishing and Approving an Audit Charter Preplanning Specific Audits Performing an Audit Risk Assessment Determining Whether an Audit Is Possible Performing the Audit Gathering Audit Evidence Conducting Audit Evidence Testing Generating Audit Findings Report Findings Conducting Follow-up (Closing Meeting)	**12**	**CO1**
II	Information Systems Acquisition and Development Project Governance and Management Business Case and Feasibility Analysis System Development Methodologies Control Identification and Design Testing Methodologies Configuration and Release Management	**12**	**CO2**

	System Migration, Infrastructure Deployment and Data Conversion Post-implementation Review		
III	Information Systems Operations Introduction Common Technology Components IT Asset Management Job Scheduling and Production Process Automation System Interfaces End-user Computing Data Governance Systems Performance Management Problem and Incident Management Change, Configuration, Release and IT Service Level Management Database Management Business Resilience Business Impact Analysis Data Backup, Storage and Restoration Business Continuity Plan Disaster Recovery Plans	**12**	**CO3**
IV	Information Systems Life Cycle Governance in Software Development Management of Software Quality Overview of the Executive Steering Committee Change Management Management of the Software Project Overview of the System Development Life Cycle Overview of Data Architecture Decision Support Systems Program Architecture Centralization vs. Decentralization Electronic Commerce System Implementation and Operations Understanding the Nature of IT Services Performing IT Operations Management Performing Capacity Management Using Administrative Protection Performing Problem Management Monitoring the Status of Controls Implementing Physical Protection	**12**	**CO4**
V	Protecting Information Assets Understanding the Threat Using Technical Protection Business Continuity and Disaster Recovery Debunking the Myths Understanding the Five Conflicting Disciplines Called Business Continuity Defining Disaster Recovery Defining the Purpose of Business Continuity Uniting Other Plans with Business Continuity Understanding the Five Phases of a Business Continuity Program Understanding the Auditor Interests in BC/DR Plans	**12**	**CO5**

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	CISA®: Certified Information Systems Auditor	David Cannon	SYBEX	Fourth Edition	2016
2.	CISA Review Manual 27th Edition		ISACA		2019
3.	CISA Certified Information Systems Auditor All-in-One Exam Guide, Fourth Edition,		O'Reilly	4th Edition	2019

Course Outcomes:

After completion of the course, a student should be able to:

CO1: Understand various information security policies and process flow, Ethics of an Information security Auditor.

CO2: Understand various information systems in an organization, their criticality and various governance and management policies associated with them.

CO3: Critically analyse various operational strategies like asset management, data governance etc. and suggest requisite changes as per organizations requirements with improvements.

CO4: Understand the information flow across the organization and identify the weak spots, and also suggest improvements to strengthen them.

CO5: Come up with strong strategies to protect information assets and come up with an efficient business continuity plan, disaster recovery strategy etc.

PSIT4P4: Project Implementation and Viva

M. Sc (Information Technology)		**Semester – IV**	
Course Name: Project Implementation and Viva		**Course Code: PSIT4P4**	
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2	50
	Internal	--	-

The project dissertation and Viva Voce details are given in Appendix 1.

Evaluation Scheme

Internal Evaluation (40 Marks)

The internal assessment marks shall be awarded as follows:

1. **30 marks (Any one of the following):**
   a. **Written Test or**
   b. **SWAYAM (Advanced Course) of minimum 20 hours and certification exam completed or**
   c. **NPTEL (Advanced Course) of minimum 20 hours and certification exam completed or**
   d. **Valid International Certifications (Prometric, Pearson, Certiport, Coursera, Udemy and the like)**
   e. **One certification marks shall be awarded one course only. For four courses, the students will have to complete four certifications.**
2. **10 marks**
   The marks given out of 40 (30 in Semester 4) for publishing the research paper should be divided into four course and should awarded out of 10 in each of the four course.

i. Suggested format of Question paper of 30 marks for the written test.

Q1.	**Attempt *any two* of the following:**	**16**
a.		
b.		
c.		
d.		
Q2.	**Attempt *any two* of the following:**	**14**
a.		
b.		
c.		
d.		

ii. 10 marks from every course coming to a total of 40 marks, shall be awarded on publishing of research paper in UGC approved / Other Journal with plagiarism less than 10%. The marks can be awarded as per the impact factor of the journal, quality of the paper, importance of the contents published, social value.

External Examination: (60 marks)

	All questions are compulsory	
Q1	**(Based on Unit 1) Attempt *any two* of the following:**	**12**
a.		
b.		

c.		
d.		
Q2	**(Based on Unit 2) Attempt *any two* of the following:**	**12**
Q3	**(Based on Unit 3) Attempt *any two* of the following:**	**12**
Q4	**(Based on Unit 4) Attempt *any two* of the following:**	**12**
Q5	**(Based on Unit 5) Attempt *any two* of the following:**	**12**

Practical Evaluation (50 marks)

A Certified copy of hard-bound journal is essential to appear for the practical examination.

1.	**Practical Question 1**	**20**
2.	**Practical Question 2**	**20**
3.	**Journal**	**5**
4.	**Viva Voce**	**5**

OR

1.	**Practical Question**	**40**
2.	**Journal**	**5**
3.	**Viva Voce**	**5**

Project Documentation and Viva Voce Evaluation

The documentation should be checked for plagiarism and as per UGC guidelines, should be less than 10%.

1.	**Documentation Report (Chapter 1 to 4)**	**20**
2.	**Innovation in the topic**	**10**
3.	**Documentation/Topic presentation and viva voce**	**20**

Project Implementation and Viva Voce Evaluation

1.	**Documentation Report (Chapter 5 to last)**	**20**
2.	**Implementation**	**10**
3.	**Relevance of the topic**	**10**
4.	**Viva Voce**	**10**

Appendix – 1

Project Documentation and Viva-voce (Semester III) and Project Implementation and Viva-Voce (Semester IV)

Goals of the course Project Documentation and Viva-Voce

The student should:

- be able to apply relevant knowledge and abilities, within the main field of study, to a given problem
- within given constraints, even with limited information, independently analyse and discuss complex inquiries/problems and handle larger problems on the advanced level within the main field of study
- reflect on, evaluate and critically review one's own and others' scientific results
- be able to document and present one's own work with strict requirements on structure, format, and language usage
- be able to identify one's need for further knowledge and continuously develop one's own knowledge

To start the project:

- Start thinking early in the programme about suitable projects.
- Read the instructions for the project.
- Attend and listen to other student´s final oral presentations.
- Look at the finished reports.
- Talk to senior master students.
- Attend possible information events (workshops / seminars / conferences etc.) about the related topics.

Application and approval:

- Read all the detailed information about project.
- Finalise finding a place and supervisor.
- Check with the coordinator about subject/project, place and supervisor.
- Write the project proposal and plan along with the supervisor.
- Fill out the application together with the supervisor.
- Hand over the complete application, proposal and plan to the coordinator.
- Get an acknowledgement and approval from the coordinator to start the project.

During the project:

- Search, gather and read information and literature about the theory.
- Document well the practical work and your results.
- Take part in seminars and the running follow-ups/supervision.
- Think early on about disposition and writing of the final report.
- Discuss your thoughts with the supervisor and others.
- Read the SOP and the rest you need again.
- Plan for and do the mid-term reporting to the coordinator/examiner.
- Do a mid-term report also at the work-place (can be a requirement in some work-places).
- Write the first draft of the final report and rewrite it based on feedback from the supervisor and possibly others.
- Plan for the final presentation of the report.

Finishing the project:

- Finish the report and obtain an OK from the supervisor.

- Ask the supervisor to send the certificate and feedback form to the coordinator.
- Attend the pre-final oral presentation arranged by the Coordinator.
- Rewrite the final report again based on feedback from the opponents and possibly others.
- Prepare a title page and a popular science summary for your report.
- Send the completed final report to the coordinator (via plagiarism software)
- Rewrite the report based on possible feedback from the coordinator.
- Appear for the final exam.

Project Proposal/research plan

- The student should spend the first 1-2 weeks writing a 1-2 pages project plan containing:
  - Short background of the project
  - Aims of the project
  - Short description of methods that will be used
  - Estimated time schedule for the project
- The research plan should be handed in to the supervisor and the coordinator.
- Writing the project plan will help you plan your project work and get you started in finding information and understanding of methods needed to perform the project.

Project Documentation

The documentation should contain:

- Introduction - that should contain a technical and social (when possible) motivation of the project topic.
- Description of the problems/topics.
- Status of the research/knowledge in the field and literature review.
- Description of the methodology/approach. (The actual structure of the chapters here depends on the topic of the documentation.)
- Results - must always contain analyses of results and associated uncertainties.
- Conclusions and proposals for the future work.
- Appendices (when needed).
- Bibliography - references and links.

For the master's documentation, the chapters cannot be dictated, they may vary according to the type of project. However, in Semester III Project Documentation and Viva Voce must contain at least 4 chapters (Introduction, Review of Literature, Methodology / Approach, Proposed Design / UI design, etc. depending on the type of project.) The Semester III report should be spiral bound.

In Semester IV, the remaining Chapters should be included (which should include Experiments performed, Results and discussion, Conclusions and proposals for future work, Appendices) and Bibliography - references and links. Semester IV report should include all the chapters and should be hardbound.

UNIVERSITY OF MUMBAI

Syllabus for Semester-I and Semester -II

Program: M.Sc.

Course: Computer Science

Choice Based Credit System (CBCS) (Revised)

With effect from the academic year 2021–2022)

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1. PREAMBLE

M.Sc. in Computer Science is a two-year post-graduate programme with the objective to develop human resources with core competence in various thrust areas of Computer Science. It will provide students with opportunities to develop and hone core competency in the field of computer science and encourage them to make a mark in the much sought-after IT industry.

The Syllabus of this Course creates a unique identity for M.Sc. in Comp Science distinct from similar degrees in other related subjects,focuses on core Computer Science subjects, incorporate advanced and most recent trends, Identify and nurture research temper among students, Offer provision for internship with industry and Focus, as far as possible, only on open-source software

The syllabus for the semester I and semester II has tried to initiate steps to meet these goals. By extending the syllabus to semester III and semester IV, it is assumed that these goals will be met to a larger extent. The syllabus proposes to have four core compulsory courses in Semester I and Semester II. UNIT -1 of Paper I ofSemester - I and Semester - II are ABILITY ENHANCEMENT UNITS and UNIT- 4 of all papers of Semester - I and Semester - II is SKILL ENHANCEMENT UNIT. Semester III and Semester IV proposes electives courses based on a recent and emerging area. Inclusion of Project as part of the internal assessment is an attempt to translate theory into practice. It is assumed that, with this back ground, a student can take up challenging research project in the semester III and semester IV and will be better fit for industry as he or she will have strong foundation on fundamentals and exposure to advanced and emerging trends.

We thank all the industry experts, senior faculties and our colleague's department of Computer Science of different colleges as well as University of Mumbai; who have given their valuable comments and suggestions, which we tried to incorporate. We thank the Chairperson and members of the Ad-hoc Board of Studies in Computer Science of University for their faith in us. Thanks to one and all who have directly or indirectly helped in this venture.

2. PROGRAM OUTCOMES

The M. Sc. Computer Science programme is designed to help the students to:

- To be fundamentally strong at core subject of Computer Science.
- To apply programming and computational skills for industrial solutions.
- Broad understanding of latest technological trends.
- To identify opportunities for establishing an enterprise for immediate Employment.
- Able to understand and apply fundamental research concepts.
- Able to use efficient soft skills for professional development.
- Engage in independent and life-long learning for continued professional development.

3. PROGRAMME STRUCTURE

A	**Programme Duration**	**Four Semester (2 Years)**
B	**Total Credits required for Successful Completion**	**96**
C	**Credits required from Core Courses**	**42**
D	**Credits required for the Ability Enhancement Courses**	**02**
E	**Credits required for the Skill Enhancement Courses**	**12**
F	**Credits required for the Practical Course**	**28**
G	**Project**	**06**
H	**Internship**	**06**
I	**Minimum Attendance per Semester**	**75%**

This is the syllabus for the Semester-I and Semester-II of M.Sc. Computer Science program of University of Mumbai to be implemented from the year 2021-22. The Syllabus offers four Theory Courses and Four Practical Courses each in each Semester.

SEMESTER - I

The syllabus proposes four subjects in Semester -I. Each subject has Theory and Practical components. Each of these Courses is of Four Credits each and is expected to complete in 60 hours.

The following table gives the details of the Theory Courses in Semester -I.

Semester - I: Theory courses

Course Code	Course Title	No of Hours	Credit
PSCS101	**Algorithm for Optimization**	**60**	**04**
PSCS102	**Software Defined Networking**	**60**	**04**
PSCS103	**Applied Signal and Image Processing**	**60**	**04**
PSCS104	**Advanced Database Techniques**	**60**	**04**
Total Credits for Theory courses in Semester-I			**16**

Semester - I: Practical Lab courses

The syllabus proposes Four Laboratory courses of 2 Credits each. As far as the Practical are concerned, equal weightage similar to that of Theory courses has been given in terms of the number of hours.

The following table gives the details of the Practical Courses in Semester -I

Course Code	Course Title	No of Hours	Credit
PSCSP101	**Algorithm for Optimization**	**60**	**02**
PSCSP102	**Software Defined Networking**	**60**	**02**
PSCSP103	**Applied Signal and Image Processing**	**60**	**02**
PSCSP104	**Advanced Database Techniques**	**60**	**02**
Total Credits for Practical courses in Semester-I			**08**

SEMESTER - II

The Syllabus proposes four subjects in Semester - II also. As in the case of Semester-I, each subject has theory and practical components. Each of these courses is of Four Credits and Two credits respectively and is expected to complete in 60 hours.

The following table gives the details of the Theory Courses in Semester -II.

Semester - II: Theory courses

Course Code	Course Title	No of Hours	Credit
PSCS201	**Applied Machine and Deep Learning**	**60**	**04**
PSCS202	**Natural Language Processing**	**60**	**04**
PSCS203	**Web Mining**	**60**	**04**
PSCS204	**Embedded and IoT Technology**	**60**	**04**
Total Credits for Theory courses in Semester -II			**16**

Semester - II: Practical Lab courses

The Syllabus proposes Four Laboratory courses of 2 Credits each. As far as the Practical are concerned, equal weightage similar to that of Theory courses has been given in terms of the number of hours.

The following table summarizes the details of the practical courses in the Semester - II.

Course Code	Course Title	No of Hours	Credit
PSCSP201	**Applied Machine and Deep Learning**	**60**	**02**
PSCSP202	**Natural Language Processing**	**60**	**02**
PSCSP203	**Web Mining**	**60**	**02**
PSCSP204	**Embedded and IoT Technology**	**60**	**02**
Total Credits for Practical Courses in Semester -II			**08**

4.DETAILED SYLLABUS FOR SEMESTER - I & SEMESTER - II

SEMESTER- I

Course Code	Course Title	Credits
PSCS101	**Algorithm for Optimization**	**04**

Course Outcome: -

- You will be able to effectively implement optimization techniques to the existing algorithm to improve its performance.
- You will be able to work in the areas of Machine Learning and Data Sciences Algorithms

Course Specific Outcome: -

- Optimization with a focus on practical algorithms for the design of engineering systems
- Exposure to multivariable calculus, linear algebra, and probability concepts.
- Learn a wide variety of optimization topics, introducing the underlying mathematical problem formulations and the algorithms for solving them.

UNIT 1: (Ability Enhancement) **Introduction to Optimization Process** Basic Optimization Problem, Constraints, Critical Points, Conditions for Local Minima, Contour Plots. Unimodality, Fibonacci Search, Golden Section Search, Quadratic Fit Search.	**15L**
UNIT 2: Order Methods First-Order Methods, Gradient Descent, Conjugate Gradient, Adagrad, RMSProp, Adadelta, Adam, Hypergradient Descent. Second-Order Methods, Newton's Method, Secant Method, Quasi-Newton Methods.	**15L**
UNIT 3: Sampling and Surrogate Models Sampling Plans, Full Factorial, Random Sampling, Uniform Projection Plans, Stratified Sampling, Space-Filling Metrics. Surrogate Models, Fitting Surrogate Models, Linear Models, Basis Functions, Fitting Noisy Objective Functions, Model Selection,	**15L**

Probabilistic Surrogate Models, Gaussian Distribution, Gaussian Processes, Prediction	
UNIT 4: (Skill Enhancement) **Optimization and Uncertainty** Optimization under Uncertainty, Uncertainty, Set-Based Uncertainty, Probabilistic Uncertainty. Uncertainty Propagation, Sampling Methods, Taylor Approximation, Polynomial Chaos, Bayesian Monte Carlo. Dynamic Programming, Ant Colony Optimization. Expression Optimization, Grammars, Genetic Programming, Grammatical Evolution, Probabilistic Grammars, Probabilistic Prototype Trees	**15L**

TEXT BOOK:

1. Algorithms for Optimization Mykel J. Kochenderfer, Tim A. Wheeler, The MIT Press 2019.

REFERENCE BOOKS:

1. Think Julia: How to Think Like a Computer Scientist by Allen B. Downey and Ben Lauwens 1st Edition 2019 O'reilly.
2. Decision Making Under Uncertainty: Theory and Application by Mykel J. Kochenderfer MIT Lincoln Laboratory Series 2015.
3. Introduction to Algorithms, By Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein 3Ed. (International Edition) (MIT Press) 2009

Course Code	Course Title	Credits
PSCSP101	**Practical Course on Algorithm Optimization**	**02**
Note: All the Practical's should be implemented using Julia Link: Julia:https://julialang.org/		
1	Implement Contour Plots.	
2	Implement Fibonacci and Golden section search.	
3	Implement Quadratic Fit Search.	
4	Implement Gradient descent.	
5	Implement quasi-Newton methods to find the local maxima.	

6	Implement the Adagrad method with application, RMSprop and Adadelta.
7	Implement radial basis functions using surrogate modelling.
8	Apply Random Forest in surrogate Model.
9	Implement Gaussian Process and its application.
10	Path finding using Ant Colony Optimization with an application.

Course Code	Course Title	Credits
PSCS102	**Software Defined Networking**	**04**

Course Outcome: -

- To make the students capable of understanding computer network basics.
- To Obtain the knowledge of Software defined networks with understanding of data plane, control plane and application plane.
- To apply network virtualization for industry standard solutions.
- To improve skills in implementing network virtualization and Software Defined Network (SDN).

Course Specific Outcome: -

- Learners will be able to understand basic concepts of Software Defined Networking and network virtualization.
- Learners will be able to explore OpenFlow specifications to build Software defined networks.
- Learners will be able to analyse and implement theories and practical related to Network management and Virtualization.
- Learners will be able to apply knowledge of Software Defined Networking as per industry standards.

Unit 1: Introduction to Computer Networking Basic Concepts and Definitions: LAN, MAN, WAN, AD-Hoc, Wireless Network, Understanding the layered architecture of OSI/RM and TCP-IP Model, Concepts and implementation of IPV4 and IPV6, Study of various network Routing protocols, Introduction to Transport layer and Application layer protocols.	**15L**

UNIT 2:Software Defined Networking Elements of Modern Networking, Requirements and Technology, SDN: Background and Motivation, SDN Data Plane and OpenFlow, SDN Control Plane, SDN Application Plane	**15L**
UNIT 3: Network Functions Virtualization Concepts and Architecture, NFV Functionality, Network Virtualization Quality of Service, MODERN NETWORK ARCHITECTURE: CLOUDS AND FOG, Cloud Computing, The Internet of Things: Components	**15L**
UNIT 4: (Skill Enhancement) **Design and implementation of Network** Understand and implement Layer 2/3 switching techniques (VLAN /TRUNKING/ Managing Spanning Tree), Implementation of OSPF V2 and V3, Implementation BGP, Implementation Multicast Routing, Implementation of MPLS, Implementation of Traffic Filtering by using Standard and Extended Access Control List, Implementation of Routing redistribution, Implementation of Policy Based Routing/ Load Balancing /QOS/Natting /VRF	**15L**

TEXT BOOK:

1. Behrouz A Forouzan “TCPIP Protocol Suite” Fourth Edition 2010
2. William Stallings, “Foundations of Modern Networking”, Pearson Ltd.,2016.
3. Software Defined Networks: A Comprehensive Approach by Paul Goransson and Chuck Black, Morgan Kaufmann Publications, 2014
4. SDN - Software Defined Networks by Thomas D. Nadeau & Ken Gray, O'Reilly, 2013

REFERENCE BOOKS:

1. Network Programmability and Automation-Jason Edelman, Matt Oswalt First Edition 2018.

Course Code	Course Title	Credits
PSCSP102	**Practical Course on Software Defined Networking**	**02**

Note: All the Practical's should be implemented using GNS3/EVE-NG/CISCO VIRL

Link: GNS3 :https://www.gns3.com/software/download
EVE-NG: https://www.eve-ng.net/index.php/download/
CISCO VIRL:https://learningnetwork.cisco.com/s/question/0D53i00000Kswpr/virl-15-download

1	Implement IP SLA (IP Service Level Agreement)
2	Implement IPv4 ACLs 1. Standard 2. Extended
3	1. Implement SPAN Technologies (Switch Port Analyzer) 2. Implement SNMP and Syslog 3. Implement Flexible NetFlow
4	1. Implement a GRE Tunnel 2. Implement VTP 3. Implement NAT
5	Implement Inter-VLAN Routing
6	Observe STP Topology Changes and Implement RSTP 1. Implement Advanced STP Modifications and Mechanisms 2. Implement MST
7	1. Implement EtherChannel 2. Tune and Optimize EtherChannel Operations
8	OSPF Implementation 1. Implement Single-Area OSPFv2 2. Implement Multi-Area OSPFv2 3. OSPFv2 Route Summarization and Filtering 4. Implement Multiarea OSPFv3
9	Implement BGP Communities 1. Implement MP-BGP 2. Implement eBGP for IPv4

	3. Implement BGP Path Manipulation
10	Implement IPsec Site-to-Site VPNs 1. Implement GRE over IPsec Site-to-Site VPNs 2. Implement VRF Lite
11	Simulating SDN with 1. OpenDaylight SDN Controller with the Mininet Network Emulator 2. OFNet SDN network emulator
12	Simulating OpenFlow Using MININET

Course Code	Course Title	Credits
PSCS103	**Applied Signal and Image Processing**	**04**

Course Outcome: -

- Introduce the concepts of signal processing terms and relate them to image processing
- Learn about basic image processing techniques (e.g., noise removal and image enhancement).
- Develop skills to design and implement algorithms for advanced image analysis
- Apply image processing to design solutions to real-life problems

Course Specific Outcome: -

- Understanding the terminologies of signal and digital image processing
- Ability to apply various images, intensity transformations, and spatial filtering.
- Knowledge of Perform frequency domain operations on images.
- Ability to apply image segmentation and extract image features.
- Apply image processing algorithms in practical applications.

UNIT 1: Fundamentals of Digital Signals Processing Periodic signals, Spectral decomposition, Signals, Reading and writing Waves, Spectrums, Wave objects, Signal objects Noise: Uncorrelated noise, Integrated spectrum, Brownian noise, Pink Noise, Gaussian noise; Autocorrelation: Correlation, Serial correlation, Autocorrelation, Autocorrelation of periodic signals, Correlation as a dot product Frequency domain Operations: Representing Image as Signals, Sampling and Fourier Transforms, Discrete Fourier Transform, Convolution and Frequency Domain Filtering, Smoothing using low-pass filters, Sharpening using high-pass filters. Fast Fourier Transforms.	**15L**
UNIT 2: Image Processing fundamentals and Pixel-Transformation Definition, Application of Image Processing, Image Processing Pipeline, Tools and Libraries for Image Processing, Image types and files formats. Intensity Transformations- Log Transform, Power-law Transform, Contrast Stretching, Thresholding Histogram Processing- Histogram Equalization and Histogram Matching; Linear and Non-linear smoothing of Images, Sharpening of images Image Derivative: Derivatives and gradients, Laplacian, the effect of noise on gradient computation	**15L**
UNIT 3: Structural and Morphological Operations Edge Detection: Sobel, Canny Prewitt, Robert edge detection techniques, LoG and DoG filters, Image Pyramids: Gaussian Pyramid, Laplacian Pyramid Morphological Image Processing: Erosion, Dilation, Opening and closing, Hit-or-Miss Transformation, Skeletonizing, Computing the	**15L**

convex hull, removing small objects, White and black top-hats, Extracting the boundary, Grayscale operations	
UNIT 4: (Skill Enhancement) **Advanced Image Processing Operations** Extracting Image Features and Descriptors: Feature detector versus descriptors, Boundary Processing and feature descriptor, Principal Components, Harris Corner Detector, Blob detector, Histogram of Oriented Gradients, Scale-invariant feature transforms, Haar-like features Image Segmentation: Hough Transform for detecting lines and circles, Thresholding and Otsu's segmentation, Edge-based/region-based segmentation Region growing, Region splitting and Merging, Watershed algorithm, Active Contours, morphological snakes, and GrabCut algorithms	**15L**
TEXT BOOK: 1. Digital Image Processing by Rafael Gonzalez & Richard Woods, Pearson; 4th edition, 2018 2. Think DSP: Digital Signal Processing in Python by Allen Downey, O'Reilly Media; 1st edition (August 16, 2016)	
REFERENCE BOOKS: 1. Understanding Digital Image Processing, Vipin Tyagi, CRC Press, 2018 2. Digital Signal and Image Processing by Tamal Bose, John Wiley 2010 3. Hands-On Image Processing with Python by Sandipan Dey,Packt Publishing, 2018 4. Fundamentals of Digital Images Processing by A K Jain, Pearson, 2010	

Course Code	Course Title	Credits
PSCSP103	**Practical Course on Applied Signal and Image Processing**	**02**
Note: All the Practical's should be implemented using Python Link:https://www.python.org/downloads/		
1	Write program to demonstrate the following aspects of signal processing on suitable data 1. Upsampling and downsampling on Image/speech signal 2. Fast Fourier Transform to compute DFT	
2	Write program to perform the following on signal 1. Create a triangle signal and plot a 3-period segment. 2. For a given signal, plot the segment and compute the correlation between them.	
3	Write program to demonstrate the following aspects of signal on sound/image data 1. Convolution operation 2. Template Matching	
4	Write program to implement point/pixel intensity transformations such as 1. Log and Power-law transformations 2. Contrast adjustments 3. Histogram equalization 4. Thresholding, and halftoning operations	
5	Write a program to apply various enhancements on images using image derivatives by implementing Gradient and Laplacian operations.	
6	Write a program to implement linear and nonlinear noise smoothing on suitable image or sound signal.	

7	Write a program to apply various image enhancement using image derivatives by implementing smoothing, sharpening, and unsharp masking filters for generating suitable images for specific application requirements.
8	Write a program to Apply edge detection techniques such as Sobel and Canny to extract meaningful information from the given image samples
9	Write the program to implement various morphological image processing techniques.
10	Write the program to extract image features by implementing methods like corner and blob detectors, HoG and Haar features.
11	Write the program to apply segmentation for detecting lines, circles, and other shapes/objects. Also, implement edge-based and region-based segmentation.

Course Code	Course Title	Credits
PSCS104	**Advanced Database Techniques**	**04**

Course Outcome: -

- To cover advanced topics of databases to become more proficient.
- To provide students with theoretical knowledge and practical skills in advanced topics in database systems, big data and modern data-intensive systems.
- To Expand Students, view and introduce advanced topics and Business Intelligence.

Course Specific Outcome: -

- To form professional competencies related to design and implementation of non-relational databases, including object-oriented, parallel and Distributed.
- Learners will be able to explore XML, and Mobile databases.
- Learners will be able to deal with methods used for dealing with spatial and Temporal Databases.
- Learner will have a solid grasp on business intelligence tools and XML.

UNIT 1: Enhanced Database Models Object–Oriented Databases: Need of Object-oriented databases, Complex Data Types, Structured Types and Inheritance, Object-Identity and Reference, ODL and OQL, Implementing O-R Features, Persistent Programming Languages, Object-Oriented versus Object-Relational, Example of Object oriented and object relational database implementation, comparison of RDBMS, OODBMS, ORDBMS XML Databases: Structured Semi structure and unstructured data, XML hierarchical tree data model, Documents DTD and XML schema, XML Documents & Database, XML query and transformation, Storage of XML data, Xpath. XQuery, Join and Nesting Queries, XML database applications. Spatial Databases: Types of spatial data, Geographical Information Systems (GIS), Conceptual Data Models for spatial databases, Logical data models for spatial databases: Raster and vector model. Physical data models for spatial databases: Clustering methods (space filling curves), Storage methods (R-tree). Query processing. Temporal Databases: Time ontology, structure, and granularity, Temporal data models, Temporal relational algebra.	**15L**
UNIT 2: Cooperative Transaction Model Parallel and Distributed Databases: Architecture of parallel databases, Parallel query evaluation, Parallelizing individual operations, Sorting Joins Distributed Databases: Concepts, Data fragmentation, Replication and allocation techniques for distributed database design, Query processing, Concurrency control and recovery in distributed databases, Architecture and Design: Centralised versus non centralized Databases, Homogeneous and Heterogeneous DDBMS, Functions and Architecture, Distributed database design, query processing in DDBMS, Distributed concurrency management, deadlock management, Distributed Commit Protocols: 2 PC and 3 PC, Concepts of replication servers. Mobile Database: Overview, Features, Advantages and Disadvantages, Mobile databases in Android System	**15L**

UNIT 3: Learning the NoSQL Basics Introduction to NoSQL: Characteristics of NoSQL, NoSQL Storage types, Advantages and Drawbacks, NoSQL Products Interfacing and interacting with NoSQL: Storing Data In and Accessing Data from MongoDB, Redis, HBase and Apache Cassandra, Language Bindings for NoSQL Data Stores Understanding the storage architecture: Working with Column-Oriented Databases, HBase Distributed Storage Architecture, Document Store Internals, Understanding Key/Value Stores in Memcached and Redis, Eventually Consistent Non-relational Databases Performing CRUD operations: Creating Records, Accessing Data, Updating and Deleting Data	**15L**
UNIT 4: : (Skill Enhancement) **Gaining Proficiency With NoSQL** Querying NoSQL Stores: Similarities Between SQL and MongoDB Query Features, Accessing Data from Column-Oriented Databases Like HBase, Querying Redis Data Stores Indexing And Ordering Data Sets: Essential Concepts Behind a Database Index, Indexing and Ordering in MongoDB, ouchDB and Apache Cassandra Managing Transactions And Data Integrity: RDBMS and ACID, Distributed ACID Systems, Upholding CAP, Consistency Implementations Using NoSQL in The Cloud: Google App Engine Data Store, Amazon SimpleDB	**15L**

TEXT BOOK:

1. Database Management Systems by Raghu Ramakrishnan and Johannes Gehrke, McGraw Hill, 3rd Edition, 2014
2. Professional NoSQL By Shashank Tiwari, Wrox-John Wiley & Sons, Inc, 2011
3. Getting Started with NoSQL, Gaurav Vaish, Packt Publishing Ltd, 2013

REFERENCE BOOKS:

1. Advanced Database Management System by byRini Chakrabarti and Shilbhadra Dasgupta, Dreamtech Press, 2017
2. SQL & NoSQL Databases, Andreas Meier · Michael Kaufmann, Springer Vieweg, 2019
3. Parallel and Distributed Systems by Arun Kulkarni, Nupur Prasad Giri, Wiley, Second edition, 2017
4. Practical Hadoop Migration: How to Integrate Your RDBMS with the Hadoop Ecosystem and Re-Architect Relational Applications to NoSQL By Bhushan Lakhe, Apress; 1st edition, 2016.

Course Code	Course Title	Credits
PSCSP104	**Practical Course on Advanced Database Techniques**	**02**
Note: All the Practical's should be implemented using NoSQL Link: https://www.oracle.com/database/technologies/nosql-database-server-downloads.html		
1	Create different types that include attributes and methods. Define tables for these types by adding a sufficient number of tuples. Demonstrate insert, update and delete operations on these tables. Execute queries on them.	
2	Create an XML database and demonstrate insert, update and delete operations on these tables. Issue queries on it.	
3	Demonstrate distributed databases environment by dividing given global conceCreate a table that stores spatial data and issue queries on it. ptual schema, into vertical and Horizontal fragments and place them on different nodes. Execute queries on these fragments.	
4	Create a table that stores spatial data and issues queries on it.	
5	Create a temporal database and issue queries on it.	
6	Demonstrate the Accessing and Storing and performing CRUD operations in	

	1. MongoDB **2.** Redis
7	Demonstrate the Accessing and Storing and performing CRUD operations in 1. HBase **2.** Apache Cassandra
8	Demonstrating MapReduce in MongoDB to count the number of female (F) and male (M) respondents in the database.
9	Demonstrate the indexing and ordering operations in 1. MongoDB 2. CouchDB **3.** Apache Cassandra
10	Demonstrate the use of data management and operations using NoSQL in the Cloud.

SEMESTER - II

Course Code	Course Title	Credit
PSCS201	Applied Machine and Deep Learning	04

Course Outcome: -

- Developing projects in machine learning for industrial applications.
- Understanding and implementing algorithms and techniques of Machine Learning useful in the field of Data Science, Image Processing, NLP, etc.

Course Specific Outcome:

- Understand core concepts of ML through implementations in python.
- Working with diverse toolkits and packages useful for developing projects in ML
- Implement and understand deep learning and ANNs useful for industry today.

UNIT 1: (Ability Enhancement) **The Fundamentals of Machine Learning** What is Machine Learning? Why use Machine Learning? Types of Machine Learning, Supervised Learning, Unsupervised Learning & Reinforcement Learning. Challenges of Machine Learning, Testing and Validation A First Application: Classification, MNIST Dataset, Performance Measures, Confusion Matrix, Precision and Recall, Precision/Recall Tradeoff, The ROC Curve, Multiclass Classification, Error Analysis.	**15L**
UNIT 2: Training Models Linear Regression, Gradient Descent, Batch Gradient Descent, Stochastic Gradient Descent, Mini-batch Gradient Descent, Polynomial Regression, Learning Curves, The Bias/Variance Tradeoff, Ridge Regression, Lasso Regression, Early Stopping, Logistic Regression, Decision Boundaries, Softmax Regression, Cross Entropy.	**15L**

UNIT 3: Support Vector Machines Linear SVM Classification, Soft Margin Classification, Nonlinear SVM Classification, Polynomial Kernel, Gaussian RBF Kernel, SVM Regression, Decision Trees, Training and Visualizing a Decision Tree, Making Predictions, The CART Training Algorithm, Gini Impurity vs Entropy, Regularization Hyperparameters.	**15L**
UNIT 4: (Skill Enhancement) **Fundamentals of Deep Learning** What is Deep Learning? Need Deep Learning? Introduction to Artificial Neural Network (ANN), Core components of neural networks, Multi-Layer Perceptron (MLP), Activation functions, Sigmoid, Rectified Linear Unit (ReLU), Introduction to Tensors and Operations, Tensorflow framework.	**15L**

TEXT BOOK:

1. Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow Concepts, Tools, and Techniques to Build Intelligent Systems by AurélienGéron, Second Edition, O'reilly 2019
2. Deep Learning with Python by François Chollet Published by Manning 2018
3. Reinforcement Learning: An Introduction by Richard S. Sutton and Andrew G. Barto, Second Edition 2014

REFERENCEBOOKS:

1. Introduction to Machine with Python - A Guide for Data Scientists by Andreas C. Müller & Sarah Guido O'reilly 2016
2. Artificial Neural Networks with TensorFlow 2 ANN Architecture Machine Learning Projects Poornachandra Sarang by Apress 2021

Course Code	Course Title	Credits
PSCSP201	**Practical Course onApplied Machine and Deep Learning**	**02**
Note: All the Practical's should be implemented using Python and TensorFlow. **Link:Python :https://www.python.org/downloads/** **TensorFlow :https://www.tensorflow.org/install**		
1	Implement Linear Regression (Diabetes Dataset)	
2	Implement Logistic Regression (Iris Dataset)	
3	Implements Multinomial Logistic Regression (Iris Dataset)	
4	Implement SVM classifier (Iris Dataset)	
5	Train and fine-tune a Decision Tree for the Moons Dataset	
6	Train an SVM regressor on the California Housing Dataset	
7	Implement Batch Gradient Descent with early stopping for Softmax Regression	
8	Implement MLP for classification of handwritten digits (MNIST Dataset)	
9	Classification of images of clothing using Tensorflow (Fashion MNIST dataset)	
10	Implement Regression to predict fuel efficiency using Tensorflow (Auto MPG dataset)	

Course Code	Course Title	Credits
PSCS202	**Natural Language Processing**	**04**

Course Outcome: -

- Understanding the importance and concepts of Natural Language Processing (NLP)
- Applying algorithms available for the processing of linguistic information and computational properties of natural languages.
- Knowledge on various morphological, syntactic, and semantic NLP tasks.
- Introducing various NLP software libraries and data sets publicly available.

● Designing and developing practical NLP based applications **Course Specific Outcome: -** ● The ability to describe the concepts of morphology, syntax, semantics, discourse & pragmatics of natural language ● Discover various linguistic and statistical features relevant to the basic NLP task, namely, spelling correction, morphological analysis, parts-of-speech tagging, parsing, and semantic analysis ● Assess and Evaluate NLP based systems ● Ability to choose appropriate solutions for solving typical NLP subproblems (tokenizing, tagging, parsing) ● Analyse NLP problems to decompose them inadequate independent components and develop real-life applications	
UNIT 1: Introduction to Natural Language Processing (NLP) and Language Modelling Introduction to NLP: Introduction and applications, NLP phases, Difficulty of NLP including ambiguity; Spelling error and Noisy Channel Model; Concepts of Parts-of speech and Formal Grammar of English. Language Modelling: N-gram and Neural Language Models Language Modelling with N-gram, Simple N-gram models, smoothing (basic techniques), Evaluating language models; Neural Network basics, Training; Neural Language Model, Case study: application of neural language model in NLP system development Python Libraries for NLP: Using Python libraries/packages such as NaturalLanguage Toolkit (NLTK), spaCy, genism	**15L**
UNIT 2: Morphology & Parsing in NLP Computational morphology & Parts-of-speech Tagging: basic concepts; Tagset; Lemmatization, Early approaches: Rule-based and TBL; POS tagging using HMM, Introduction to POS Tagging using	**15L**

Neural Model. Parsing Basic concepts: top-down and bottom-up parsing, treebank; Syntactic parsing: CKY parsing; Statistical Parsing basics: Probabilistic Context-Free Grammar (PCFG); Probabilistic CKY Parsing of PCFGs.	
UNIT 3: Semantics and Word Embedding Semantics Vector Semantics: Words and Vector; Measuring Similarity; Semantics with dense vectors; SVD and Latent Semantic Analysis Embeddings from prediction: Skip-gram and Continuous Bag of words; Concept of Word Sense; Introduction to WordNet	**15L**
UNIT 4: (Skill Enhancement) **NLP Applications and Case Studies** Intelligent Work Processors: Machine Translation; User Interfaces; man-machine Interfaces: Natural language Querying Tutoring and Authoring Systems. Speech Recognition Commercial use of NLP: NLP in customer Service, Sentiment Analysis, Emotion Mining, Handling Frauds and SMS, Bots, LSTM & BERT models, Conversations	**15L**

TEXT BOOK:

1. “Speech and Language Processing”, Jurafsky Dan and Martin James H., 3rd Edition, Pearson, 2018.
2. “Natural Language Processing with Python”, Steven Bird, Ewan Klein, and Edward Loper, 2nd Edition, O’Reilly, 2016.

REFERENCE BOOKS:

1. “Practical NaturalLanguage Processing with Python”, Mathangi Sri, Apress, 2021
2. "Handbook of Computational Linguistics and Natural Language Processing”, Martin Whitehead, Clanrye International, 2020
3. “Handbook of Natural Language Processing”, Nitin Indurkhya, and Fred J. Damerau, Pearson; 2nd edition, 2008

4. “Foundations of Statistical Natural Language Processing”, Manning, Christopher and Heinrich, Schutze, MIT Press, 1997

Course Code	Course Title	Credits
PSCSP202	**Practical Course on Natural Language Processing**	**02**

Note: - The following set of practicals can be performed using any Python Libraries for NLP such as NLTK, spaCy, genism:

Link:-https://www.python.org/downloads/

1	Write a program to implement sentence segmentation and word tokenization
2	Write a program to Implement stemming and lemmatization
3	Write a program to Implement a tri-gram model
4	Write a program to Implement PoS tagging using HMM & Neural Model
5	Write a program to Implement syntactic parsing of a given text
6	Write a program to Implement dependency parsing of a given text
7	Write a program to Implement Named Entity Recognition (NER)
8	Write a program to Implement Text Summarization for the given sample text

Apply the concepts and techniques of Natural language processing learned for real-life applications. A suitable application can be modelled which demonstrates the NLP skills. Some of the concepts/themes for lab exercises (not limited to the following) are described.

9	Consider a scenario of applying NLP in Customer Service. Design and develop an application that demonstrates NLP operations for working with tasks and data like voice calls, chats, Ticket Data, Email Data. Process the data to understand the voice of the Customer (intent mining, Top words, word cloud, classify topics). Identify issues, replace patterns and gain insight into sales chats.
10	Consider a scenario of Online Review and demonstrate the concept of sentiment analysis and emotion mining by applying various approaches like lexicon-based approach and rule-based

	approaches.
11	Apply NLP in Banking, Financial Services, and Insurance. Design Application to detect frauds and work with SMS data.
12	Demonstrate the use of NLP in designing Virtual Assistants. Apply LSTM, build conversational Bots.

Course Code	Course Title	Credits
PSCS203	**Web Mining**	**04**

Course Outcome: -

- To Understand the difference between Web Mining and Data mining.
- To Understand the Basics and Needs of Web Mining.
- To Understand Web-based Data.
- To Understand Opinion Mining and Sentiment classification.

Course Specific Outcome:

- Develop deep understanding of mining techniques exclusively for the Internet
- Understand and develop analytics for social media data.
- Design and implementation of various web analytical tool to understand complex unstructured data on the Internet for aiding individuals and Businesses to grow their business

UNIT 1: Introduction to Web Mining Web Mining, Data Mining, Basic Concepts, Difference, Mining Sequential Patterns on Prefix Span, Generating Rules from Sequential Patterns. Basic Concepts of Information Retrieval, Information Retrieval Models, Relevance feedback, Evaluation measures Text and Web Page Preprocessing, Inverted Index and Its Compression, latent semantic indexing, Web Search, Web Spamming	**15L**
UNIT 2: Opinion Mining and Web Usage Mining Web Information Retrieval, Sentiment Classification, Feature based	

Opinion Mining and Summarization, Comparative Sentence and Relation Mining, Opinion Search and Opinion Spam. Web Usage Mining.	**15L**
UNIT 3: Social Network & Link Analysis Link Analysis, Scrapy using python (without pipelining), Social Network Analysis, Co-Citation and Bibliographic Coupling, PageRank, HITS, Community Discovery	**15L**
UNIT 4: (Skill Enhancement) **Webpage crawlers and usage mining** Basic Crawler Algorithm, Implementation Issues, Universal Crawlers, Focused Crawlers, Topical Crawlers, Crawler Ethics and Conflicts, Data modelling and webpage usage mining., Discovery and analysis of web usage patterns, Recommender systems and collaborative filtering, query log mining	**15L**
TEXT BOOK: 1. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by Bing Liu (Springer Publications) 2017 publication	
REFERENCE BOOKS: 1. Data Mining: Concepts and Techniques, Second Edition Jiawei Han, Micheline Kamber (Elsevier Publications),2017 2. Web Mining: Applications and Techniques by Anthony Scime,2010 3. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti 2010	

Course Code	Course Title	Credits
PSCSP203	**Practical Course on Web Mining**	**02**
Note: - The following set of practical's should be implemented in Scrape, python: **Link:-Python : https://www.python.org/downloads/**		

1	Scrape an online E-Commerce Site for Data. 1. Extract product data from Amazon - be it any product and put these details in the MySQL database. One can use pipeline. Like 1 pipeline to process the scraped data and other to put data in the databaseand since Amazon has some restrictions on scraping of data, ask them to work on small set of requests otherwise proxies and all would have to be used. 2. Scrape the details like color, dimensions, material etc. Or customer ratings by features.
2	Scrape an online Social Media Site for Data. Use python to scrape information from twitter.
3	Page Rank for link analysis using python Create a small set of pages namely page1, page2, page3 and page4 apply random walk on the same
4	Perform Spam Classifier.
5	Demonstrate Text Mining and Webpage Pre-processing using meta information from the web pages (Local/Online).
6	Apriori Algorithm implementation in case study.
7	Develop a basic crawler for the web search for user defined keywords.
8	Develop a focused crawler for local search.
9	Develop a programme for deep search implementation to detect plagiarism in documents online.
10	Sentiment analysis for reviews by customers and visualize the same.

Course Code	**Course Title**	**Credits**
PSCS204	**Embedded and IoT Technology**	**04**

Course Outcome: -

- The course is designed to enable students, to understand and implement IoT in industry.
- Design and executive projects in IoT with Automatic Identification and Data Capture

Course Specific Outcome: -

- Understand basic components and functionalities of Embedded System including its hardware.
- Effectively achieve collaboration of various technologies in IoT and enable the same using software programming like Python, Embedded C etc.
- Understand case studies in IoT and replicate the same for more detailed analysis of the IoT development.

UNIT 1: Embedded System Basics Introduction to Embedded Systems, Design of Embedded Systems, Memory Architecture, Input/Output. Basic electronics: Semiconductors, Transistors, BJT, Flip Flops, Resistors, Capacitors, CMOS, MOSFET, FPGA, Relays. Microcontrollers, UART Communications, SPI-peripherals interface, I2C communication, Wireless Sensor Network (WSN)	**15L**
UNIT 2: Basics of IOT Introduction IoT:Evolution of the IoT concept, vision and definition of IoT, basic characteristics of IoT, distinguish the IoT from other related technologies, IoT enablers, IoT architectures, pros and cons of IoT, IoT architecture concepts for specific IoT applications. IoT Building Blocks -Hardware and Software:The basic IoT building blocks, smart thing components and capabilities, basics of Packet Tracer with reference to IoT, basics of IoT gateway, Cloud, and analytics Sensing Principles and Wireless Sensor Network:Sensor fundamentals and classification of sensors, physical principles of some common sensors, basics of WSNs, WSN architecture and types, layer-level functionality of WSN protocol stack.	**15L**
UNIT 3: Advanced IOT Technologies IoT Gateway:IoT architecture domains, IoT gateway architecture, IoT	**15L**

gateway functionalities, IoT gateway selection criteria, IoT gateway and edge computing, edge computing-based solution for specific IoT applications IoT Protocol Stack:Mapping of IoT protocols to layered IoT architecture, functionality of infrastructure, service discovery, and application layer protocols of IoT protocol stack IoT Cloud and Fog Computing:Components of IoT Cloud architecture, usage of application domains of IoT Cloud platforms, layered architecture of Fog computing, distinguish Fog computing from other related terms IoT Applications:Main applications of IoT, Implementation details of various IoT application domains	
UNIT 4: (Skill Enhancement) **Security, Communication and Data analytics in IOT** IoT Security: Security constraints in IoT systems, security requirements of IoT systems, IoT attacks, security threats at each layer of IoT architecture, design secure IoT system for specific application Social IoT: Nature of social relationships among IoT Devices, functionality of different components of social IoT architecture, social aspects of smart devices in IoT applications Packet Tracer and IoT: Basics of Packet Tracer and Blockly programming language, design simple IoT projects in Packet Tracer.	**15L**

TEXT BOOK:

1. Introduction to Embedded Systems – Cyber physical systems Approach Edward Ashford Lee &SanjitArunkumarSeshia Second Edition — MIT Press — 2017
2. Enabling the Internet of Things Fundamentals, Design and Applications by Muhammad Azhar Iqbal, Sajjad Hussain, Huanlai Xing, Muhammad Ali Imran Wiley Pub.1st Edition 2021

REFERENCE BOOKS:

1. Introduction Embedded Systems by K.V. Shibu Second Edition McGraw Hills–2017
2. Build your own IoT Platform Develop a Fully Flexible and Scalable Internet

of Things Platform in 24 Hours by Anand Tamboli 2019 Apress

Course Code	Course Title	Credits
PSCSP204	**Practical Course onEmbedded and IoT Technology**	**02**
Note: - The following set of practicals should be implemented in CodeVisionAVR, Proteus8, Cisco Packet Tracer, Keli V5, Python **Link: -Python:https://www.python.org/downloads/** **CodeVisionAVR :https://www.codevision.be/** **Proteus8:https://www.labcenter.com/downloads/** **Cisco Packet Tracer:https://www.netacad.com/courses/packet-tracer** **Keli V5: https://www.keil.com/download/**		
1	Design and implement basics embedded circuits 1. Automatic Alarm system- Alarm should get tigger by senor 2. Timer based buzzer 3. Sensor based Counting device	
2	Demonstrate communication between two embedded devices using UART port	
3	Built an IoT system to send ticket before entering the bus.	
4	Demonstrate an IoT based game which can be played between two player who are physically at a considerable distance.	
5	Develop a IoT application which will record the movement and orientation of your phone and give the data back to the PC	
6	Develop an IoT application that will raise an alarm whenever with going to rain outside based on the weather prediction data.	
7	Deploy an IoT application which will alert you by beeping or vibrating your phone whenever you get someone call your name.	
8	Develop an IoT application for monitoring water levels in tanks and automatically start the motor to fill the tank if the level goes below the critical level.	
9	Develop an IoT module to which measure the intensity of light and send the same to your PC/ Phone	
10	Develop an IoT application for Motion detection.	

5. EVALUATION

The evaluation of each paper shall contain two parts:

(i) Internal Assessment- 40 Marks.
(ii) External Assessment - 60 Marks.

The Internal to External assessment ratio shall be 2:3.

6. SCHEME OF EXAMINATIONS AND DISTRIBUTION PATTERN OF MARKS

SCHEME OF EXTERNAL EXAMINATIONOF SEMESTER- I AND SEMESTER – II

The External Theory examination of all semesters shall be conducted by the University at the end of each semester.

SCHEME OF INTERNAL EVALUATIONOF SEMESTER- I AND SEMESTER – II

Internal evaluation is to be done by continuous assessment which will consist of two components viz.

- Course Specific Project should be done for Each Course of Semester - I & II. The scope of the Course Specific Project may be within or beyond the scope of the 4 units and practical's prescribed for the Course.
- Assignments / QUIZ / Seminars / Case Studies.

The particulars of the Internal examination for each course of Semester- I and Semester – II are given below:

No	Semester	Course Code	Particular	Marks	Total Marks
1	I / II	PSCS101 / PSCS201	Course Specific Project	30	40
			Assignments / QUIZ / Seminars / Case Studies.	10	

2		PSCS102 / PSCS202	Course Specific Project	30	40
			Assignments / QUIZ / Seminars / Case Studies.	10	
3		PSCS103 / PSCS203	Course Specific Project	30	40
			Assignments / QUIZ / Seminars / Case Studies.	10	
4		PSCS104 / PSCS204	Course Specific Project	30	40
			Assignments / QUIZ / Seminars / Case Studies.	10	

SCHEME OF EXAMINATION FOR PRACTICAL COURSES

There will not be any Internal examination for practical courses of Semester- I and Semester – II.

EXTERNAL EXAMINATION FOR PRACTICAL COURSES

The particulars of the external examination for each practical course of Semester- I and Semester – II are given below:

No	Semester	Course Code	Particular	No of Questions	Marks	Total Marks
1	I / II	PSCSP101 / PSCSP201	Laboratory experiment question with internal choice	01	40	50
			Journal		05	
			VIVA		05	
2		PSCSP102/ PSCSP202	Laboratory experiment question with internal choice	01	40	50

			Journal		05	
			VIVA		05	
3		PSCSP103/ PSCSP203	Laboratory experiment question with internal choice	01	40	50
			Journal		05	
			VIVA		05	
4		PSCSP104/ PSCSP204	Laboratory experiment question with internal choice	01	40	50
			Journal		05	
			VIVA		05	

GUIDELINES OF JOURNALS

A student should maintain a Journal with Practical experiments reported for each of the practical course of Semester- I and Semester - II. Related theories/algorithms need to be explained in a journal.

Certified Journal with at least 70% of the list of the Practical need to be submitted at the time of the practical examination.

AUDIT COURSES

Students who have obtained Undergraduate Degree in subjects other than B.SC Computer science from a duly recognized University shall undertake **an Online Audit Courses provided below.**
They are supposed to submit the **online completion certificate** of the same to the concerned department at the end of each semester 1 and semester 2.

Semester I

Course Code	Course Name	Online Courses
PSCS101	Algorithm for Optimization	Design and analysis of algorithms https://onlinecourses.nptel.ac.in/noc21_cs68/preview
PSCS102	Software Defined Networking	Demystifying Networking https://onlinecourses.nptel.ac.in/noc21_cs94/preview
PSCS103	Applied Signal and Image Processing	Digital Signal Processing https://onlinecourses.nptel.ac.in/noc19_ee50/preview Digital Signal Processing and Applications https://onlinecourses.nptel.ac.in/noc21_ee20/preview
PSCS104	Advanced Database Techniques	Introduction to Database Systems https://nptel.ac.in/courses/106/106/106106220/ Introduction to Databases https://nptel.ac.in/courses/106/104/106104135/

Semester II

Course Code	Course Name	Online Courses
PSCS201	Applied Machine and Deep Learning	Introduction to Machine Learning https://onlinecourses.nptel.ac.in/noc21_cs85/preview
PSCS202	Natural Language	An Introduction to Artificial Intelligence https://onlinecourses.nptel.ac.in/noc21_cs42/preview

	Processing	The Joy of Computing using Python https://onlinecourses.nptel.ac.in/noc21_cs75/preview
PSCS203	Web Mining	Web Scraping without Scrapy https://www.udemy.com/course/webscraping-without-scrapy/
PSCS204	IoT Technology	Design for internet of things https://onlinecourses.nptel.ac.in/noc21_ee85/preview Introduction to Industry 4.0 and Industrial Internet of Things https://onlinecourses.nptel.ac.in/noc21_cs66/preview Introduction to internet of things https://onlinecourses.nptel.ac.in/noc21_cs63/preview

UNIVERSITY OF MUMBAI

Syllabus for Semester-III and Semester -IV
Program: M.Sc.
Course: Computer Science

(Credit Based Semester and Grading System with effect from the academic year 2016–2017)

Preamble

This syllabus is an extension of the syllabus for semester - I and semester – II of MSc Computer Science of University of Mumbai, which came into existence in the academic year 2015-2016. As mentioned in the syllabus of semester I and II, the intended philosophy of the new syllabus is to meet following guidelines:

- Give strong foundation on core Computer Science subjects.
- Expose student to emerging trends in a gradual and incremental way.
- Prepare student community for the demands of ICT industry.
- Offer specialization on a chosen area.
- Create research temper among students in the whole process.

This syllabus for the semester - III and semester – IV has tried to continue the steps initiated in the semester- I and semester –II to meet the goals set. This proposes two core compulsory subjects in semester III. The student has to continue with the tracks they have taken in the semester II as elective subjects. The syllabus also includes project proposal as part of the practical course in elective subjects.

The semester – IV will have one compulsory subject. Student can choose one subject as specialization out of the two electives he or she has been pursuing since the semester – II. That means, there will be four specializations in the semester IV as mentioned below:

- Cloud Computing
- Cyber and Information Security
- Business Intelligence and Big Data Analytics
- Machine Learning

The syllabus also offers an internship and project implementation in the semester – IV, each of which has weights equivalent to a full course. By introducing different electives as tracks in semester –II, espousing more of that tracks in the semester –III and offering the opportunity to choose the specialization based on the tracks pursed in semester –IV

will give the student the added advantage of high level competency in the advanced and emerging areas of computer science. This will definitely equip the student with industry readiness as internship in an IT or IT-related organization gives a practical exposure to what is learned and what is practiced. The strong foundation given in the core courses in different semesters will give enough confidence to the learner to face and adapt to the changing trends and requirements of industry and academia.

As one can easily notice, the syllabus offers lots of emphasis on student driven learning and learning through experience. Research is embedded in the course structure. By introducing Researching Computing in semester – I, Case study in semester – II, Project Proposal in semester – III and Project Implementation in semester – IV (which together has a weightage equivalent to almost two theory courses), the syllabus prepares a strong army of budding computer science researchers. The syllabus designed on the firm believe that by focusing on student driven research on cutting edge and emerging trends with lots of practical experience will make the learning more interesting and stimulating. It is hoped that the student community and teacher colleagues will appreciate the thrust, direction and treatment given in the syllabus.

We thank all our colleagues in the University of Mumbai for their inputs, suggestions and critical observations. We acknowledge the contributions of experts from premier institutions and industry for making the syllabus more relevant. We thank the chairperson and members of the present and previous Adhoc Board of Studies in Computer Science of University for their constant support. Thanks to one and all who have directly or indirectly helped in this venture.

Structure of the syllabus

This is the syllabus for the semester–III and semester–IV of MSc Computer Science program of University of Mumbai to be implemented from the year 2016-2017.

Semester-III

The syllabus offers four theory courses and two practical courses in semester-III. Of the four theory courses, two are compulsory courses. The remaining two are electives. Each elective course has two tracks (track A and track B for elective I and track C and track D for elective II). A student is expected to continue with the track they have chosen in semester-II.

The syllabus proposes four subjects in semester-III. Each subject has theory and practical components.

Semester–III: Theory courses

The four theory courses offered in semester-III are:

(i) Ubiquitous Computing

(ii) Social Network Analysis

(iii) Elective - I

- (a) Track A: Cloud Computing – II (Cloud Computing Technologies)
- (b) Track B: Cyber and Information Security – II (Cyber Forensics)

(iv) Elective – II

- (a) Track C: Business Intelligence and Big Data Analytics – II (Mining Massive Data sets)
- (b) Track D: Machine Learning – II (Advanced Machine Learning)

A student is expected to continue with the same tracks he or she has taken in semester-II for elective –I and elective –II. Each of these theory courses (compulsory as well as elective) is of four credits each and is expected to complete in 60 hours. The details are shown in the following table.

Semester III – Theory courses

Course Code	Course Nomenclature	Lecture In Hours	Credits
PSCS 301	Ubiquitous Computing	60	4
PSCS 302	Social Network Analysis	60	4
PSCS 3031	Elective I - Track A: Cloud Computing –II (Cloud Computing Technologies)	60	4
PSCS 3032	Elective I - Track B: Cyber and Information Security- II (Cyber Forensics)		
PSCS 3033	Elective II - Track C: Business Intelligence and Big Data Analytics –II (Mining Massive Data sets)	60	4
PSCS 3034	Elective II - Track D: Machine Learning –II (Advanced Machine Learning)		
Total Credits for Theory courses in Semester III			16

Semester–III: Practical Laboratory Courses

The syllabus proposes two laboratory courses of 4 credits each. The laboratory experiments from the first two theory courses (PSCS301 and PSCS302) are combined together and are proposed as the first practical course (PSCSP5). Similarly, the laboratory experiments from the elective courses are combined together and taken as the second practical course (PSCSP6). The following table summarizes the details of the practical courses in the semester –III.

Semester-III: Practical Laboratory Courses

Course code	Course Title	No of hours	Credits
PSCSP5	Ubiquitous Computing and Social Network Analysis	60+60= 120	04
PSCSP6	Elective I and Elective II	60+60= 120	04
Total Credits for Practical Laboratory courses in Semester–III			08

Project Proposal: The syllabus introduces a project proposal in the semester-III under lab course PSCSP6. As per this, a student is expected to select a topic for project based on the specialization he or she is planning to take in the semester-IV. Needless to say, the project proposal will be based on a topic related to the elective the student has been pursuing in semester –II and semester-III and intends to continue in semester-IV as specialization.

The proposal will contain introduction, related works, objectives and methodology. The implementation, experimental results and analysis will be part of the Project implementation in the semester-IV.

Semester –IV

The syllabus proposes two subjects in semester-IV, each with theory and practical components. In addition, there will be internship with industry and a project implementation. The important feature of the semester-IV is the specialization a student can choose. A student can choose a specialization based on the electives one has been pursuing since semester–II. Since there are two electives in semester-III, a student can drop one and choose the other as the specialization in semester–IV.

Semester–IV: Theory courses

The two theory courses offered in semester-IV are:

(i) Simulation and Modeling

(ii) Specialization

(a) Track A: Cloud Computing – III (Building Clouds and Services)

(b) Track B: Cyber and Information Security–III (Cryptography and Crypt Analysis)

(c) Track C: Business Intelligence and Big Data Analytics – III (Intelligent Data Analysis)

(d) Track D: Machine Learning – III (Computational Intelligence)

Each of these courses (core as well as the specialization) is expected to complete in 60 hours. The details are given in the following table.

Semester-IV: Theory courses

<table>
<tr><th>Course Code</th><th>Course Nomenclature</th><th>Lecture In Hours</th><th>Credits</th></tr>
<tr><td>PSCS 401</td><td>Simulation and Modeling</td><td>60</td><td>4</td></tr>
<tr><td>PSCS 4021</td><td>Specialization - Track A: Cloud Computing –III (Building Clouds and Services)</td><td rowspan="4">60</td><td rowspan="4">4</td></tr>
<tr><td>PSCS 4022</td><td>Specialization - Track B: Cyber and Information Security- II (Cryptography and Crypt Analysis)</td></tr>
<tr><td>PSCS 4023</td><td>Specialization - Track C: Business Intelligence and Big Data Analytics –III (Intelligent Data Analysis)</td></tr>
<tr><td>PSCS 4024</td><td>Specialization - Track D: Machine Learning –III (Computational Intelligence)</td></tr>
<tr><td colspan="3">Total Credits for Theory courses in Semester-IV</td><td>08</td></tr>
</table>

Semester–IV: Practical Laboratory courses

The syllabus proposes one laboratory course of 4 credits. The laboratory experiments from the two theory courses are combined together and are proposed as the first practical course (PSCSP7).

Semester-IV: Practical course

Course code	Course Title	No of hours	Credits
PSCSP7	Simulation & Modeling and Specialization	60+60= 120	04

Semester–IV: Internship with industry

The syllabus proposes an internship for about 8 weeks to 12 weeks to be done by a student. It is expected that a student chooses an IT or IT-related industry and formally works as a full time intern during the period. The student should subject oneself with an internship evaluation with proper documentation of the attendance and the type of work he or she has done in the chosen organization. Proper certification (as per the guidelines given in Appendix 1 and 2) by the person, to whom the student was reporting, with Organization's seal should be attached as part of the documentation.

Semester–IV: Internship

Course code	Course Title	No of hours	Credits
PSCSP8	Internship with industry	300	06

Semester–IV: Project Implementation

The syllabus proposes project implementation as part of the semester–IV. The project implementation is continuation of the project proposal the students has submitted and evaluated in semester-III. The student is expected to continue with the proposal made and examined in the semester-III and implement the same in the semester–IV. In addition, experimental set up, analysis of results, comparison with results of related works, conclusion and future prospects will be part of the project implementation. A student is expected to make a project implementation report and appear for a project viva. He or she needs to spend around 200 hours for the project implementation, which fetches 6 credits. The details are given below:

Semester–IV: Project Implementation

Course code	Course Title	No of hours	Credits
PSCSP9	Project Implementation	200	06

Detailed syllabus of semester– III

Course Code	Course Title	Credits
PSCS301	**Ubiquitous Computing**	**04**

Unit I: Basics of **Ubiquitous Computing**

Examples of Ubiquitous Computing Applications, Holistic Framework for UbiCom: Smart DEI, Modeling the Key Ubiquitous Computing Properties, Ubiquitous System Environment Interaction, Architectural Design for UbiCom Systems: Smart DEI Model, Smart Devices and Services, Service Architecture Models, Service Provision Life Cycle.

Unit II: Smart Mobiles, Cards and Device Networks

Smart Mobile Devices, Users, Resources and Code, Operating Systems for Mobile Computers and Communicator Devices, Smart Card Devices, Device Networks.

Human–Computer Interaction (HCI): Explicit HCI, Implicit HCI, User Interfaces and Interaction for Devices, Hidden UI Via Basic Smart Devices, Hidden UI Via Wearable and Implanted Devices, Human Centered Design (HCD).

Unit III: Smart Environments

Tagging, Sensing and Controlling, Tagging the Physical World, Sensors and Sensor Networks, Micro Actuation and Sensing: MEMS, Embedded Systems and Real Time Systems, Control Systems.

Unit IV: Ubiquitous Communication

Audio Networks, Data Networks, Wireless Data Networks, Universal and Transparent Audio, Video and Alphanumeric Data Network Access, Ubiquitous Networks, Network Design Issues.

Text book:

- Ubiquitous Computing Smart Devices, Environments and Interactions, Stefan Poslad, Wiley, 2009.

References:

- Ubiquitous Computing Fundamentals. John Krumm, Chapman & Hall/CRC 2009.
- Ambient intelligence, wireless networking and ubiquitous computing, Vasilakos, A., & Pedrycz, W. ArtechHouse, Boston, 2006.
- http://www.eecs.qmul.ac.uk/~stefan/ubicom.

Course Code	Course Title	Credits
PSCS302	Social Network Analysis	04

Unit I: Introduction to social network analysis (SNA)

Introduction to networks and relations- analyzing relationships to understand people and groups, binary and valued relationships, symmetric and asymmetric relationships, multimode relationships, Using graph theory for social networks analysis- adjacency matrices, edge-lists, adjacency lists, graph traversals and distances, depth-first traversal, breadth-first traversal paths and walks, Dijkstra's algorithm, graph distance and graph diameter, social networks vs. link analysis, ego-centric and socio-centric density.

Unit II: Networks, Centrality and centralization in SNA

Understanding networks- density, reachability, connectivity, reciprocity, group-external and group-internal ties in networks, ego networks, extracting and visualizing ego networks, structural holes, Centrality- degree of centrality, closeness and betweenness centrality, local and global centrality, centralization and graph centers, notion of importance within network, Google pagerank algorithm, Analyzing network structure- bottom-up approaches using cliques, N-cliques, N-clans, K-plexes, K-cores, F-groups and top-down approaches using components, blocks and cut-points, lambda sets and bridges, and factions.

Unit III: Measures of similarity and structural equivalence in SNA

Approaches to network positions and social roles- defining equivalence or similarity, structural equivalence, automorphic equivalence, finding equivalence sets, brute force and Tabu search, regular equivalence, equivalence of distances: Maxsim, regular equivalence, Measuring similarity/dissimilarity- valued relations, Pearson correlations covariance and cross-products, Understanding clustering- agglomerative and divisive clusters, Euclidean, Manhattan, and squared distances, binary relations, matches: exact, Jaccard, Hamming,

Unit IV: Two-mode networks for SNA

Understanding mode networks- Bi-partite data structures, visualizing two-mode data, quantitative analysis using two-mode Singular value decomposition (SVD) analysis,

two-mode factor analysis, two-mode correspondence analysis, qualitative analysis using two-mode core-periphery analysis, two-mode factions analysis, affiliation and attribute networks.

Text book:

- Introduction to Social Network Methods: Robert A. Hanneman, Mark Riddle, University of California, 2005 [Published in digital form and available at http://faculty.ucr.edu/~hanneman/nettext/index.html].
- Social Network Analysis for Startups- Finding connections on the social web: Maksim Tsvetovat, Alexander Kouznetsov, O'Reilly Media, 2011.
- Social Network Analysis- 3rd edition, John Scott, SAGE Publications, 2012.

Reference book:

- Exploratory Social Network Analysis with Pajek, Second edition: Wouter de Nooy, Andrej Mrvar, Vladimir Batagelj, Cambridge University Press, 2011.
- Analyzing Social Networks, Stephen P Borgatti, Martin G. Everett, Jeffrey C. Johnson, SAGE Publications, 2013.
- Statistical Analysis of Network Data with R: Eric D. Kolaczyk, Gábor Csárdi, Springer, 2014.
- Network Analysis: Methodological Foundations, (Editors) Ulrik Brandes, Thomas Erlebach. Springer, 2005.
- Models and Methods in Social Network Analysis: (Editors) Peter J. Carrington, John Scott,Stanley Wasserman, Cambridge University Press, 2005.

Course Code	Course Title	Credits
PSCS3031	Elective I- Track A: Cloud Computing -II (Cloud Computing Technologies)	04

Unit I: Parallel and Distributed Computing

Elements of parallel computing, elements of distributed computing, Technologies for distributed computing: RPC, Distributed object frameworks, Service oriented computing Virtualization – Characteristics, taxonomy, virtualization and cloud computing.

Unit II: Computing Platforms

Cloud Computing definition and characteristics, Enterprise Computing, The internet as a platform, Cloud computing services: SaaS, PaaS, IaaS, Enterprise architecture, Types of clouds.

Unit III: Cloud Technologies

Cloud computing platforms, Web services, AJAX, mashups, multi-tenant software, Concurrent computing: Thread programming, High-throughput computing: Task programming, Data intensive computing: Map-Reduce programming.

Unit IV: Software Architecture

Dev 2.0 platforms, Enterprise software: ERP, SCM, CRM

Custom enterprise applications and Dev 2.0, Cloud applications.

Text book:

- Enterprise Cloud Computing Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010
- Mastering In Cloud Computing, Rajkumar Buyya, Christian Vecchiola And Thamari Selvi S, Tata Mcgraw-Hill Education, 2013
- Cloud Computing: A Practical Approach, Anthony T Velte, Tata Mcgraw Hill, 2009

References:

- Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS), Michael J. Kavis, Wiley CIO, 2014
- Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Kris Jamsa, Jones & Bartlett Learning, 2013

Course Code	Course Title	Credits
PSCS3032	**Elective I- Track B: Cyber and Information Security- II (Cyber Forensics)**	**04**

Unit I: Computer Forensic Fundamentals: Introduction to Computer Forensics and objective, the Computer Forensics Specialist, Use of Computer Forensic in Law Enforcement, Users of Computer Forensic Evidence, Case Studies, Information Security Investigations. Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised, Internet Tracing Methods, Security and Wireless Technologies. Types of Computer Forensics Systems: Study different Security System: Internet, Intrusion Detection, Firewall, Storage Area, Network Disaster Recovery, Public Key Infrastructure, Wireless Network, Satellite Encryption, Instant Messaging (IM), Net Privacy, Identity Management, Biometric, Identity Theft.

Unit II: Data Recovery: Data Recovery and Backup, Role of Data Recovery, Hiding and Recovering Hidden Data. Evidence Collection: Need to Collect the Evidence, Types of Evidences, The Rules of Evidence, Collection Steps. Computer Image Verification and Authentication: Special Needs of Evidence Authentication. Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices, Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

Unit III: Network Forensics: Sources of Network Based Evidence, Principles of Internetworking, Internet Protocol Suite. Evidence Acquisition: Physical Interception, Traffic Acquisition Software, Active Acquisition. Traffic Analysis: Protocol Analysis, Packet Analysis, Flow Analysis, Higher-Layer Traffic analysis. Statistical Flow Analysis: Sensors, Flow Record Export Protocols, Collection and Aggregation, Analysis. Wireless: the IEEE Layer 2 Protocol Series, Wireless Access Point, Wireless Traffic Capture and Analysis, Common Attacks, Locating Wireless Devices. Network Intrusion Detection and

Analysis: NIDS/NIPS Functionality, Modes of Detection, Types of NIDS/NIPS, NIDS/NIPS Evidence Acquisition.

Unit IV: Network Devices and Mobile Phone Forensics: Sources of Logs, Network Architecture, Collecting and Analyzing Evidence, switches, routers, firewalls, interfaces Web Proxies: Need to Investigate Web Proxies, Functionality, Evidence, Squid, Web Proxy Analysis, Encrypted Web Traffic. Mobile Phone Forensics: Crime and Mobile Phones, Voice, SMS and Identification of Data Interception in GSM, Mobile Phone Tricks, SMS Security, Mobile Forensic.

Text book:

- Computer Forensics Computer Crime Scene Investigation, John R. Vacca, Second Edition, 2005.
- Network Forensics, Sherri Davidoff, Jonathan HAM, Prentice Hall, 2012.
- Mobile Phone Security and Forensic: A Practical Approach, Second Edition, Iosif I. Androulidkis, Springer, 2012.

References:

- Digital forensics: Digital evidence in criminal investigation", Angus M.Marshall, John – Wiley and Sons, 2008.
- Computer Forensics with FTK, Fernando Carbone, PACKT Publishing, 2014.
- Practical Mobile Forensics, Satish Bommisetty, Rohit Tamma, Heather Mahalik, PACKT Publishing, 2014.

Course Code	Course Title	Credits
PSCS3033	**Elective I- Track C: Business Intelligence and Big Data Analytics –II (Mining Massive Data sets)**	**04**

Unit I: Introduction To Big Data

Big data: Introduction to Big data Platform, Traits of big data, Challenges of conventional systems, Web data, Analytic processes and tools, Analysis vs Reporting, Modern data analytic tools, Statistical concepts: Sampling distributions, Re-sampling, Statistical Inference, Prediction error. Data Analysis: Regression modeling, Analysis of time Series: Linear systems analysis, Nonlinear dynamics, Rule induction, Neural networks: Learning and Generalization, Competitive Learning, Principal Component Analysis and Neural Networks, Fuzzy Logic: Extracting Fuzzy Models from Data, Fuzzy Decision Trees, Stochastic Search Methods.

Unit II: MAP REDUCE

Introduction to Map Reduce: The map tasks, Grouping by key, The reduce tasks, Combiners, Details of MapReduce Execution, Coping with node failures. Algorithms Using MapReduce: Matrix-Vector Multiplication, Computing Selections and Projections, Union, Intersection, and Difference, Natural Join. Extensions to MapReduce: Workflow Systems, Recursive extensions to MapReduce, Common map reduce algorithms.

Unit III: SHINGLING OF DOCUMENTS

Finding Similar Items, Applications of Near-Neighbor Search, Jaccard similarity of sets, Similarity of documents, Collaborative filtering as a similar-sets problem, Documents, k-Shingles, Choosing the Shingle Size, Hashing Shingles, Shingles built from Words. Similarity-Preserving Summaries of Sets, Locality-Sensitive hashing for documents. The Theory of Locality-Sensitive functions. Methods for high degrees of similarity.

Unit IV: MINING DATA STREAMS

Introduction to streams concepts – Stream data model and architecture, Stream computing, Sampling data in a stream, Filtering streams, Counting distinct elements in a stream, Estimating moments, Counting oneness in a Window, Decaying window, Real time analytics Platform(RTAP).

Text book:

- Mining of Massive Datasets, Anand Rajaraman and Jeffrey David Ullman, Cambridge University Press, 2012.
- Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Michael Minelli, Wiley, 2013

References:

- Big Data for Dummies, J. Hurwitz, et al., Wiley, 2013
- Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data, Paul C. Zikopoulos, Chris Eaton, Dirk deRoos, Thomas Deutsch, George Lapis, McGraw-Hill, 2012.
- Big data: The next frontier for innovation, competition, and productivity, James Manyika ,Michael Chui, Brad Brown, Jacques Bughin, Richard Dobbs, Charles Roxburgh, Angela Hung Byers, McKinsey Global Institute May 2011.
- Big Data Glossary, Pete Warden, O'Reilly, 2011.
- Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph, David Loshin, Morgan Kaufmann Publishers, 2013

Course Code	Course Title	Credits
PSCS3034	**Elective I- Track D: Machine Intelligence - II (Advanced Machine Learning Techniques)**	**04**

Unit I: Probability

A brief review of probability theory, Some common discrete distributions, Some common continuous distributions, Joint probability distributions, Transformations of random variables, Monte Carlo approximation, Information theory. Directed graphical models (Bayes nets): Introduction, Examples, Inference, Learning, Conditional independence properties of DGMs. Mixture models and EM algorithm: Latent variable models, Mixture models, Parameter estimation for mixture models, The EM algorithm.

Unit II: Kernels

Introduction, kernel function, Using Kernel inside GLMs, kernel trick, Support vector machines, Comparison of discriminative kernel methods.

Markov and hidden Markov models: Markov models, Hidden Markov Models (HMM), Inference in HMMs, Learning for HMMs. Undirected graphical models (Markov random fields): Conditional independence properties of UGMs, Parameterization of MRFs, Examples of MRFs, Learning, Conditional random fields (CRFs), applications of CRFs.

Unit III: Monte Carlo inference

Introduction, Sampling from standard distributions, Rejection sampling, Importance sampling, Particle filtering, Applications: visual object tracking, time series forecasting, Rao-Blackwellised Particle Filtering (RBPF).

Markov chain Monte Carlo (MCMC) inference: Gibbs sampling, Metropolis Hastings algorithm, Speed and accuracy of MCMC.

Unit IV: Graphical model structure learning

Structure learning for knowledge discovery, Learning tree structures, Learning DAG structure with latent variables, Learning causal DAGs, Learning undirected Gaussian graphical models, Learning undirected discrete graphical models. Deep learning: Deep generative models, Deep neural networks, Applications of deep networks.

Text book:

- Machine Learning: A Probabilistic Perspective: Kevin P Murphy, The MIT Press Cambridge (2012).

References:

- Introducing Monte Carlo Methods with R, Christian P. Robert, George Casella, Springer, 2010
- Introduction to Machine Learning (Third Edition): Ethem Alpaydın, The MIT Press (2015).
- Pattern Recognition and Machine Learning: Christopher M. Bishop, Springer (2006)

- Bayesian Reasoning and Machine Learning: David Barber, Cambridge University Press (2012).
- Statistical And Machine Learning Approaches For Network Analysis, Edited By Matthias Dehmer, Subhash C. Basak: John Wiley & Sons, Inc (2012)
- Practical Graph Mining with R: Edited by Nagiza-F-Samatova et al, CRC Press (2014)
- https://class.coursera.org/pgm/lecture/preview

List of practical Experiments for Semester –III

Course Code	Course Title	Credits
PSCSP301	**Ubiquitous Computing**	**02**

No	List of Practical Experiments
1	Design and develop location based messaging app
2	Design and develop chat messaging app which is a location-based
3	Design and develop app demonstrating Simple Downstream Messaging
4	Design and develop app demonstrating Send Upstream Messages
5	Design and develop app for Device Group Messaging
6	Implementing GCM Network Manager
7	Demonstrate use of OpenGTS (Open Source GPS Tracking System)
8	Context-Aware system Context-awareness is a key concept in ubiquitous computing. The Java Context-Awareness Framework (JCAF) is a Java-based context-awareness infrastructure and programming API for creating context-aware applications
9	Develop application demonstrating Human Computer Interaction
10	Write a Java Card applet

Course Code	Course Title	Credits
PSCSP302	Social Network Analysis	02

Sr No	List of Practical Experiments
1	Write a program to compute the following for a given a network: (i) number of edges, (ii) number of nodes; (iii) degree of node; (iv) node with lowest degree; (v) the adjacency list; (vi) matrix of the graph.
2	Perform following tasks: (i) View data collection forms and/or import one-mode/two-mode datasets; (ii) Basic Networks matrices transformations
3	Compute the following node level measures: (i) Density; (ii) Degree; (iii) Reciprocity; (iv) Transitivity; (v) Centralization; (vi) Clustering.
4	For a given network find the following: (i) Length of the shortest path from a given node to another node; (ii) the density of the graph; (iii) Draw egocentric network of node G with chosen configuration parameters.
5	Write a program to distinguish between a network as a matrix, a network as an edge list, and a network as a sociogram (or “network graph”) using 3 distinct networks representatives of each.
6	Write a program to exhibit structural equivalence, automatic equivalence, and regular equivalence from a network.
7	Create sociograms for the persons-by-persons network and the committee-by-committee network for a given relevant problem. Create one-mode network and two-node network for the same.
8	Perform SVD analysis of a network.
9	Identify ties within the network using two-mode core periphery analysis.
10	Find “factions” in the network using two-mode faction analysis.

Note:
One may use programming languages like R, Python, Pajek etc and open software/ tools like (i) EGONet; (ii) Ora; (iii) Netlogo; (iv) Pajek; and (v) NetDraw; to do the practical experiments.

Course Code	**Course Title**	**Credits**
PSCSP3031	**Practical Course on Elective I-Track A:Cloud Computing-II (Cloud Computing Technologies)**	**02**

Sr No	List of Practical Experiments
1	Execute & check the performance of existing algorithms using CloudSim.
2	Install a Cloud Analyst and Integrate with Eclipse/Netbeans. Monitor the performance of an Existing Algorithms.
3	Build an application on private cloud.
4	Demonstrate any Cloud Monitoring tool.
5	Evaluate a Private IAAS Cloud using TryStack.
6	Implement FOSS-Cloud Functionality - VDI (Virtual Desktop Infrastructure)
7	Implement FOSS-Cloud Functionality VSI (Virtual Server Infrastructure) Infrastructure as a Service (IaaS)
8	Implement FOSS-Cloud Functionality - VSI Platform as a Service (PaaS)
9	Implement FOSS-Cloud Functionality - VSI Software as a Service (SaaS)
10	Explore FOSS-Cloud Functionality- Storage Cloud

Course Code	Course Title	Credits
PSCSP3032	**Practical Course on Elective I-Track B: Cyber and Information Security- II (Cyber Forensics)**	**02**

Sr No	List of Practical Experiments
1	Write a program to take backup of mysql database
2	Write a program to restore mysql database
3	Use DriveImage XML to image a hard drive
4	Write a program to create a log file
5	Write a program to find a file in a directory
6	Write a program to find a word in a file
7	Create forensic images of digital devices from volatile data such as memory using Imager for: (i) Computer System; (ii) Server; (iii) Mobile Device
8	Access and extract relevant information from Windows Registry for investigation process using Registry View, perform data analysis and bookmark the findings with respect to: (i) Computer System; (ii) Computer Network; (iii) Mobile Device; (iv) Wireless Network
9	Generate a report based on the analysis done using Registry View for different case scenario of the following: (i) Computer System; (ii) Computer Network; (iii) Mobile Device; (iv) Wireless Network
10	Create a new investigation case using Forensic Tool: (i) Computer System; (ii) Computer Network; (iii) Mobile Device ;(iv) Wireless Network.

Course Code	Course Title	Credits
PSCSP3033	**Practical Course on Elective II-Track C: Business Intelligence and Big Data Analytics - II (Mining Massive Data sets -I)**	**02**

No	List of Practical Experiments
1	Generate regression model and interpret the result for a given data set.
2	Generate forecasting model and interpret the result for a given data set.
3	Write a map-reduce program to count the number of occurrences of each alphabetic character in the given dataset. The count for each letter should be case-insensitive (i.e., include both upper-case and lower-case versions of the letter; Ignore non-alphabetic characters).
4	Write a map-reduce program to count the number of occurrences of each word in the given dataset. (A word is defined as any string of alphabetic characters appearing between non-alphabetic characters like nature's is two words. The count should be case-insensitive. If a word occurs multiple times in a line, all should be counted)
5	Write a map-reduce program to determine the average ratings of movies. The input consists of a series of lines, each containing a movie number, user number, rating and a timestamp.
6	Write a map-reduce program: (i) to find matrix-vector multiplication; (ii) to compute selections and projections; (iii) to find union, intersection, difference, natural Join for a given dataset.
7	Write a program to construct different types of k-shingles for given document.
8	Write a program for measuring similarity among documents and detecting passages which have been reused.
9	Write a program to compute the n- moment for a given stream where n is given.
10	Write a program to demonstrate the Alon-Matias-Szegedy Algorithm for second moments.
Note: The experiments may be done using software/tools like Hadoop / WEKA / R / Java etc.	

Course Code	Course Title	Credits
PSCSP3034	**Practical Course on Elective II- Track D: Machine Intelligence - II (Advanced Machine Learning Techniques)**	**02**

Sr No	List of Practical Experiments
1	Find probability density function or probability mass function, cumulative distribution function and joint distribution function to calculate probabilities and quantiles for standard statistical distributions.
2	Create a Directed Acyclic Graph (DAG) using (i) set of formulae (ii) set of vectors and (iii) set of matrices. Find parents and children of nodes. Read conditional independence from DAG. Add and remove edges from graph.
3	Create a Bayesian network for a given narrative. Set findings and ask queries [One may use narratives like 'chest clinic narrative' and package gRain for the purpose].
4	Implement EM algorithm.
5	Use string kernel to find the similarity of two amino acid sequence where similarity is defined as the number of a substring in common.
6	Demonstrate SVM as a binary classifier.
7	Create a random graph and find its page rank.
8	Apply random walk technique to a multivariate time series.
9	Implement two stage Gibbs Sampler.
10	Implement Metropolis Hastings algorithm.

Detailed syllabus of semester – IV

Course Code	Course Title	Credits
PSCS401	**Simulation and Modeling**	**04**

Unit I: Introduction

Introduction to Simulation, Need of Simulation, Time to simulate, Inside simulation software: Modeling the progress of Time, Modeling Variability, Conceptual Modeling: Introduction to Conceptual modeling, Defining conceptual model, Requirements of the conceptual model, Communicating the conceptual model, Developing the Conceptual Model: Introduction, A framework for conceptual modeling, methods of model simplification.

Unit II: Model Verification and Validation

Data Collection and Analysis: Introduction, Data requirements, Obtaining data, Representing unpredictable variability, Selecting statistical distributions. Obtaining Accurate Results: Introduction, The nature of simulation models and simulation output, Issues in obtaining accurate simulation results, example model, dealing with initialization bias: warm-up and initial conditions, Selecting the number of replications and run-length. Searching the Solution Space: Introduction, The nature of simulation experimentation, Analysis of results from a single scenario, Comparing alternatives, Search experimentation, and Sensitive analysis. Verification, Validation and Confidence: Introduction, Defining Verification and Validation, The difficulties of verification and validation, Methods of verification and validation, Independent verification and validation.

Unit III: Modeling and simulation modeling

Types of models, Analytical vs Simulation modeling, Application of simulation modeling, Level of abstraction, Simulation Modeling. Methods, System Dynamics, Discrete Event Modeling, Agent Based modeling: Introduction to Agent, Agent-based modeling**,** Time in agent based models, Space in agent based models, Discrete space, Continuous space movement in continuous space, Communication between agents, Dynamic creation and destruction of agents, Statics on agent population, Condition triggered events and transition in agents. Building agents based models: The problem statement, Phases of

modeling, Assumptions, 3 D animation. Dynamics Systems: Stock and flow diagrams, examples of stock and flow diagrams. Multi-method modeling: Architecture, Technical aspects of combining modeling methods, Examples.

Unit IV: Design and behavior of models

Designing state-based behavior: Statecharts, State transitions, Viewing and debugging Statecharts at runtime, Statecharts for dynamic objects. Discrete events and Event model object: Discrete event, Event-the simplest low level model object, Dynamic events, and Exchanging data with external world. Presentation and animation: Working with shapes, groups and colors, Designing interactive models: using controls, Dynamic properties of controls, 3D Animation. Randomness in Models: Probability distributions, sources of randomness in the model, randomness in system dynamics model, random number generators, Model time, date and calendar: Virtual and real time: The model time, date and calendar, Virtual and real-time execution modes.

Text book:

- Simulation: The Practice of Model Development and Use by Stewart Robinson, John Wiley and Sons, Ltd, 2004.
- The Big Book of Simulation Modeling: Multi Method Modeling by Andrei Borshchev, 2013.

References:

- Agent Based Modeling and Simulation, Taylor S, 2014.
- Simulation Modeling Handbook: A Practical Approach, Christopher A. Chung, 2003.
- Object Oriented Simulation: A Modeling and Programming Perspective, Garrido, José M, 2009.
- Simulation, Modeling and Analysis, Averill M Law and W. David Kelton, "Tata McGraw Hill, Third Edition, 2003.
- Process Control: Modeling, Design and Simulation, Wayne Bequette W, Prentice Hall of India, 2003.

Course Code	Course Title	Credits
PSCS4021	**Specialization: Cloud Computing -III (Building Clouds and Services)**	**04**

Unit I: Cloud Reference Architectures and Security

The NIST definition of Cloud Computing, Cloud Computing reference architecture, Cloud Computing use cases, Cloud Computing standards. Cloud Computing Security-Basic Terms and Concepts, Threat Agents, Cloud Security Threats. Cloud Security Mechanisms, Encryption, Hashing, Digital Signature, Public Key Infrastructure (PKI), Identity and Access Management (IAM), Single Sign-On (SSO), Cloud-Based Security Groups, Hardened Virtual Server Images.

Unit II: Cloud Computing Mechanisms

Cloud Infrastructure Mechanisms, Logical Network Perimeter, Virtual Server, Cloud Storage Device, Cloud Usage Monitor, Resource Replication Ready-Made Environment. Specialized Cloud Mechanisms, Automated Scaling Listener, Load Balancer, SLA Monitor, Pay-Per-Use Monitor, Audit Monitor, Failover System, Hypervisor, Resource Cluster, Multi-Device Broker, State Management Database. Cloud Management Mechanisms, Remote Administration System, Resource Management System, SLA Management System, Billing Management System.

Unit III: Cloud Computing Architecture

Fundamental Cloud Architectures, Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture. Advanced Cloud Architectures, Hypervisor Clustering Architecture, Load Balanced Virtual Server Instances Architecture, Non-Disruptive Service Relocation Architecture, Zero Downtime Architecture, Cloud Balancing Architecture, Resource Reservation Architecture, Dynamic Failure Detection and Recovery Architecture, Bare-Metal Provisioning Architecture, Rapid Provisioning Architecture, Storage Workload Management Architecture.

Unit IV: Working with Clouds

Cloud Delivery Model Considerations, Cloud Delivery Models: The Cloud Provider Perspective, Building IaaS Environments, Equipping PaaS Environments, Optimizing SaaS Environments, Cloud Delivery Models: The Cloud Consumer Perspective. Cost Metrics and Pricing Models, Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations. Service Quality Metrics and SLAs, Service Quality Metrics, Service Availability Metrics, Service Reliability Metrics, Service Performance Metrics, Service Scalability Metrics, Service Resiliency Metrics.

Text book:

- Cloud Computing Concepts, Technology & Architecture, Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, Prentice Hall, 2013.
- Cloud Security - A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley Publishing, Inc., 2010.
- Open Stack Cloud Computing Cookbook, Kevin Jackson, Cody Bunch, Egle Sigler, Packt Publishing, Third Edition, 2015.

Reference:

- Tom Fifield, Diane Fleming, Anne Gentle, Lorin Hochstein, Jonathan Proulx, Everett Toews, and Joe, Topjian,OpenStack Operations Guide, O'Reilly Media, Inc, 2014.
- NIST Cloud Computing Standards Roadmap, Special Publication 500-291, Version 2, NIST, July 2013, http://www.nist.gov/itl/cloud/upload/NIST_SP-500-291_Version-2_2013_June18_FINAL.pdf
- https://www.openstack.org
- http://cloudstack.apache.org
- http://www.foss-cloud.org/en/wiki/FOSS-Cloud
- http://www.ubuntu.com/cloud/openstack/autopilot

Course Code	Course Title	Credits
PSCS4022	**Specialization: Cyber and Information Security (Cryptography and Crypt Analysis)**	**04**

Unit I: Introduction to Number Theory

Topics in Elementary Number Theory: O and notations, time estimates for doing arithmetic-divisibility and the Euclidean algorithm, Congruence: Definitions and properties, linear congruence, residue classes, Euler's phi function, Fermat's Little Theorem, Chinese Reminder Theorem, Applications to factoring, finite fields, quadratic residues and reciprocity: Quadratic residues, Legendre symbol, Jacobi Symbol. (proofs of the theorems are not expected to cover).

Unit II: Simple Cryptosystems

Shift Cipher, Substitution Cipher, Affine Cipher, Vigenère Cipher, Vermin Cipher, Hill Cipher, Permutation Cipher, Stream Cipher, Cryptanalysis of Affine Cipher, Substitution Cipher, Vigenère Cipher and Hill Cipher, Block Ciphers, Algorithm Modes, DES, Double DES, Triple DES, Meet-in-Middle Attack, AES, IDEA algorithm. Cryptographic Hash Functions: Hash Functions and Data Integrity, Security of Hash Functions, Secure Hash Algorithm, Message Authentication Code, Nested MACs, HMAC.

Unit III: RSA Cryptosystem

The RSA Algorithm, Primarily Testing, Legendre and Jacobi Symbols, The Solovay-Strassen Algorithm, The Miller-Rabin Algorithm, Factoring Algorithm: The pollard p-1 Algorithm, Dixon's Random Squares Algorithm, Attacks on RSA, The Rabin Cryptosystem. Public Key Cryptosystems: The idea of public key Cryptography, The Diffie-Hellman Key Agreement, ElGamal Cryptosystem, The Pollard Rho Discrete Logarithm Algorithm, Elliptic Curves, Knapsack problem.

Unit IV: Key Distribution and Key Agreement Scheme

Diffie-Hellman Key distribution and Key agreement scheme, Key Distribution Patterns, Mitchell-Piper Key distribution pattern, Station-to-station protocol, MTI Key Agreement

scheme. Public-Key Infrastructure: What is PKI?, Secure Socket Layer, Certificates, Certificate Life cycle, Trust Models: Strict Hierarchy Model, Networked PKIs, The web browser Model, Pretty Good Privacy.

Text book:

- Discrete Mathematics and Its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill, 2012.
- Cryptography Theory and Practice, 3rd Edition, Douglas R. Stinson, 2005.

Reference:

- Network Security and Cryptography, Atul Kahate, McGraw Hill, 2003.
- Cryptography and Network Security: Principles and Practices, William Stalling, Fourth Edition, Prentice Hall, 2013.
- Introduction to Cryptography with coding theory, second edition, Wade Trappe, Lawrence C. Washington, Pearson, 2005.

Course Code	Course Title	Credits
PSCS4023	**Specialization: Business Intelligence and Big Data Analytics (Intelligent Data Analysis)**	**04**

Unit I: Clustering

Distance/Similarity, Partitioning Algorithm: K-Means; K-Medoids, Partitioning Algorithm for large data set: CLARA; CLARANS, Hierarchical Algorithms: Agglomerative (AGNES); Divisive (DIANA), Density based clustering: DBSCAN, Clustering in Non-Euclidean Spaces, Clustering for Streams and Parallelism.

Unit II: Classification

Challenges, Distance based Algorithm: K nearest Neighbors and kD-Trees, Rules and Trees based Classifiers, Information gain theory, Statistical based classifiers: Bayesian classification, Document classification, Bayesian Networks. Introduction to Support

Vector Machines, Evaluation: Confusion Matrix, Costs, Lift Curves, ROC Curves, Regression/model trees: CHAID (Chi Squared Automatic Interaction Detector). CART (Classification And Regression Tree).

Unit III: Dimensionality Reduction

Introduction to Eigen values and Eigen vectors of Symmetric Matrices, Principal-Component Analysis, Singular-Value Decomposition, CUR Decomposition.

Unit IV: Link Analysis And Recommendation Systems

Link analysis: PageRank, Efficient Computation of PageRank, Topic-Sensitive PageRank, Link Spam. Recommendation Systems: A Model for Recommendation Systems, Content-Based Recommendations, Collaborative Filtering, Dimensionality Reduction.

Text book:

- Mining of Massive Datasets, Anand Rajaraman and Jeffrey David Ullman, Cambridge University Press, 2012.
- Data Mining: Introductory and Advanced Topics, Margaret H. Dunham, Pearson, 2013.

Reference:

- Big Data for Dummies, J. Hurwitz, et al., Wiley, 2013.
- Networks, Crowds, and Markets: Reasoning about a Highly Connected World, David Easley and Jon Kleinberg, Cambridge University Press, 2010.
- Lecture Notes in Data Mining, Berry, Browne, World Scientific, 2009.
- Data Mining: Concepts and Techniques third edition, Han and Kamber, Morgan Kaufmann, 2011.
- Data Mining Practical Machine Learning Tools and Techniques, Ian H. Witten, Eibe Frank, The Morgan Kaufmann Series in Data Management Systems, 2005.
- Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL and Graph, David Loshin, Morgan Kaufmann Publishers, 2013.

Course Code	Course Title	Credits
PSCS4024	Specialization: Machine Learning -III (Computational Intelligence)	04

Unit I: Artificial Neural Networks

The Artificial Neuron, Supervised Learning Neural Networks, Unsupervised Learning Neural Networks, Radial Basis Function Networks, Reinforcement Learning, Performance Issues.

Unit II: Evolutionary Computation

Introduction to Evolutionary Computation, Genetic Algorithms, Genetic Programming, Evolutionary Programming, Evolution Strategies, Differential Evolution, Cultural Algorithms, Co-evolution.

Unit III: Computational Swarm Intelligence

Particle Swarm Optimization(PSO) - Basic Particle Swarm Optimization, Social Network Structures, Basic Variations and parameters, Single-Solution PSO. Advanced Topics and applications. Ant Algorithms- Ant Colony Optimization Meta-Heuristic, Cemetery Organization and Brood Care, Division of Labor, Advanced Topics and applications.

Unit IV: Artificial Immune systems, Fuzzy Systems and Rough Sets

Natural Immune System, Artificial Immune Models, Fuzzy Sets, Fuzzy Logic and Reasoning, Fuzzy Controllers, Rough Sets.

Text book:

- Computational Intelligence- An Introduction (Second Edition): Andries P. Engelbrecht, John Willey & Sons Publications (2007).

Reference:

- Computational Intelligence And Feature Selection: Rough And Fuzzy Approaches, Richard Jensen Qiang Shen, IEEE Press Series On Computational Intelligence, A John Wiley & Sons, Inc., Publication, 2008.
- Computational Intelligence And Pattern Analysis In Biological Informatics, (Editors). Ujjwal Maulik, Sanghamitra Bandyopadhyay, Jason T. L.Wang, John Wiley & Sons, Inc, 2010.

- Neural Networks for Applied Sciences and Engineering: From Fundamentals to Complex Pattern Recognition 1st Edition, Sandhya Samarasinghe, Auerbach Publications, 2006.
- Introduction to Evolutionary Computing (Natural Computing Series) 2nd ed, A.E. Eiben , James E Smith, Springer; 2015.
- Swarm Intelligence, 1st Edition, Russell C. Eberhart, Yuhui Shi, James Kennedy, Morgan Kaufmann, 2001
- Artificial Immune System: Applications in Computer Security, Ying Tan, Wiley-IEEE Computer Society, 2016.
- Computational Intelligence and Feature Selection: Rough and Fuzzy Approaches 1st Edition, Richard Jensen, Qiang Shen, Wiley-IEEE Press, 2008

List of Practical Experiments for Semester –IV

Course Code	**Course Title**	**Credits**
PSCSP401	**Practical course on Simulation and modeling**	**02**

Sr No	List of Practical Experiments
1	Design and develop agent based model by • Creating the agent population • Defining the agent behavior • Add a chart to visualize the model output. [Use a case scenario like grocery store, telephone call center etc for the purpose].
2	Design and develop agent based model by • Creating the agent population • Defining the agent behavior • Adding a chart to visualize the model output • Adding word of mouth effect • Considering product discards

	• Considering delivery time [Use a case scenario like restaurant].
3	Design and develop agent based model by • Creating the agent population • Defining the agent behavior • Adding a chart to visualize the model output • Adding word of mouth effect • Considering product discards • Consider delivery time • Simulating agent impatience • Comparing model runs with different parameter values [Use a scenario like market model]
4	Design and develop System Dynamic model by • Creating a stock and flow diagram • Adding a plot to visualize dynamics • Parameter Variation • Calibration [Use a case scenario like spread of contagious disease for the purpose]
5	Design and develop a discrete-event model that will simulate process by: • Creating a simple model • Adding resources • Creating 3D animation • Modeling delivery [Use a case situation like a company's manufacturing and shipping].
6	Design and develop time-slice simulation for a scenario like airport model to design how passengers move within a small airport that hosts two airlines, each with their own gate. Passengers arrive at the airport, check in, pass the security checkpoint and then go to the waiting area. After boarding starts, each airline's representatives check their passengers' tickets before they allow them to board.

7	Verify and validate a model developed like bank model or manufacturing model
8	Create defense model to stimulate aircraft behavior
9	Stimulate the travelling sales man problem to compute the shortest path.
10	Stimulate the Urban dynamics to address the scenarios like: (a) The problem of public transport line (b) To compute the time taken for train to enter the station

Course Code	**Course Title**	**Credits**
PSCSP4021	**Practical Course on Specialization: Cloud Computing (Building Clouds and Services)**	**02**

Sr No	List of Practical Experiments
1	Develop a private cloud using an open source technology.
2	Develop a public cloud using an open source technology.
3	Explore Service Offerings, Disk Offerings, Network Offerings and Templates.
4	Explore Working of the following with Virtual Machines • VM Lifecycle • Creating VMs • Accessing VMs • Assigning VMs to Hosts
5	Explore Working of the following with Virtual Machines • Changing the Service Offering for a VM • Using SSH Keys for Authentication
6	Explore the working of the following: Storage Overview • Primary Storage

	• Secondary Storage
7	Explore the working of the following: Storage Overview • Working With Volumes • Working with Volume Snapshots
8	Explore managing the Cloud using following: • Tags to Organize Resources in the Cloud • Reporting CPU Sockets
9	Explore managing the Cloud using following: • Changing the Database Configuration • File encryption type
10	Explore managing the Cloud using following: • Administrator Alerts • Customizing the Network Domain Name

Note

Recommended Open Source Technologies for completing practical:

- FOSS-Cloud
- Try Stack
- Apache CloudStack
- OpenStack
- Canonical's OpenStack Autopilot

Recommended Configuration: Desktop PC Core I5 with minimum 250 GB Hard Drive and minimum 8 GB RAM

Course Code	Course Title	Credits
PSCSP4022	**Practical Course on Specialization: Cyber & Information Security (Cryptography and Crypt Analysis)**	**02**

Sr No	List of Practical Experiments
1	Write a program to implement following: • Chinese Reminder Theorem • Fermat's Little Theorem
2	Write a program to implement the (i) Affine Cipher (ii) Rail Fence Technique (iii) Simple Columnar Technique (iv) Vermin Cipher (v) Hill Cipher to perform encryption and decryption.
3	Write a program to implement the (i) RSA Algorithm to perform encryption and decryption.
4	Write a program to implement the (i) Miller-Rabin Algorithm (ii) pollard p-1 Algorithm to perform encryption and decryption.
5	Write a program to implement the ElGamal Cryptosystem to generate keys and perform encryption and decryption.
6	Write a program to implement the Diffie-Hellman Key Agreement algorithm to generate symmetric keys.
7	Write a program to implement the MD5 algorithm compute the message digest.
8	Write a program to implement different processes of DES algorithm like (i) Initial Permutation process of DES algorithm, (ii) Generate Keys for DES algorithm, (iii) S-Box substitution for DES algorithm.
9	Write a program to encrypt and decrypt text using IDEA algorithm.
10	Write a program to implement HMAC signatures.

Course Code	Course Title	Credits
PSCSP2023	**Practical Course on Specialization: Business Intelligence & Big Data Analytics (Intelligent Data Analysis)**	**02**

Sr No	List of Practical Experiments
1	Pre-process the given data set and hence apply clustering techniques like K-Means, K-Medoids. Interpret the result.
2	Pre-process the given data set and hence apply partition clustering algorithms. Interpret the result
3	Pre-process the given data set and hence apply hierarchical algorithms and density based clustering techniques. Interpret the result.
4	Pre-process the given data set and hence classify the resultant data set using tree classification techniques. Interpret the result.
5	Pre-process the given data set and hence classify the resultant data set using Statistical based classifiers. Interpret the result.
6	Pre-process the given data set and hence classify the resultant data set using support vector machine. Interpret the result.
7	Write a program to explain different functions of Principal Components.
8	Write a program to explain CUR Decomposition technique.
9	Write a program to explain links to establish higher-order relationships among entities in Link Analysis.
10	Write a program to implement step-by-step a Collaborative Filtering Recommender System.
The experiments may be done using software/ tools like R/Weka/Java etc.	

Course Code	Course Title	Credits
PSCSP2024	**Practical Course on Specialization: Machine Intelligence (Computational Intelligence)**	**02**

Sr No	List of Practical Experiments
1	Implement feed forward neural network for a given data.
2	Implement Self Organizing Map neural network.
3	Implement Radial Basis Function neural network with gradient descent.
4	Implement a basic genetic algorithm with selection, mutation and crossover as genetic operators.
5	Implement evolution strategy algorithm.
6	Implement general differential evolution algorithm.
7	Implement gbest and lbest of PSO.
8	Implement simple Ant colony optimization algorithm.
9	Implement basic artificial immune system algorithm.
10	Apply different defuzzification methods for centroid calculation of a given fuzzy rule base.

Note: The above practical experiments may use programming languages like C, Java, R etc.

Scheme of Examination for Theory Courses

There will be internal and external examination for the theory courses. The weightage of internal/external and scheme of examination will be as per common guidelines provided by the University for the PG courses in the faculty of Science.

Scheme of Examination for Practical Courses

There will not be any internal examination for practical courses.

External Examination for practical courses:

The evaluation of the external examination of practical course is given below:

Sr No	Semester	Course Code	Particular		No of questions	Marks per question	Total Marks
1	III	PSCSP5	Laboratory experiment question		2	40	80
			Journal		-	10	10
			Viva		-	10	10
		Marks for each course			100		
2	III	PSCSP6	Laboratory experiment question		2	25	50
			Journal		-	10	10
			Viva		-	10	10
			viva on Project Proposal	Documentation		10	30
				Presentation		10	
				Viva		10	
		Total Marks			100		

Sr No	Semester	Course Code	Particular			No of questions	Marks per question	Total Marks
1	IV	PSCSP7	Laboratory experiment question			2	40	80
			Journal			-	10	10
			Viva			-	10	10
		Total Marks					100	
2	IV	PSCSP8	Intern-ship	Internship conduct	Quality and relevance		40	100
					Documentation		30	
					Presentation		30	
				Internship Viva			50	50
			Total Marks				150	
3	IV	PSCSP9	Project Implementation	Project conduct	Quality and relevance		40	100
					Documentation		30	
					Presentation		30	
				Project viva			50	50
			Total Marks				150	

Guide lines for maintenance of journals:

A student should maintain a journal with at least six practical experiments for each part of the practical course. Certified journals need to be submitted at the time of the practical examination.

Guidelines for Project Proposal in Semester - III

- Student should take a topic related to the specialization he or she is planning to take in Semester-IV.
- Should have studied the related topics in the elective he or she has chosen in semester-II and semester- III
- A student is expected to devote at least 2 to 3 months of study as part of topic selection and its documentation.
- The student should be comfortable to implement the proposal in the semester – IV.

Guidelines for Documentation of Project Proposal in Semester –III

Student is expected to make a project proposal documentation which should contain the following:

- **Title:** A suitable title giving the idea about what work is proposed.
- **Introduction:** An introduction to the topic of around 3-5 pages, giving proper back ground of the topic discussed.
- **Related works:** A detailed survey of the relevant works done by others in the domain. Student is expected to refer at least 5 research papers in addition to text books and web-links in the relevant topic. It may be around 7 to 10 pages.
- **Objective:** A detailed objective of the proposal is needed. It may be of 1 to 2 pages.
- **Methodology:** A proper and detailed procedure of how to solve the problem discussed. It shall contain the techniques, tools, software and data to be used. It shall be of around 3 to 5 pages.

The report may be of around 20 pages, which needs to be signed by the teacher in charge and head of the Department. Students should submit the signed project proposal documentation at the time of viva as part of the University examination.

Guidelines for internship in Semester - IV

- Internship should be of 2 to 3 months with 8 to 12 weeks duration.
- A student is expected to find internship by himself or herself. However, the institution should assist their students in getting internship in good organizations.
- The home institution cannot be taken as the place of internship.
- A student is expected to devote at least 300 hours physically at the organization.
- Internship can be on any topic covered in the syllabus mentioned in the syllabus, not restricted to the specialization.
- Internship can be done, in one of the following, but not restricted to, types of organizations:
    - Software development firms
    - Hardware/ manufacturing firms
    - Any small scale industries, service providers like banks
    - Clinics/ NGOs/professional institutions like that of CA, Advocate etc
    - Civic Depts like Ward office/post office/police station/ punchayat.
    - Research Centres/ University Depts/ College as research Assistant for research projects or similar capacities.

Guidelines for making Internship Report in Semester –IV

A student is expected to make a report based on the internship he or she has done in an organization. It should contain the following:

- **Certificate:** A certificate in the prescribed Performa (given in appendix 1) from the organization where the internship done.
- **Evaluation form:** The form filled by the supervisor or to whom the intern was reporting, in the prescribed Performa (given in appendix 2).

- **Title:** A suitable title giving the idea about what work the student has performed during the internship.
- **Description of the organization:** A small description of 1 to 2 pages on the organization where the student has interned
- **Description about the activities done by the section where the intern has worked**: A description of 2 to 4 pages about the section or cell of the organization where the intern actually worked. This should give an idea about the type of activity a new employee is expected to do in that section of the organization.
- **Description of work allotted and actually done by the intern:** A detailed description of the work allotted and actual work performed by the intern during the internship period. Intern may give a weekly report of the work by him or her if needed. It shall be of around 7 to 10 pages.
- **Self assessment:** A self assessment by the intern on what he or she has learnt during the internship period. It shall contain both technical as well as inter personal skills learned in the process. It shall be of around 2 to 3 pages.

The internship report may be around 15 pages and this needs to be submitted to the external examiner at the time of University examination.

Guidelines for Research Implementation in Semester - IV

- Student should continue with topic proposed and evaluated at the semester – III.
- The topic has to be related with the specialization he or she has chosen in the semester – IV.
- A student is expected to devote at least 3 to 4 months of efforts for the implementation.
- Student should submit a detailed project implementation report at the time of viva.

Guidelines for Documentation of Project Proposal in Semester –IV

A Student should submit project implementation report with following details:

- **Title:** Title of the project (Same as the one proposed and evaluated at the semester II examination).
- **Implementation details:** A description of how the project has been implemented. It shall be of 2 to 4 pages.
- **Experimental set up and results:** A detailed explanation on how experiments were conducted, what software used and the results obtained. Details like screen shots, tables and graphs can come here. It shall be of 6 to 10 pages.
- **Analysis of the results:** A description on what the results means and how they have been arrived at. Different performing measures or statistical tools used etc may be part of this. It shall be of 4 to 6 pages.
- **Conclusion:** A conclusion of the project performed in terms of its outcome (May be half a page).
- **Future enhancement:** A small description on what enhancement can be done when more time and resources are available (May be half a page).
- **Program code:** The program code may be given as appendix.

The report may be of around 20 pages (excluding program code), which needs to be signed by the teacher in charge and head of the Department. Student should submit the signed project implementation report along with evaluated copy of the project proposal documentation (of semester –III) at the time of Project evaluation and viva as part of the University examination.

Appendix 1

(Proforma for the certificate for internship in official letter head)

This is to certify that Mr/Ms_____ of _____College/Institution worked as an intern as part of her MSc course in Computer Science of University of Mumbai. The particulars of internship are given below:

Internship starting date: _____

Internship ending date:_____

Actual number of days worked:_____

Tentative number of hours worked:_____ Hours

Broad area of work:_____

A small description of work done by the intern during the period:

_____

_____

_____

_____

_____

_____

Signature:

Name:

Designation:

Contact number:

Email:

(seal of the organization)

Appendix 2

(Proforma for the Evaluation of the intern by the supervisor/to whom the intern was reporting in the organization)

Professional Evaluation of intern

Name of intern:_____

College/institution:_____

[Note: Give a score in the 1-5 scale by putting √ in the respective cells]

Sr No	Particular	Excellent	Very Good	Good	Moderate	Satisfactory
1	Attendance					
2	Punctuality					
3	Adaptability					
4	Ability to shoulder responsibility					
5	Ability to work in a team					
6	Written and oral communication skills					
7	Problem solving skills					
8	Ability to grasp new concepts					
9	Ability to complete task					
10	Quality of work done					

Comments:

_____

_____

_____

Signature:

Name:

Designation:

Contact number:

Email:

(seal of the organization)

University of Mumbai

No. AAMS_UGS/ICC/2022-23/ 105

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology is invited to this office circular No. UG/166 of 2016-17 dated 19th November, 2016 relating to the revised syllabus F.Y.B.Sc.(Chemistry) (Sem . I & II) (CBCS).

They are hereby informed that the recommendations made by the Board of Studies in **Chemistry** at its meeting held on 09th June, 2022 and subsequently passed in the Faculty and then by the Board of Deans at its meeting held on 5th July, 2022 **vide** item No. 6.5 (R) have been accepted by the Academic Council at its meeting held on 11th July, 2022 **vide** item No. 6.5 (R) and that in accordance therewith, the revised syllabus of F.Y.B.Sc.(Chemistry) (Sem . I & II) (CBCS). has been brought into force with effect from the academic year 2022-23. (The same is available on the University's website www.mu.ac.in).

(Dr. Shailendra Deolankar)
I/c Registrar

MUMBAI – 400 032
11th October, 2022

To

The Principals of the Affiliated Colleges and Directors of the Recognized Institutions in Faculty of Science & Technology.

A.C/6.5(R)/11/07/2022

****

No. AAMS_UGS/ICC/ 2022-23/ 105

11th October, 2022

Copy forwarded with Compliments for information to:-

1) The Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies Chemistry,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Director, Department of Information & Communication Technology,
6) The Co-ordinator, MKCL.

(Dr. Shailendra Deolankar)
I/c Registrar

Desktop/Circular Faculty of Science/priya

Copy to :-

1. **The Deputy Registrar, Academic Authorities Meetings and Services (AAMS),**
2. **The Deputy Registrar, College Affiliations & Development Department (CAD),**
3. **The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Department (AEM),**
4. **The Deputy Registrar, Research Administration & Promotion Cell (RAPC),**
5. **The Deputy Registrar, Executive Authorities Section (EA),**
6. **The Deputy Registrar, PRO, Fort, (Publication Section),**
7. **The Deputy Registrar, (Special Cell),**
8. **The Deputy Registrar, Fort/ Vidyanagari Administration Department (FAD) (VAD), Record Section,**
9. **The Director, Institute of Distance and Open Learning (IDOL Admin), Vidyanagari,**

They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above circular and that on separate Action Taken Report will be sent in this connection.

1. **P.A to Hon'ble Vice-Chancellor,**
2. **P.A Pro-Vice-Chancellor,**
3. **P.A to Registrar,**
4. **All Deans of all Faculties,**
5. **P.A to Finance & Account Officers, (F.& A.O),**
6. **P.A to Director, Board of Examinations and Evaluation,**
7. **P.A to Director, Innovation, Incubation and Linkages,**
8. **P.A to Director, Board of Lifelong Learning and Extension (BLLE),**
9. **The Director, Dept. of Information and Communication Technology (DICT) (CCF & UCC), Vidyanagari,**
10. **The Director of Board of Student Development,**
11. **The Director, Department of Students Walfare (DSD),**
12. **All Deputy Registrar, Examination House,**
13. **The Deputy Registrars, Finance & Accounts Section,**
14. **The Assistant Registrar, Administrative sub-Campus Thane,**
15. **The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan,**
16. **The Assistant Registrar, Ratnagiri sub-centre, Ratnagiri,**
17. **The Assistant Registrar, Constituent Colleges Unit,**
18. **BUCTU,**
19. **The Receptionist,**
20. **The Telephone Operator,**
21. **The Secretary MUASA**

for information.

AC – 11/07/2022
ItemNo. 6.5 (R)

UNIVERSITYOF MUMBAI

Revised Syllabus for
F.Y.B.Sc.
(Chemistry)
Semester:I&II
(CBCS)

(Witheffectfrom the academic year 2022-23)

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	F.Y.B. Sc. (Chemistry)
2	Eligibility for Admission	**12th Science of all recognized Board**
3	Passing Marks	40%
4	Ordinances / Regulations (if any)	
5	No. of Years /Semesters	Two
6	Level	UG
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year: 2022-2023

Date:

Dr Vishwanath Patil
Chairman BoS in Chemistry

Signature:

Dr. Anuradha Majumdar
Dean, Science and Technology

Proposed syllabus for CBCS

F. Y. B. Sc. Chemistry

For the subject of chemistry, there shall be two papers for 45 lectures each comprising of three units of 15 L each.

Semester-I

1. Paper-I / II (General Chemistry) Unit-I will be for PhysicalChemistry
2. Paper-I / II Unit-II will be for Inorganic Chemistry
3. Paper- I / II Unit-III will be for OrganicChemistry.

Semester-II

1. Paper-I /II (General Chemistry) Unit-I will be for PhysicalChemistry
2. Paper-I / II Unit-II will be for Inorganic Chemistry
3. Paper-I / II Unit-III will be for OrganicChemistry

Choice Based Credit System F.Y.B.Sc. Chemistry
Syllabus To be implemented from the
Academic year 2022-2023

SEMESTER I

Course Code	Unit	Topic	Credits	L/per week
USCH101	I	Chemical Thermodynamics	2	1
		Chemical calculations		
	II	Atomic structure		1
		Periodic Table and periodicity		
	III	Basics of Organic Chemistry:		1
		Bonding and Structure of organic compounds		
		Fundamentals of organic reaction Mechanism		
USCH102	I	Chemical Kinetics	2	1
		Liquid States		
	II	Comparative Chemistry of Main Group elements		1
	III	Stereochemistry I		1
USCHP1	Chemistry Practical		2	6

SEMESTER II

Course Code	Unit	Topic	Credits	L/per week
USCH201	I	Gaseous State	2	1
		Electrochemistry – I		
		Chemical Equilibria and Thermodynamic Parameters		
	II	Concept of Qualitative Analysis		1
		Acid Base Theories		
	III	Chemistry of Aliphatic Hydrocarbons		1
USCH202	I	Ionic Equilibria	2	1
		Photochemistry Molecular Spectroscopy		
	II	Chemical Bond and Reactivity		1
		Oxidation Reduction Chemistry		
	III	Stereochemistry II		1
		Aromatic Hydrocarbons		
USCHP2	Chemistry Practical		2	6

Programme Outcomes
B.Sc. Chemistry

The student graduating with the Degree B.Sc Chemistry should be able to acquire;

i) Core competency: Students will acquire core competency in the subject Chemistry, and in allied subject areas.

ii) A systematic and coherent understanding of the fundamental concepts in Physical chemistry, Organic Chemistry, Inorganic Chemistry, Analytical Chemistry, and all other related allied chemistry subjects.

iii) Students will be able to use the evidence-based comparative chemistry approach to explain chemical synthesis and analysis.

iv) Students will be able to characterize, identify and separate components of organic or inorganic origin and will also be able to analyze them by making use of the modern instrumental methods learned.

v) Students will be able to understand the basic principle of equipmentand instruments used in the chemistry laboratory.

vi) Students will be able to demonstrate the experimental techniques and methods of their area of specialization in Chemistry

vii) The course curriculum also includes components that can be helpful to graduate students to develop critical thinking ability by way of solving problems/numerical using basic chemistry knowledge and concepts.

viii) Appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues, and key issues facing our society in terms of energy, health, and medicine.

ix) Lifelong learner: The course curriculum is designed to inculcate a habit of learning continuously through the use of advanced ICTtechniques and other available techniques/books/journals for personal academic growth as well as for increasing employability opportunity.

SEMESTER I
Paper I
UNIT I

1.1	**Chemical Thermodynamics (10 L)** **Thermodynamic terms;** System, surrounding, boundaries, types of system, Intensive and Extensive properties, State functions and path functions, Thermodynamic processes. **First law of thermodynamics:** Concept of heat (q), work (w), internal energy (U), enthalpy, heat capacity, relation between heat capacities, sign conventions, calculations of heat, work, internal energy and enthalpy (H). **Thermochemistry:** Heat of reactions, standard states, enthalpy of formation of molecules, enthalpy of combustion and its applications, calculations of bond energy, bond dissociation energy and resonance energy from thermochemical data, Kirchhoff's equation (Numerical problems expected wherever necessary)
1.2	**Chemical Calculations: (5L)** Methods of expressing concentration of solutions: Normality, Molarity, Formality, Mole fractions, Weight ratio, Volume ratio, Weight to volume ratio, ppm, ppb, millimoles, milliequivalents, Preparation of solutions. (Numerical problems expected wherever necessary)
	UNIT II
2.1	**Atomic structure:(8 L)**
	Historical perspectives of the atomic structure; J. J. Thomson Model, Rutherford's Atomic Model- alpha particle scattering experiment, Bohr's theory, its limitations and atomic spectrum of hydrogen atom. Structureof hydrogenatom. **Hydrogenicatoms:** 1. Simple principles of quantummechanics 2. Atomicorbitals i) Hydrogenic energylevels ii) Shells, subshells and orbitals iii) Electronspin iv) Radial shapes oforbitals v) Angular shapes oforbitals. Aufbauprinciple, Hund's rule of maximum multiplicity and Pauli exclusion principle
2.2	**Periodic Table and periodicity:(7 L)** **Long form of Periodic Table;** Classification for elements as main group, transition and inner transition elements. **Periodicity in the following properties:** Atomic and ionic size, electron gain enthalpy, ionization enthalpy, effective nuclear charge (Slater's rule), electronegativity, Pauling and Mulliken methods. (Numerical problemsexpected, wherever applicable.)
	Unit III
3	**Basics of Organic Chemistry**
3.1	**Classification and Nomenclature of Organic Compounds: (5L)** **Nomenclature of mono and bi-functional aliphatic compounds on the basis of priority order of the following classes of compounds**: Alkanes, alkenes, alkynes, haloalkanes, alcohols, ethers, aldehydes, ketones, carboxylic acids, carboxylic acid

	derivatives (acid halides, esters, anhydrides, amides), nitro compounds, nitriles and amines and their cyclic analogues.
3.2	**Bonding and Structure of organic compounds: (4L)** **Hybridization**: sp3, sp2, sp hybridization of carbon and nitrogen; sp3 and sp2 hybridizations of oxygen in Organic compounds (alcohol, ether, aldehyde, ketone, carboxylic acid, ester, cyanide, amine and amide) **Overlap of atomic orbitals:** Overlaps of atomic orbitals to form sigma and pi bonds, shapes of organic molecules. **Shapes of molecules;** Influence of hybridization on bond properties (as applicable to ethane, ethene, ethyne).
3.3	**Fundamentals of organic reaction mechanism: (6L)** **Electronic Effects:** Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications. Dipole moment**;** Organic acids and bases; their relative strengths. **Basic terms & concepts**:: Homolytic and Heterolytic fission with suitable examples. Electrophiles and Nucleophiles; Nucleophilicity and basicity, Electrophilicity and acidity. **Types (primary, secondary, tertiary, allyl, benzyl), shape and their relative stability of the following reactive intermediates**: i. Carbocations ii. Carbanions and iii. Free radicals **Introduction to types of organic reactions:** Addition, Elimination and Substitution reaction. (With one example of each)
	Semester- I **Paper – II** **Unit – I**
1.1	**Chemical Kinetics: (8L)** Rate of reaction, rate constant, measurement of reaction rates, order and molecularity of reaction, Integrated rate equation of first order and Second order reactions (with equal initial concentration of reactants) Determination of order of reaction by a) Integration method b) Graphical method c) Ostwald's isolation method d) Half time method, Effect of temperature on the rate of reaction, Concept of activation energy and its calculation from Arrhenius equation (derivation not expected). (Numerical problems expected wherever necessary).
1.2	**Liquid State: (7L)** **Surface tension:** Introduction, methods of determination of surface tension by drop number method **Viscosity:** Introduction, coefficient of viscosity, relative viscosity, specific viscosity, reduced viscosity, determination of viscosity by Ostwald viscometer **Refractive index**: Introduction, molar refraction and polarizability, determination of refractive index by Abbe's refractometer. **Liquid crystals**: Introduction, Classification and structure of thermotropic phases (Nematic, Smectic and Cholesteric phases), applications of liquid crystals. (Numerical problems expected wherever necessary).
	Unit II
2	**Comparative chemistry of MainGroupElements:(15L)**

	Metallic and non-metallic nature, oxidation states, electronegativity, anomalous behavior of second period elements, allotropy, catenation, diagonal relationship. Comparative chemistry of oxides and hydroxides of group I and group II elements. Some important compounds- **$NaHCO_3$, Na_2CO_3, CaO, $CaCO_3$**; oxides of carbon, oxides of Sulphur and Nitrogen with respect to environmental aspects like greenhouse effect, photochemical smog and acid rain.
	Unit III
3	**Stereochemistry I: (15L)** Projection formulae: Flying Wedge projection, Fischer Projection, Newman and Sawhorse Projection formulae (of erythro, threo isomers of tartaric acid and 2,3 - dichlorobutane) and their interconversions; **Geometrical isomerism in alkene and cycloalkanes**: cis–trans and syn-anti isomerism E/Z notations with C.I.P rules. **Optical Isomerism:** Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two similar and dissimilar chiral-centres, Diastereoisomers, meso structures, racemic mixture and resolution (methods of resolution not expected). **Relative and absolute configuration**: D/L and R/S designations. **Conformational analysis of alkanes** (ethane, propane and n-butane); Relative stability with energy diagrams

Semester II
Paper I
Unit I

1.1	**Gaseous State (6L)** Kinetic theory of gases, Maxwell-Boltzmann's distribution of velocities (Qualitative discussion), Ideal gas laws, Deviation from ideal gas laws, Ideal and real gases, Reasons for deviation from ideal gas laws, Compressibility factor, Boyle's temperature, van der Waals equation of state, Critical phenomena, Relation between critical constants and van der Waals constants. (Numerical problems expected wherever necessary)
1.2	**Electrochemistry - I (4 L)** Conductance, specific conductance, equivalent conductance, molar conductance, Variation of molar conductance with concentration of strong and weak electrolyte. Reversible electrodes, Electrode potential, standard electrode potential, Galvanic cells, Conventions to represent the galvanic cells, Concept of emf of cell. (Numerical problems expected wherever necessary)
1.3	**Chemical Equilibria and Thermodynamic Parameters (5L)** Second law of thermodynamics, concept of entropy, Physical significance of entropy, Concept of free energy, Helmholtz and Gibbs free energy, Variation of free energy with temperature and pressure, Spontaneity and Physical significance of free energy. Re Reversible and irreversible reactions, equilibrium constants (Kc and Kp), relationship between Kc and Kp. Thermodynamic derivation of equilibrium constant (Numerical problems expected wherever necessary)
	Unit II

2	**Concept of Qualitative Analysis:(8 L)**
2.1	Testing of Gaseous Evolutes, Role of Papers impregnated with Reagents in qualitative analysis (with reference to papers impregnated with starchiodide, potassium dichromate, lead acetate, dimethylglyoxime and oxinereagents).
	Precipitation equilibria,Formation of precipitates likeAgCl, AgBr, AgI and $BaSO_4$ effect of common ions, uncommon ions, oxidationstates, buffer action, complexing agents on precipitation of ionic compounds. (Balanced chemical equations)
2.2	**Acid Base Theories: (7L)**
	Arrhenius, Lowry- Bronsted, Lewis, Solvent – Solute concept of acids and bases, Usanovich concept, Hard and Soft acids and bases, Applications of HSAB.
	Unit III
3	**Chemistry of Aliphatic Hydrocarbons**
3.1	**Carbon - Carbon sigma bonds: (3L)** Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig reaction, free radical substitutions: Halogenation - relative reactivity and selectivity
3.2	**Carbon - Carbon pi bonds (12L):** **Formation of alkenes and alkynes by elimination reactions**: Mechanism of E1, E2, E1cb reaction. Saytzeff and Hofmann eliminations **Reactions of alkenes**: Electrophilic additions with mechanisms (Markownikoff / AntiMarkownikoff addition), Mechanism of oxymercuration - demercuration, hydroboration - oxidation, ozonolysis, reduction (catalytic and chemical), syn- and anti-dihydroxylation (oxidation), 1, 2- and 1, 4-addition reactions in conjugated dienes, Diels-Alder reaction. **Reaction of alkynes**: Acidity, Electrophilic and Nucleophilic additions with mechanisms. Hydration to form carbonyl compounds, Alkylation of terminal alkynes
	Semester II **Paper II** **Unit I**
1.1	**Ionic Equilibria: (7L)** Strong and weak electrolytes, degree of ionization, factors affecting degree of ionization,Ionization constant and ionic product of water, Ionization of weak acids and bases, Dissociation constants of mono-, di-, and tri-protic acids. pH scale, Buffer solutions, types of buffers, Derivation of Henderson equation for acidic and basic buffers, Buffer action, buffer capacity (Numerical problems expected, wherever necessary)
1.2	**Photochemistry (4L)** Laws of photochemistry, Quantum yield or efficiency, experimental determination of quantum yield, Reasons for low and high quantum yield, Primary and secondary processes. Photochemical reactions (with suitable examples), Photosensitizers and photosensitized reactions, Fluorescence, Phosphorescence and Chemiluminescence. (Numerical problems expected, wherever necessary)
1.3	**Molecular Spectroscopy: (4L)** Electromagnetic radiation, electromagnetic spectrum, Planck's equation, Interaction of electromagnetic radiation with matter; Absorption, Emission, Scattering, Electronic, Vibrational and Rotational transitions, Beer-Lamberts law.

	(Numerical problems expected, wherever necessary)
	Unit II
2.1	**Chemical Bond and Reactivity:(10 L)** Types of chemical bond, comparison between ionic and covalent bonds, polarizability (Fajan's Rule), shapes of molecules, Lewis dot structure, Sidgwick Powell Theory, basic VSEPR theory for AB_n type molecules with and without lone pair of electrons, isoelectronic principles, applications and limitations of VSEPR theory.
2.2	**Oxidation Reduction Chemistry: (5L)** Reductionpotentials, **Redox potentials: half reactions**; balancing redoxequations. **Applications of redoxchemistry**; Redox reagents in Volumetric analysis; a) I_2 b)$KMnO_4$
	Unit III
3.1	**Stereochemistry II: (5L)** **Cycloalkanes and Conformational Analysis: (5L)** Types of cycloalkanes and their relative stability, Baeyer strain theory, Conformational analysis of cyclohexane: Chair, Boat and Twist boat forms; Relative stability with energy diagram.
3.2	**Aromatic Hydrocarbons: (10L)** **Aromaticity:** Hückel's rule, anti-aromaticity, aromatic character of arenes, cyclic carbocations/carbanions and heterocyclic compounds with suitable examples. **Electrophilic aromatic substitution:** halogenation, nitration, sulphonation and Friedel-Crafts alkylation/acylation with their mechanism, Directing effects of the groups

Reference Books:

Unit – I

1) Concise Graduate Chemistry – I, II, III & IV, University Text Book of Chemistry, University of Mumbai.
2)
3) Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry 10th Ed., Oxford University Press (2014).
4) Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
5) Keith J. Laidler& John H. Meiser, Physical Chemistry, 2nd Ed. (2004)
6) Puri B. R., Sharma L. R. &Pathania M. S. Principles of Physical Chemistry, Vishal Publishing Company, 2008
7) Ball, D. W. Physical Chemistry Thomson Press, India (2007).
8) Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
9) Engel, T. & Reid, P. *Physical Chemistry3rd Ed.*, Prentice-Hall (2012).
10) McQuarrie, D. A. & Simon, J. D. *Molecular Thermodynamics* Viva Books Pvt. Ltd.: New Delhi (2004).
11) Levine, I .N. *Physical Chemistry* 6th Ed.,Tata Mc Graw Hill (2010).

Unit II

1. Concise Graduate Chemistry – I, II, III & IV, University Text Book of Chemistry, University of Mumbai.
2. Lee, J.D. Concise Inorganic Chemistry ELBS, 1991.
3. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry, Oxford, 1970
4. Atkins, P.W. & Paula, J. Physical Chemistry, 10^{th} Ed., Oxford University Press, 2014. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications, 1962.
5. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India

Unit III

1. Concise Graduate Chemistry – I, II, III & IV, University Text Book of Chemistry, University of Mumbai.
2. Morrison, R. T. and Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt Ltd. (Pearson Education).2012
3. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt Ltd. (Pearson Education).
4. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt Ltd. (Pearson Education).
5. Eliel, E. L. and Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994
6. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
7. Mc Murry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013
8. Paula Y Bruice, Organic Chemistry, 7th Ed, Pearson education, Asia.2014
9. Graham Solomon, Fryhle, Dnyder, Organic Chemistry, Wiley publication. 12 th Ed,2016
10. Bahl and Bahl, Advanced Organic chemistry by S. Chand publication.2010
11. Peter Sykes. Guidebook to the mechanism in Organic chemistry ,6^{th}edition
12. D. Nasipuri.Stereochemistry of Organic Compounds,Principles and Applications, Second Edition

Chemistry lab.
Semester – I

Unit – I: Physical Chemistry

1) To prepare 0.1 N succinic acid and standardize the NaOH solution of different concentrations.
2) To determine the rate constant for the hydrolysis of ester using HCl as catalyst.
3) To determine enthalpy of dissolution of salt (KNO_3)
4) Determination of viscosity of aqueous solutions of (i) polymer (ii) ethanol and (iii) sugar at room temperature (Any two solutions).

Unit II: Inorganic Chemistry

1) Commercial analysis of (anytwo)
    a) Mineralacid
    b) Organicacid
    c) Salt of weak acid and strongbase.
2) Titration using double indicator: analysis of solution of $Na_2CO_3$and$NaHCO_3$

3) Gravimetric analysis
   a) To determine the percent purity of sample of $BaSO_4$containingNH_4Cl
   b) To determine the percent purity of ZnO containing$ZnCO_3$.

Unit III Organic Chemistry

1. Purification of organic compounds by recrystallization selecting suitable solvent (minimum 2 organic compounds to be given)
   (Learners are expected to report a) Solvent for recrystallization. b) Percentage Yield and the melting points of the purified compound.)

2. Basic principles of Organic compound characterization (minimum 4 Solid organic compounds)
   (Learners should perform Preliminary Tests, Solubility Test, obtain melting point and recrystallize the compound with given solvent)

Minimum 80 percent of practical must be completed in each term

Chemistry lab:
Semester - II

Unit – I: Physical Chemistry

1) To determine the amount of strong acid in the given solution by titrating against strong base conductometrically.
2) To determine the dissociation constant of weak acid (Ka) using Henderson's equation and the method of incomplete titration pH metrically.
3) To verify Beer-Lamberts law using $KMnO_4$ solution by colorimetric method.
4) To standardize commercial sample of HCl using borax and to write material safety data of the chemicals involved.

Unit II Inorganic Chemistry

1) **Qualitative analysis: (5 mixtures to beanalyzed)**
   Semi-micro inorganic qualitative analysis of a sample containing two cations and two anions(from amongst):

   Cations (from amongst): Pb^{2+}, Ba^{2+}, Ca^{2+}, Sr^{2+}, Cu^{2+}, Cd^{2+}, Fe^{2+}, Ni^{2+}, Mn^{2+}, Mg^{2+}, Al^{3+}, Cr^{3+}, K^+,NH_4^+

Anions (from amongst):CO_3^{2-}, S^{2-}, SO^{2-}, NO_2^-, NO_3^-, Cl^-, Br^-, I^-, SO_4^{2-}, PO_4
(Scheme of analysis should avoid use of sulphide ion in any form for precipitation/ separation of cations.)

2) **Redox Titration:** To determine the percentage of copper(II) present in agiven sample by titration against a standard aqueous solution of sodium thiosulfate (iodometrytitration)

Unit III Organic Chemistry

1) **Characterization of organic compounds** containing C, H, (O), N, S, X elements (6 solid/liquid Organic compounds)
(Preliminary Tests, Solubility/Miscibility Test, Detection of Elements, Detection of Functional group and determination of Physical constant)

Minimum 80 percent of practicals must be completed in each term

Reference Books

Unit I:Physical Chemistry

1) Laboratory Experiments in Chemistry I & II, University Practical Book of Chemistry, University of Mumbai.
2) Athawale, V. D. & Mathur, P. *Experimental Physical Chemistry* New Age International: New Delhi (2001).
3) Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry,* R. Chand & Co.: New Delhi (2011).
4) Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. *Experiments in Physical Chemistry8th Ed.*; McGraw-Hill: New York (2003).
5) Halpern, A. M. &McBane, G. C. *Experimental Physical Chemistry3rd Ed.;* W.H. Freeman & Co.: New York (2003).

Unit II: Inorganic Chemistry

1) Laboratory Experiments in Chemistry I & II, University Practical Book of Chemistry, University of Mumbai.
2) Mendham, J., A. I. Vogel's *Quantitative Chemical Analysis 6thEd.,* Pearson, 2009.

Unit III: Organic Chemistry

1) Laboratory Experiments in Chemistry I & II, University Practical Book of Chemistry, University of Mumbai.
2) Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).
3) Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012).
4) Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of Practical Organic Chemistry, Prentice-Hall, 5th edition, 1996.

UNIVERSITY OF MUMBAI

Syllabus

for S. Y. B. Sc. / S. Y. B. A. Semester III & IV (CBCS)

Program: B. Sc. / B. A.

Course: Mathematics

with effect from the academic year 2021-2022

(UNIVERSITY OF MUMBAI)

Syllabus for: S.Y.B.Sc./S.Y.B.A.

Program: B.Sc./B/A.
Course: Mathematics
Choice based Credit System (CBCS)
with effect from the
academic year 2021-22

SEMESTER III

Calculus III				
Course Code	UNIT	TOPICS	Credits	L/Week
USMT 301, UAMT 301	I	Infinite Series	2	3
	II	Riemann Integration		
	III	Applications of Integrations and Improper Integrals		
Linear Algebra I				
USMT 302 ,UAMT 302	I	System of Equations and Matrices	2	3
	II	Vector Spaces over IR		
	III	Determinants, Linear Equations (Revisited)		
ORDINARY DIFFERENTIAL EQUATIONS				
USMT 303	I	Higher Order linear Differential Equations	2	3
	II	Systems of First Order Linear differential equations		
	III	Numerical Solutions of Ordinary Differential Equations		
PRACTICALS				
USMTP03		Practicals based on USMT301, USMT 302 and USMT 303	3	5
UAMTP03		Practicals based on UAMT301, UAMT 302	2	4

SEMESTER IV

Multivariable Calculus I				
Course Code	UNIT	TOPICS	Credits	L/Week
USMT 401, UAMT 401	I	Functions of several variables	2	3
	II	Differentiation of Scalar Fields		
	III	Applications of Differentiation of Scalar Fields and Differentiation of Vector Fields		
Linear Algebra II				
USMT 402 ,UAMT 402	I	Linear transformation, Isomorphism, Matrix associated with L.T.	2	3
	II	Inner product spaces		
	III	Eigen values, eigen vectors, diagonalizable matrix		
Numerical methods (Elective A)				
USMT 403A	I	Solutions of algebraic and transcendental equations	2	3
	II	Interpolation, Curve fitting, Numerical integration		
	III	Solutions of linear system of Equations and eigen value problems		
Statistical methods an their applications(Elective B)				
USMT 403B	I	Descriptive Statistics and random variables	2	3
	II	Probability Distribution and Correlation		
	III	Inferential Statistics		
PRACTICALS				
USMTP04		Practicals based on USMT401, USMT 402 and USMT 403	3	5
UAMTP04		Practicals based on UAMT401, UAMT 402	2	4

Teaching Pattern for Semester III

1. Three lectures per week per course. Each lecture is of 48 minutes duration.
2. One Practical (2L) per week per batch for courses USMT301, USMT 302 combined and one Practical (3L) per week for course USMT303 (the batches tobe formed as prescribed by the University. Each practical session is of 48 minutes duration.)

Teaching Pattern for Semester IV

1. Three lectures per week per course. Each lecture is of 48 minutes duration.
2. One Practical (2L) per week per batch for courses USMT301, USMT 302 combined and one Practical (3L) per week for course USMT303 (the batches to be formed as prescribed by the University. Each practical session is of 48 minutes duration.)

Semester-III

Note: Unless indicated otherwise, proofs of the results mentioned in the syllabus should be covered.

USMT301/ UAMT301: Calculus III

Unit I. Infinite Series (15 Lectures)

1. Infinite series in $\mathbb{R}$. Definition of convergence and divergence. Basic examples including geometric series. Elementary results such as if $\sum_{n=1}^{\infty} a_n$ is convergent, then $a_n \longrightarrow 0$ but converse not true. Cauchy Criterion. Algebra of convergent series.
2. Tests for convergence: Comparison Test, Limit Comparison Test, Ratio Test (without proof), Root Test (without proof), Abel Test (without proof) and Dirichlet Test (without proof). Examples. The decimal expansion of real numbers. Convergence of $\sum_{n=1}^{\infty} \frac{1}{n^p}$ $(p > 1)$. Divergence of harmonic series $\sum_{n=1}^{\infty} \frac{1}{n}$.
3. Alternating series. Leibnitz's Test. Examples. Absolute convergence, absolute convergence implies convergence but not conversely. Conditional Convergence.

Unit II. Riemann Integration (15 Lectures)

1. Idea of approximating the area under a curve by inscribed and circumscribed rectangles. Partitions of an interval. Refinement of a partition. Upper and Lower sums for a bounded real valued function on a closed and bounded interval. Riemann integrability and the Riemann integral.
2. Criterion for Riemann integrability. Characterization of the Riemann integral as the limit of a sum. Examples.

3. Algebra of Riemann integrable functions. Also, basic results such as if $f : [a, b] \longrightarrow \mathbb{R}$ is integrable, then (i) $\int_a^b f(x)\ dx = \int_a^c f(x)\ dx + \int_c^b f(x)\ dx$. (ii) $|f|$ is integrable and $\left| \int_a^b f(x)\ dx \right| \leq \int_a^b |f|(x)\ dx$ (iii) If $f(x) \geq 0$ for all $x \in [a, b]$ then $\int_a^b f(x)\ dx \geq 0$.
4. Riemann integrability of a continuous function, and more generally of a bounded function whose set of discontinuities has only finitely many points. Riemann integrability of monotone functions.

Unit III. Applications of Integrations and Improper Integrals (15 lectures)

1. Area between the two curves. Lengths of plane curves. Surface area of surfaces of revolution.
2. Continuity of the function $F(x) = \int_a^x f(t)\ dt, x \in [a, b]$, when $f : [a, b] \longrightarrow \mathbb{R}$ is Riemann integrable. First and Second Fundamental Theorems of Calculus.
3. Mean value theorem. Integration by parts formula. Leibnitz's Rule.
4. Definition of two types of improper integrals. Necessary and sufficient conditions for convergence.
5. Absolute convergence. Comparison and limit comparison tests for convergence.
6. Gamma and Beta functions and their properties. Relationship between them (without proof).

Reference Books

1. Sudhir Ghorpade, Balmohan Limaye; A Course in Calculus and Real Analysis (second edition); Springer.
2. R.R. Goldberg; Methods of Real Analysis; Oxford and IBH Pub. Co., New Delhi, 1970.
3. Calculus and Analytic Geometry (Ninth Edition); Thomas and Finney; Addison-Wesley, Reading Mass., 1998.
4. T. Apostol; Calculus Vol. 2; John Wiley.

Additional Reference Books

1. Ajit Kumar, S.Kumaresan; A Basic Course in Real Analysis; CRC Press, 2014
2. D. Somasundaram and B.Choudhary; A First Course in Mathematical Analysis, Narosa, New Delhi, 1996.
3. K. Stewart; Calculus, Booke/Cole Publishing Co, 1994.
4. J. E. Marsden, A.J. Tromba and A. Weinstein; Basic Multivariable Calculus; Springer.
5. R.G. Brtle and D. R. Sherbert; Introduction to Real Analysis Second Ed. ; John Wiley, New Yorm, 1992.

6. M. H. Protter; Basic Elements of Real Analysis; Springer-Verlag, New York, 1998.

USMT/UAMT 302: Linear Algebra I

Unit I. System of Equations, Matrices (15 Lectures)

1. Systems of homogeneous and non-homogeneous linear equations, Simple examples of finding solutions of such systems. Geometric and algebraic understanding of the solutions. Matrices (with real entries), Matrix representation of system of homogeneous and non-homogeneous linear equations. Algebra of solutions of systems of homogeneous linear equations. A system of homogeneous linear equations with number of unknowns more than the number of equations has infinitely many solutions.

2. Elementary row and column operations. Row equivalent matrices. Row reduction (of a matrix to its row echelon form). Gaussian elimination. Applications to solving systems of linear equations. Examples.

3. Elementary matrices. Relation of elementary row operations with elementary matrices. Invertibility of elementary matrices. Consequences such as (i) a square matrix is invertible if and only if its row echelon form is invertible. (ii) invertible matrices are products of elementary matrices. Examples of the computation of the inverse of a matrix using Gauss elimination method.

Unit II. Vector space over $\mathbb{R}$ (15 Lectures)

1. Definition of a vector space over $\mathbb{R}$. Subspaces; criterion for a nonempty subset to be a subspace of a vector space. Examples of vector spaces, including the Euclidean space $\mathbb{R}^n$, lines, planes and hyperplanes in $\mathbb{R}^n$ passing through the origin, space of systems of homogeneous linear equations, space of polynomials, space of various types of matrices, space of real valued functions on a set.

2. Intersections and sums of subspaces. Direct sums of vector spaces. Quotient space of a vector space by its subspace.

3. Linear combination of vectors. Linear span of a subset of a vector space. Definition of a finitely generated vector space. Linear dependence and independence of subsets of a vector space.

4. Basis of a vector space. Basic results that any two bases of a finitely generated vector space have the same number of elements. Dimension of a vector space. Examples. Bases of a vector space as a maximal linearly independent sets and as minimal generating sets.

Unit III. Determinants, Linear Equations (Revisited) (15 Lectures)

1. Inductive definition of the determinant of a $n \times n$ matrix (e. g. in terms of expansion along the first row). Example of a lower triangular matrix. Laplace expansions along an arbitrary row or column. Determinant expansions using permutations
$\Big(\det(A) = \sum_{\sigma \in S_n} \text{sign}(\sigma) \prod_{i=1}^{n} a_{\sigma(i),i} \Big)$.

2. Basic properties of determinants (Statements only); (i) $\det A = \det A^T$. (ii) Multilinearity and alternating property for columns and rows. (iii) A square matrix A is invertible if and only if $\det A \neq 0$. (iv) Minors and cofactors. Formula for A^{-1} when $\det A \neq 0$. (v) $\det(AB) = \det A \det B$.

3. Row space and the column space of a matrix as examples of vector space. Notion of row rank and the column rank. Equivalence of the row rank and the column rank. Invariance of rank upon elementary row or column operations. Examples of computing the rank using row reduction.

4. Relation between the solutions of a system of non-homogeneous linear equations and the associated system of homogeneous linear equations. Necessary and sufficient condition for a system of non-homogeneous linear equations to have a solution [viz., the rank of the coefficient matrix equals the rank of the augmented matrix $[A|B]$]. Equivalence of statements (in which A denotes an $n \times n$ matrix) such as the following.

   (i) The system $A\boldsymbol{x} = \boldsymbol{b}$ of non-homogeneous linear equations has a unique solution.
   (ii) The system $A\boldsymbol{x} = \boldsymbol{0}$ of homogeneous linear equations has no nontrivial solution.
   (iii) A is invertible.
   (iv) $\det A \neq 0$.
   (v) $\operatorname{rank}(A) = n$.

5. Cramers Rule. LU Decomposition. If a square matrix A is a matrix that can be reduced to row echelon form U by Gauss elimination without row interchanges, then A can be factored as $A = LU$ where L is a lower triangular matrix.

Reference books

1 Howard Anton, Chris Rorres, Elementary Linear Algebra, Wiley Student Edition).

2 Serge Lang, Introduction to Linear Algebra, Springer.

3 S Kumaresan, Linear Algebra - A Geometric Approach, PHI Learning.

4 Sheldon Axler, Linear Algebra done right, Springer.

5 Gareth Williams, Linear Algebra with Applications, Jones and Bartlett Publishers.

6 David W. Lewis, Matrix theory.

USMT303: Ordinary Differential Equations

Unit I. Higher order Linear Differential equations (15 Lectures)

1. The general $n-$th order linear differential equations, Linear independence, An existence and uniqueness theorem, the Wronskian, Classification: homogeneous and non-homogeneous, General solution of homogeneous and non-homogeneous LDE, The Differential operator and its properties.

2. Higher order homogeneous linear differential equations with constant coefficients, the auxiliary equations, Roots of the auxiliary equations: real and distinct, real and repeated, complex and complex repeated.

3. Higher order homogeneous linear differential equations with constant coefficients, the method of undermined coefficients, method of variation of parameters.

4. The inverse differential operator and particular integral, Evaluation of $\frac{1}{f(D)}$ for the functions like e^{ax}, $\sin ax$, $\cos ax$, x^m, $x^m \sin ax$, $x^m \cos ax$, $e^{ax}V$ and xV where V is any function of x,

5. Higher order linear differential equations with variable coefficients:
   The Cauchy's equation: $x^3\frac{d^3y}{dx^3} + x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = f(x)$ and
   The Legendre's equation: $(ax+b)^3\frac{d^3y}{dx^3} + (ax+b)^2\frac{d^2y}{dx^2} + (ax+b)\frac{dy}{dx} + y = f(x)$.

Reference Books

1. Units 5, 6, 7 and 8 of E.D. Rainville and P.E. Bedient; Elementary Differential Equations; Macmillan.

2. Units 5, 6 and 7 of M.D. Raisinghania; Ordinary and Partial Differential Equations; S. Chand.

Unit II. Systems of First Order Linear Differential Equations (15 Lectures)

(a) Existence and uniqueness theorem for the solutions of initial value problems for a system of two first order linear differential equations in two unknown functions x, y of a single independent variable t, of the form $\begin{cases} \frac{dx}{dt} = F(t,x,y) \\ \frac{dy}{dt} = G(t,x,y) \end{cases}$ (Statement only).

(b) Homogeneous linear system of two first order differential equations in two unknown functions of a single independent variable t, of the form $\begin{cases} \frac{dx}{dt} = a_1(t)x + b_1(t)y, \\ \frac{dy}{dt} = a_2(t)x + b_2(t)y. \end{cases}$.

(c) Wronskian for a homogeneous linear system of first order linear differential equations in two functions x, y of a single independent variable t. Vanishing properties of the Wronskian. Relation with linear independence of solutions.

(d) Homogeneous linear systems with constant coefficients in two unknown functions x, y of a single independent variable t. Auxiliary equation associated to a homogenous system of equations with constant coefficients. Description fo the general solution depending on the roots and their multiplicities of the auxiliary equation, proof of independence of the solutions. Real form of solutions in case the auxiliary equation has complex roots.

(e) Non-homogeneous linear system of linear system of two first order differential equations in two unknown functions of a single independent variable t, of the form
$\begin{cases} \frac{dx}{dt} = a_1(t)x + b_1(t)y + f_1(t), \\ \frac{dy}{dt} = a_2(t)x + b_2(t)y + f_2(t). \end{cases}$
General Solution of non-homogeneous system. Relation between the solutions of a system

of non-homogeneous linear differential equations and the associated system of homogeneous linear differential equations.

Reference Books

1. G.F. Simmons; Differential Equations with Applications and Historical Notes; Taylor's and Francis.

Unit III. Numerical Solution of Ordinary Differential Equations (15 lectures)

1. Numerical Solution of initial value problem of first order ordinary differential equation using:
   (i) Taylor's series method,
   (ii) Picard's method for successive approximation and its convergence,
   (iii) Euler's method and error estimates for Euler's method,
   (iv) Modified Euler's Method,
   (v) Runge-Kutta method of second order and its error estimates,
   (vi) Runge-Kutta fourth order method.
2. Numerical solution of simultaneous and higher order ordinary differential equation using:
   (i) Runge-Kutta fourth order method for solving simultaneous ordinary differential equation,
   (ii) Finite difference method for the solution of two point linear boundary value problem.

Reference Books

1. Units 8 of S. S. Sastry, Introductory Methods of Numerical Analysis, PHI.

Additional Reference Books

1. E.D. Rainville and P.E. Bedient, Elementary Differential Equations, Macmillan.
2. M.D. Raisinghania, Ordinary and Partial Differential Equations, S. Chand.
3. G.F. Simmons, Differential Equations with Applications and Historical Notes, Taylor's and Francis.
4. S. S. Sastry, Introductory Methods of Numerical Analysis, PHI.
5. K. Atkinson, W.Han and D Stewart, Numerical Solution of Ordinary Differential Equations, Wiley.

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USMT P03 / UAMT P03: Practicals

Suggested Practicals for USMT 301/ UAMT 301

1. Examples of convergent / divergent series and algebra of convergent series.
2. Tests for convergence of series.
3. Calculation of upper sum, lower sum and Riemann integral.
4. Problems on properties of Riemann integral.
5. Problems on fundamental theorem of calculus, mean value theorems, integration by parts, Leibnitz rule.
6. Convergence of improper integrals, different tests for convergence. Beta Gamma Functions.
7. Miscellaneous Theoretical Questions based on full paper.

Suggested Practicals for USMT302 / UAMT 302

1. Systems of homogeneous and non-homogeneous linear equations.
2. Elementary row/column operations and Elementary matrices.
3. Vector spaces, Subspaces.
4. Linear Dependence/independence, Basis, Dimension.
5. Determinant and Rank of a matrix.
6. Solution to a system of linear equations, LU decomposition
7. Miscellaneous Theory Questions.
8. Miscellaneous theory questions from units I, II and III.

Suggested Practicals For USMT 303

1. Finding the general solution of homogeneous and non-homogeneous higher order linear differential equations.
2. Solving higher order linear differential equations using method of undetermined coefficients and method of variation of parameters.
3. Solving a system of first order linear ODES have auxiliary equations with real and complex roots.
4. Finding the numerical solution of initial value problems using Taylor's series method, Picard's method, modified Euler's method, Runge-Kutta method of fourth order and calculating their accuracy.
5. Finding the numerical solution of simultaneous ordinary differential equation using fourth order Runge-Kutta method.
6. Finding the numerical solution of two point linear boundary value problem using Finite difference method.

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Semester-IV

Note: Unless indicated otherwise, proofs of the results mentioned in the syllabus should be covered.

USMT 401/ UAMT 401: Multivariable Calculus I

UNIT I. Functions of Several Variables (15 Lectures)

1. Review of vectors in $\mathbb{R}^n$ [with emphasis on $\mathbb{R}^2$ and $\mathbb{R}^3$] and basic notions such as addition and scalar multiplication, inner product, length (norm), and distance between two points.

2. Real-valued functions of several variables (Scalar fields). Graph of a function. Level sets (level curves, level surfaces, etc). Examples. Vector valued functions of several variables (Vector fields). Component functions. Examples.

3. Sequences, Limits and Continuity: Sequence in $\mathbb{R}^n$ [with emphasis on $\mathbb{R}^2$ and $\mathbb{R}^3$] and their limits. Neighbourhoods in $\mathbb{R}^n$. Limits and continuity of scalar fields. Composition of continuous functions. Sequential characterizations. Algebra of limits and continuity (Results with proofs). Iterated limits.
   Limits and continuity of vector fields. Algebra of limits and continuity vector fields. (without proofs).

4. Partial and Directional Derivatives of scalar fields: Definitions of partial derivative and directional derivative of scalar fields (with emphasis on $\mathbb{R}^2$ and $\mathbb{R}^3$). Mean Value Theorem of scalar fields.

UNIT II. Differentiation of Scalar Fields (15 Lectures)

1. Differentiability of scalar fields (in terms of linear transformation). The concept of (total) derivative. Uniqueness of total derivative of a differentiable function at a point. Examples of functions of two or three variables. Increment Theorem. Basic properties including (i) continuity at a point of differentiability, (ii)existence of partial derivatives at a point of differentiability, and (iii) differentiability when the partial derivatives exist and are continuous.

2. Gradient. Relation between total derivative and gradient of a function. Chain rule. Geometric properties of gradient. Tangent planes.

3. Euler's Theorem.

4. Higher order partial derivatives. Mixed Partial Theorem (n=2).

UNIT III. Applications of Differentiation of Scalar Fields and Differentiation of Vector Fields (15 lectures)

1. Applications of Differentiation of Scalar Fields: The maximum and minimum rate of change of scalar fields. Taylor's Theorem for twice continuously differentiable functions. Notions of local maxima, local minima and saddle points. First Derivative Test. Examples. Hessian matrix. Second Derivative Test for functions of two variables. Examples. Method of Lagrange Multipliers.

2. Differentiation of Vector Fields: Differentiability and the notion of (total) derivative. Differentiability of a vector field implies continuity, Jacobian matrix. Relationship between total derivative and Jacobian matrix. The chain rule for derivative of vector fields (statements only).

Reference books

1. T. Apostol; Calculus, Vol. 2 (Second Edition); John Wiley.
2. Sudhir Ghorpade, Balmohan Limaye; A Course in Multivariable Calculus and Analysis (Second Edition); Springer.
3. Walter Rudin; Principles of Mathematical Analysis; McGraw-Hill, Inc.
4. J. E. Marsden, A.J. Tromba and A. Weinstein, Basic Multivariable Calculus; Springer.
5. D.Somasundaram and B.Choudhary; A First Course in Mathematical Analysis, Narosa, New Delhi, 1996.
6. K. Stewart; Calculus; Booke/Cole Publishing Co, 1994.

Additional Reference Books

1. Calculus and Analytic Geometry, G.B. Thomas and R. L. Finney, (Ninth Edition); Addison-Wesley, 1998.
2. Howard Anton; Calculus- A new Horizon,(Sixth Edition); John Wiley and Sons Inc, 1999.
3. S L Gupta and Nisha Rani; Principles of Real Analysis; Vikas Publishing house PVT LTD.
4. Shabanov, Sergei; Concepts in Calculus, III: Multivariable Calculus; University Press of Florida, 2012.
5. S C Malik and Savita Arora; Mathematical Analysis; New Age International Publishers.

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USMT402/UAMT402: Linear Algebra II

UNIT I. Linear Transformations

1. Definition of a linear transformation of vector spaces; elementary properties. Examples. Sums and scalar multiples of linear transformations. Composites of linear transformations. A Linear transformation of $V \longrightarrow W$, where V, W are vector spaces over $\mathbb{R}$ and V is a finite-dimensional vector space is completely determined by its action on an ordered basis of V.
2. Null-space (kernel) and the image (range) of a linear transformation. Nullity and rank of a linear transformation. Rank-Nullity Theorem (Fundamental Theorem of Homomorphisms).
3. Matrix associated with linear transformation of $V \longrightarrow W$ where V and W are finite dimensional vector spaces over $\mathbb{R}$.. Matrix of the composite of two linear transformations. Invertible linear transformations (isomorphisms), Linear operator, Effect of change of bases on matrices of linear operator.

4. Equivalence of the rank of a matrix and the rank of the associated linear transformation. Similar matrices.

UNIT II. Inner Products and Orthogonality

1. Inner product spaces (over $\mathbb{R}$). Examples, including the Euclidean space $\mathbb{R}^n$ and the space of real valued continuous functions on a closed and bounded interval. Norm associated to an inner product. Cauchy-Schwarz inequality. Triangle inequality.

2. Angle between two vectors. Orthogonality of vectors. Pythagoras theorem and some geometric applications in $\mathbb{R}^2$. Orthogonal sets, Orthonormal sets. Gram-Schmidt orthogonalizaton process. Orthogonal basis and orthonormal basis for a finite-dimensional inner product space.

3. Orthogonal complement of any set of vectors in an inner product space. Orthogonal complement of a set is a vector subspace of the inner product space. Orthogonal decomposition of an inner product space with respect to its subspace. Orthogonal projection of a vector onto a line (one dimensional subspace). Orthogonal projection of an inner product space onto its subspace.

UNIT III. Eigenvalues, Eigenvectors and Diagonalisation

1. Eigenvalues and eigenvectors of a linear transformation of a vector space into itself and of square matrices. The eigenvectors corresponding to distinct eigenvalues of a linear transformation are linearly independent. Eigen spaces. Algebraic and geometric multiplicity of an eigenvalue.

2. Characteristic polynomial. Properties of characteristic polynomials (only statements). Examples. Cayley-Hamilton Theorem. Applications.

3. Invariance of the characteristic polynomial and eigenvalues of similar matrices.

4. Diagonalisable matrix. A real square matrix A is diagonalisable if and only if there is a basis of $\mathbb{R}^n$ consisting of eigenvectors of A. (Statement only - $A_{n\times n}$ is diagonalisable if and only if sum of algebraic multiplicities is equal to sum of geometric multiplicities of all the eigenvalues of $A\ = n$). Procedure for diagonalising a matrix.

5. Spectral Theorem for Real Symmetric Matrices (Statement only). Examples of orthogonal diagonalisation of real symmetric matrices. Applications to quadratic forms and classification of conic sections.

Reference books

1. Howard Anton, Chris Rorres; Elementary Linear Algebra; Wiley Student Edition).

2. Serge Lang; Introduction to Linear Algebra; Springer.

3. S Kumaresan; Linear Algebra - A Geometric Approach; PHI Learning.

4. Sheldon Axler; Linear Algebra done right; Springer.

5. Gareth Williams; Linear Algebra with Applications; Jones and Bartlett Publishers.

6. David W. Lewis; Matrix theory.

USMT403A: Numerical Methods (Elective A)

Unit I. Solution of Algebraic and Transcendental Equations (15L)

1. Measures of Errors: Relative, absolute and percentage errors, Accuracy and precision: Accuracy to n decimal places, accuracy to n significant digits or significant figures, Rounding and Chopping of a number, Types of Errors: Inherent error, Round-off error and Truncation error.

2. Iteration methods based on first degree equation: Newton-Raphson method. Secant method. Regula-Falsi method.
   Derivations and geometrical interpretation and rate of convergence of all above methods to be covered.

3. General Iteration method: Fixed point iteration method.

Unit II. Interpolation, Curve fitting, Numerical Integration(15L)

1. Interpolation: Lagrange's Interpolation. Finite difference operators: Forward Difference operator, Backward Difference operator. Shift operator. Newton's forward difference interpolation formula. Newton's backward difference interpolation formula.
   Derivations of all above methods to be covered.

2. Curve fitting: linear curve fitting. Quadratic curve fitting.

3. Numerical Integration: Trapezoidal Rule. Simpson's 1/3 rd Rule. Simpson's 3/8th Rule. Derivations all the above three rules to be covered.

Unit III. Solution Linear Systems of Equations, Eigenvalue problems(15L)

1. Linear Systems of Equations: LU Decomposition Method (Dolittle's Method and Crout's Method). Gauss-Seidel Iterative method.

2. Eigenvalue problems: Jacobi's method for symmetric matrices. Rutishauser method for arbitrary matrices.

Reference Books:

1. Kendall E. and Atkinson; An Introduction to Numerical Analysis; Wiley.

2. M. K. Jain, S. R. K. Iyengar and R. K. Jain; Numerical Methods for Scientific and Engineering Computation; New Age International Publications.

3. S. Sastry; Introductory methods of Numerical Analysis; PHI Learning.

4. An introduction to Scilab-Cse iitb.

Additional Reference Books

1. S.D. Comte and Carl de Boor; Elementary Numerical Analysis, An algorithmic approach; McGrawHillll International Book Company.

2. Hildebrand F.B.; Introduction to Numerical Analysis; Dover Publication, NY.

3. Scarborough James B.; Numerical Mathematical Analysis; Oxford University Press, New Delhi.

USMT403B Statistical Methods and their Applications (Elective B)

Unit I. Descriptive Statistics and random variables (15 Lectures)
Measures of location (mean, median, mode), Partition values and their graphical locations, measures of dispersion, skewness and kurtosis, Exploratory Data Analysis (Five number summary, Box Plot, Outliers), Random Variables (discrete and continuous), Expectation and variance of a random variable.

Unit II. Probability Distributions and Correlation (15 Lectures)
Discrete Probability Distribution (Binomial, Poisson), Continuous Probability Distribution: (Uniform, Normal), Correlation, Karl Pearson's Coefficient of Correlation, Concept of linear Regression, Fitting of a straight line and curve to the given data by the method of least squares, relation between correlation coefficient and regression coefficients.

Unit III. Inferential Statistics (15 lectures)
Population and sample, parameter and statistic, sampling distribution of Sample mean and Sample Variance, concept of statistical hypothesis, critical region, level of significance, confidence interval and two types of errors, Tests of significance (t-test, Z-test, F-test, Chi-Square Test (only applications))

Reference Books

1. Fundamentals of Mathematical Statistics,12th Edition, S. C. Gupta and V. K. Kapoor,Sultan Chand & Sons, 2020.

2. Statistics for Business and Economics, 11th Edition, David R. Anderson, Dennis J. Sweeney and Thomas A. Williams, Cengage Learning, 2011.

3. Introductory Statistics, 8th Edition, Prem S. Mann, John Wiley & Sons Inc., 2013.

4. A First Course in Statistics, 12th Edition, James McClave and Terry Sincich, Pearson Education Limited, 2018.

5. Introductory Statistics, Barbara Illowsky, Susan Dean and Laurel Chiappetta, OpenStax, 2013.

6. Hands-On Programming with R, Garrett Grolemund, O'Reilly.

USMT P04 / UAMT P04: Practicals

Suggested Practical for USMT 401/ UAMT 401

1. Limits and continuity of scalar fields and vector fields, using "definition and otherwise" , iterated limits.
2. Computing directional derivatives, partial derivatives and mean value theorem of scalar fields.
3. Differentiability of scalar field,Total derivative, gradient, level sets and tangent planes.
4. Chain rule, higher order derivatives and mixed partial derivatives of scalar fields.
5. Maximum and minimum rate of change of scalar fields. Taylor's Theorem. Finding Hessian/Jacobean matrix. Differentiation of a vector field at a point. Chain Rule for vector fields.
6. Finding maxima, minima and saddle points. Second derivative test for extrema of functions of two variables and method of Lagrange multipliers.
7. Miscellaneous Theoretical Questions based on full paper.

Suggested Practicals for USMT402/UAMT 402

1. Linear transformation, Kernel, Rank-Nullity Theorem.
2. Linear Isomorphism, Matrix associated with Linear transformations.
3. Inner product and properties, Projection, Orthogonal complements.
4. Orthogonal, orthonormal sets, Gram-Schmidt orthogonalisation
5. Eigenvalues, Eigenvectors, Characteristic polynomial. Applications of Cayley Hamilton Theorem.
6. Diagonalisation of matrix, orthogonal diagonalisation of symmetric matrix and application to quadratic form.
7. Miscellaneous Theoretical Questions based on full paper.

Suggested Practicals for USMT403A

The Practical no. 1 to 6 should be performed either using non-programable scientific calculators or by using the software Scilab.

1. Newton-Raphson method, Secant method.
2. Regula-Falsi method, Iteration Method..
3. Interpolating polynomial by Lagrange's Interpolation, Newton forward and backward difference Interpolation.
4. Curve fitting, Trapezoidal Rule, Simpson's 1/3rd Rule, Simpson's 3/8th Rule.
5. LU decomposition method, Gauss-Seidel Interative method.

6. Jacobi's method, Rutishauser method..
7. Miscellaneous theoretical questions from all units.

Suggested Practicals for USMT403B
All practicals should be performed using any one of the following softwares: MS Excel, R, Strata, SPSS, Sage Math to carry out data analysis and computations.

1. Descriptive Statistics.
2. Random Variables.
3. Probability Distributions.
4. Correlation and Regression.
5. Testing of hypothesis.
6. Case studies.
7. Miscellaneous Theory questions based on Unit I,II,III.

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Scheme of Examination (75:25)

The performance of the learners shall be evaluated into two parts.

- Internal Assessment of 25 percent marks.
- Semester End Examinations of 75 percent marks.

I. **Internal Evaluation of 25 Marks:**

S.Y.B.Sc. :

(i) One class Test of 20 marks to be conducted during Practical session.
Paper pattern of the Test:
Q1: Definitions/ Fill in the blanks/ True or False with Justification (04 Marks).
Q2: Multiple choice 5 questions. (10 Marks: 5×2)
Q3: Attempt any 2 from 3 descriptive questions. (06 marks: 2×3)

(ii) Active participation in routine class: 05 Marks.

OR

Students who are willing to explore topics related to syllabus, dealing with applications historical development or some interesting theorems and their applications can be encouraged to submit a project for 25 marks under the guidance of teachers.

S.Y.B.A. :

(i) One class Test of 20 marks to be conducted during Tutorial session.
Paper pattern of the Test:
Q1: Definitions/ Fill in the blanks/ True or False with Justification (04 Marks).

Q2: Multiple choice 5 questions. (10 Marks: 5×2)

Q3: Attempt any 2 from 3 descriptive questions. (06 marks: 2×3)

(ii) Journal : 05 Marks.

OR

Students who are willing to explore topics related to syllabus, dealing with applications historical development or some interesting theorems and their applications can be encouraged to submit a project for 25 marks under the guidance of teachers.

II. **Semester End Theory Examinations :** There will be a Semester-end external Theory examination of 75 marks for each of the courses USMT301/UAMT301, USMT/USAT 302, USMT 303 of Semester III and USMT/UAMT401, USMT/UAMT 402, USMT 403 of semester IV to be conducted by the college.

1. Duration: The examinations shall be of 2 and $\frac{1}{2}$ hours duration.
2. Theory Question Paper Pattern:
   a) There shall be FOUR questions. The first three questions Q1, Q2, Q3 shall be of 20 marks, each based on the units I, II, III respectively. The question Q4 shall be of 15 marks based on the entire syllabus.
   b) All the questions shall be compulsory. The questions Q1, Q2, Q3, Q4 shall have internal choices within the questions. Including the choices, the marks for each question shall be 25-27.
   c) The questions Q1, Q2, Q3, Q4 may be subdivided into sub-questions as a, b, c, d & e, etc and the allocation of marks depends on the weightage of the topic.

III. **Semester End Examinations Practicals:**

At the end of the Semesters III & IV Practical examinations of three hours duration and 150 marks shall be conducted for the courses USMTP03, USMTP04.

At the end of the Semesters III & IV Practical examinations of two hours duration and 100 marks shall be conducted for the courses UAMTP03, UAMTP04.
In semester III, the Practical examinations for USMT301/UAMT301, USMT302/UAMT302 and USMT303 are held together by the college.
In Semester IV, the Practical examinations for USMT401/UAMT401, USMT402/UAMT402 and USMT403 are held together by the college.

Paper pattern: The question paper shall have two parts A and B.
Each part shall have two Sections.

Section I Objective in nature: Attempt any Eight out of Twelve multiple choice questions (04 objective questions from each unit) ($8 \times 3 = 24$ Marks).

Section II Problems: Attempt any Two out of Three (01 descriptive question from each unit) ($8 \times 2 = 16$ Marks).

Practical Course	Part A	Part B	Part C	Marks out of	duration
USMTP03	Questions from USMT301	Questions from USMT302	Questions from USMT 303	120	3 hours
UAMTP03	Questions from UAMT301	Questions from UAMT302	——	80	2 hours
USMTP04	Questions from USMT401	Questions from USMT402	Questions from USMT403	120	3 hours
UAMTP04	Questions from UAMT401	Questions from UAMT402	——	80	2 hours

Marks for Journals and Viva:
For each course USMT301/UAMT301, USMT302/UAMT302, USMT303, USMT401/UAMT401, USMT402/UAMT402, USMT3031:

1. Journal: 10 marks (5 marks for each journal).

2. Viva: 10 marks.

Each Practical of every course of Semester III and IV shall contain 10 (ten) problems out of which minimum 05 (five) have to be written in the journal. .
A student must have a certified journal before appearing for the practical examination.
In case a student does not posses a certified journal he/she will be evaluated for 120/80 marks. He/she is not qualified for Journal + Viva marks.

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University of Mumbai

No. UG/ 125 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to syllabus uploaded by Academic Authority Unit which was accepted by the Academic Council at its meeting held on 19th March, 2012 **vide** item No. 4.5 relating to the revised syllabus as per the (CBSGS) for the S.Y.B.A. Programme – B.A. Course – Economics Paper – II & III (Semester – III & IV).

They are hereby informed that the recommendations made by the Board of Studies in Economics at its meeting held on 07th June, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 **vide** item No.4.25 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.A. (Sem. III) Macro Economics – I in Economics has been brought into force with effect from the academic year 2020-21, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
26th September, 2019

(Dr. Vinod P. Patil)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.25/26/07/2019

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No. UG/ 125 -A of 2019-20 MUMBAI-400 032 26th September, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Economics,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Vinod P. Patil)
I/c REGISTRAR

AC. 28/07/2020
Item No. 4.25

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**S.Y.B.A.** **Semester- III** **Economics- Paper- III** **Macroeconomics – I**
2	Eligibility for Admission	HSC (Science)
3	Passing Marks	40 Percentage (Pass Class)
4	Ordinances / Regulations (if any)	-
5	No. of Years / Semesters	2 Semesters
6	Level	U.G
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year: 2020-21

Date:

Signature :

Chairman/ Chairperson : _____

Dean Faculty of Humanities : _____

AC- 26/07/2019
Item No.- 4.25

UNIVERSITY OF MUMBAI

Revised Syllabus for the S.Y.B.A. (Sem III)
Paper III
Macro Economics – I

Course: Economics

(As Per Choice Based Credit System with effect from the academic year 2020-21)

Macro Economics - I

S.Y.B.A. Semester – III Paper III
(Academic Year: 2020 - 21)

Preamble: This course is designed to provide an introduction to the students about the basic building blocks of Macro Economics which will serve as a foundation throughout their career.

Module – I: Introduction to Macro Economics and National Income (12 Lectures)
Introduction: Meaning and Scope of Macro Economics; Concepts of National Income: GNP, NNP, NDP, Per Capita Income, Personal Income and Disposal Income; Methods and Difficulties in Measurement of National Income; Circular Flow of National Income: Closed Economy (Two and Three Sector) and Open Economy Models (Four Sector Model)

Module – II: Consumption and Investment (12 Lectures)
Consumption and Investment; Says Law of Market; Theory of Effective Demand; Consumption Function; Investment Function; Marginal Efficiency of Capital and Rate of Interest- Investment Multiplier

Module – III: Supply of Money and Demand for Money (12 Lectures)
Supply of Money; Determinants of Money Supply; Velocity of Circulation of Money; RBI's Approach to Measurement of Money Supply; Demand for Money: Classical, Keynesian and Friedman's Approaches

Module – IV: Banking (12 Lectures)
Banking: Commercial Bank, Functions of Commercial Banks, Multiple Credit Creation, Balance Sheet of Commercial Bank; Development in Commercial Banking Sector Since 1990-91; Central Bank: Functions of Central Bank - Traditional, Developmental, Promotional

Reference

1) N. Gregory Mnakiw, (2015), Principle of Macroeconomics, 7th edition, Cengage Learning.
2) Abel A. B. B. S. Beranake and D. Croushore (2011), Macroeconomics, Pearson, New Delhi.
3) Ahuja H. L., (2008), Macroeconomics theory and Policy, S. Chand and company Ltd. New Delhi.
4) Dwivedi D.N., (2007), Macroeconomics theory and Policy, TATA Mcgraw - Hill Publication company Ltd. Delhi.
5) Dornbusch Rudiger, Fischer, Stanley and Startz, (2017) (Indian Edition), Macroeconomics Delhi: Mcgraw Hill Publication.
6) Paul Samuelson and William Nordhaus, (2010), Economics, Mcgraw Hill Publication.

University of Mumbai

No. UG/128 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office Circular No. UG/40 of 2012-13, dated 25th June, 2012 relating to the revised syllabus as per the (CBSGS) of Paper II & III in Semester III & Semester IV of B.A. programme in the course of Economics.

They are hereby informed that the recommendations made by the Board of Studies in Economics at its meeting held on 7th June, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 **vide** item No.4.28 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.A. (Sem. IV) Indian Economy – Paper VI in Economics has been brought into force with effect from the academic year 2020-21, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
26th September, 2019

(Dr. Vinod P. Patil)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.28/26/07/2019

No. UG/128 -A of 2019-20

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MUMBAI-400 032

26th September, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Economics,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Vinod P. Patil)
I/c REGISTRAR

Cover Page

AC 26/07/2019
Item No. 4.28

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**S.Y.B.A.** **Semester IV** **Economics- Paper VI** **Indian Economy**
2	Eligibility for Admission	FYBA
3	Passing Marks	40
4	Ordinances / Regulations (if any)	
5	No. of Years / Semesters	2 Semesters
6	Level	U.G
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year 2020-21

Date:

Signature :

Chairman/ Chairperson : _____

Dean Faculty of Humanities : _____

AC- 26/07/2019
Item No.- 4.28

UNIVERSITY OF MUMBAI

Revised Syllabus for the S.Y.B.A. (Sem IV) Paper VI

Indian Economy

Course: Economics

(As Per Choice Based Credit System with effect from the academic year 2020-21)

Economics
S.Y.B.A. Semester IV
Paper VI
Indian Economy

Preamble
This paper deals with the nature and sector wise composition of Indian economy. The learners shall be able to understand the problems and prospects of Indian Economy. The content has also intended to orient the learners about the recent developments in the economy.

Module- I: Introduction (12 Lectures)
Trends in India's National Income and PCI Since 1990; Structural Changes In Indian Economy; Brief Overview of the Employment Generation and Poverty Alleviation Programmes; Regional Inequalities; Measures to Reduce Regional Inequalities in India

Module - II: Agricultural Sector (12 Lectures)
Role of Agriculture in Economic Development; Causes of Low Productivity; Agricultural Inputs; Agricultural Price Policy: Recent Minimum Support Price Policy; Income Support for Farmers; Sources of Agricultural Finance; Micro Finance; NABARD: Role and Function; Agricultural Marketing: Structure and Problems; National Policy for Farmers, 2007; Organic Farming Policy; Food Security in India

Module -III: Industrial Sector (12 Lectures)
Infrastructure for Industrial Development; Industrial Policies in India; Industrial Policy of 1991; Micro, Small and Medium Enterprises (MSMEs): Classification, Role and Policy Measures; Growth of Large Scale Industries and Economic Development; Recent Policies and Programs for Industrial Development: Start Up India, Make in India, Skill India; Role and Trends of FDI in Industrial Sector Development

Module -IV: Service Sector (12 Lectures)
Role of Service Sector in Indian Economy; Growth and Performance of Healthcare; Performance of Trade and Tourism, Information Technology and IT - Enabled Services; Research and Development Services With Reference to Education and Skill Development in Employment Generation in India; Performance of Service Sector during XIIth Five Year Plan

Reference

1) Ashwini Mahajan, Gaurav Datt, (2018) 'Indian Economy', S. Chand and Company, New Delhi.
2) Brahmananda, P.R. and V.R. Panchmukhi (Eds.), (2001), 'Development Experience in the Indian Economy: Inter-State Perspectives', Bookwell, New Delhi.
3) Datt, Ruddra and K.P.M, Sundaram, (2017), 'Indian Economy', S. Chand & Company Ltd., New Delhi.
4) Misra, S. K. and V. K. Puri, (2018) 'Indian Economy', Himalaya Publishing House, Mumbai.

5) Gaurav Datt and Ashwani Mahajan, (2016) ‘Indian Economy’, S Chand Publishing House, New Delhi.
6) Uma Kapila, (2018),’ Indian Economy: Performance and Policies, 2018-19’, Academic Foundation, New Delhi.

UNIVERSITY OF MUMBAI

Revised Syllabus for the S.Y.BA

Program: B.A

Course: ECONOMICS

SEMESTER III & IV APPLIED COMPONENT

(As per Credit Based Semester and Grading System
with effect from the academic year 2017–2018)

S.Y.B.A (ECONOMICS)

APPLIED COMPONENT (Revised Syllabus)

(To be implemented as per Credit Based Semester and Grading System with effect from the academic year 2017–2018)

SEMESTER - III

303(A) Demography (Credits-2)

OR

303(B) Elementary Quantitative Techniques (Credits-2)

OR

303© Entrepreneurial Development (Credits-2)

OR

303 (D) Investment Analysis (Credits-2)

OR

303(E) Market Research (Credits-2)

SEMESTER - IV

403 (A) Demography (Credits-2)

OR

403(B) Elementary Quantitative Techniques (Credits-2)

OR

403© Entrepreneurial Development (Credits-2)

OR

403(D) Investment Analysis (Credits-2)

OR

403(E) Market Research (Credits-2)

303(A) Demography Paper - I

Preamble: The modules incorporated in this paper educate the students about the inter-relationship between economic development and population along with an exposition of the established theories of population. Issues related to demographic techniques and basic sources of demographic data in the Indian economy have also been included. Aspects of the population policy and the study of its social characteristics are other important components of the modules of this paper.

Semester III

1. Introduction : (15)
    - Demography – Its definition, nature and scope, its relation with other disciplines.
    - Theories of Population - Malthusian Theory, Optimum theory of population and theory of demographic transition.
    - Population growth in India.
    - Features of Indian population.

2. Sources of demographic data in India : (15)
    - Salient features of census – including 2011 census.
    - Civil Registration System.
    - National Sample Survey.
    - Demographic Survey – National Family Health survey -1,2 and 3.
    - Relative merits and demerits of these sources.

3. Techniques of Analysis : (15)
    - Crude birth rate and death rate, Age specific birth rate and death rate, standardized birth rate and death rate.
    - Study of fertility – total fertility rate, gross reproduction rate and net reproduction rate.
    - Measurement of population growth rate – simple growth rate and compound growth rate.

REFERENCES :

1. Agarwal S.S. (1985) - 'India's Population Problem' – Tata McGraw Hill Publication, Bombay.
2. A.K. P.C. Swain (2008) – 'Population Studies' – Kalyani Publications, Ludhiana.
3. Bhende A.A. & Tara Kanitkar (1982) – 'Principles of Population Studies'– Himalaya Publishing House, Bombay.
4. Hans Raj (1984) – 'Fundamentals of Demography – Surjeet Publication, Delhi.

5. Jhingan, Bhat & Desai – 'Demography' –
6. Dr. D.D.Kachole (2001) – 'Demography' – Kailasha Publication, Aurangabad.

ADDITIONAL REFERENCES

1. Bose A. (1996)– 'India's Basic Demographic Statistics' – B.R. Publishing Corporation, New Delhi
2. Government of India – (Various Reports), Census of India, New Delhi.
3. Srinivasan K (1998) – 'Basic Demographic Techniques and Applications' – Sage Publications, New Delhi.
4. Dutt & Sundaram – 'Indian Economy'
5. Tara Kanetkar and Sumati Kulkarni (1979) - 'Loksankhya Shastra' – Shri Vidya Prakashan, Pune.
6. Bhosale & Kate (2010) – 'Bharatiya Arth Vyavastha' – Phadke Prakashan , Kolhapur.
7. Bhosale & Kate (2006)– 'Loksankhya Shastra' - Phadke Prakashan , Kolhapur.
8. K.H. Thakkar - 'Loksankhya Shastra' – Phadke Prakashan , Kolhapur.
9. Ahirrao-Alizad-Dapte-Varat-Bhose (2001) – 'Loksankhya' – Nirali Publication, Pune

403(A) Demography Paper-II

Semester IV

1. Fertility, Nuptiality and Mortality. (15)
   - Fertility – concept and factors affecting fertility.
   - Nuptiality – concept, age at marriage and factors affecting nuptiality.
   - Mortality - concept and factors affecting mortality.
   - Life Table – concept and its importance.

2. Migration and Urbanisation: (15)
   - Migration – concept and types, factors affecting migration, Theory of Migration (Harris and Todaro model), issues related to migration.
   - Urbanisation - Concept, trends and patterns of urbanization in India, problems of urbanization in India (poverty, food supply, water, sanitation, housing, slum areas, employment, health, education, transport, environment etc.).

3. Population Policy : (15)
   - Salient features and evolution of India's population policy.
   - Shift in policy focus from population control to family welfare to women empowerment.
   - Family Planning – Meaning, importance and methods of family planning.
   - Population Projection in India.

REFERENCES :

1. Agarwal S.S. (1985) - 'India's Population Problem' – Tata McGraw Hill Publication, Bombay.
2. A.K. P.C. Swain (2008) – 'Population Studies' – Kalyani Publications, Ludhiana.
3. Bhende A.A. & Tara Kanitkar (1982) – 'Principles of Population Studies'– Himalaya Publishing House, Bombay.
4. Hans Raj (1984) – 'Fundamentals of Demography – Surjeet Publication, Delhi.
5. Jhingan, Bhat & Desai – 'Demography' –
6. Dr. D.D.Kachole (2001) – 'Demography' – Kailasha Publication, Aurangabad.

ADDITIONAL REFERENCES

1. Choubey P.K. (2000) - 'Population Policy of India', - Kanishka Publication, New Delhi.
2. Gandotra & Narayan Das (1984) – 'Population Policy in India'- Blackie Publication, Mumbai.
3. Government of India – (Various Reports), Census of India, New Delhi.
4. Gupta J.A. (2000), 'New Reproductive Technologies : Women's Health and Autonomy, Indo-Dutch Studies on Development Alternatives, Sage Publications, New Delhi.
5. Phadke V.S. & Swapna Banerjee Guha (Ed) (2007)- 'Urbanisation, Development and Environment' – Rawat Publication, New Delhi.
6. Shekhar Mukherjee (2006)– ' Migration and Urban Decay' – Rawat Publication, New Delhi.
7. Todaro Michael P & Stephen C Smith (2003) – 'Economic Development', 8e- Delhi Pearson Education.
8. Dutt & Sundaram – 'Indian Economy'
9. Tara Kanetkar and Sumati Kulkarni (1979) - 'Loksankhya Shastra' – Shri Vidya Prakashan, Pune.
10. Bhosale & Kate (2010) – 'Bharatiya Arth Vyavastha' – Phadke Prakashan , Kolhapur.
11. Bhosale & Kate (2006)– 'Loksankhya Shastra' - Phadke Prakashan , Kolhapur.
12. K.H. Thakkar - 'Loksankhya Shastra' – Phadke Prakashan , Kolhapur.
13. Ahirrao-Alizad-Dapte-Varat-Bhose (2001) – 'Loksankhya' – Nirali Publication, Pune

University of

No. UG/127 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to syllabus uploaded by Academic Authority Unit which was accepted by the Academic Council at its meeting held on 19th March, 2012 **vide** item No. 4.5 relating to the revised syllabus as per (CBSGS) for the S.Y.B.A. Programme – B.A. Course – Economics Paper – II & III (Semester – III & IV).

They are hereby informed that the recommendations made by the Board of Studies in Economics at its meeting held on 07th June, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 **vide** item No.4.27 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.A. (Sem. -IV) Macro Economics - II in Economics has been brought into force with effect from the academic year 2020-21, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
26th September, 2019

(Dr. Vinod P. Patil)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.27/26/07/2019

No. UG/127-A of 2019-20

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MUMBAI-400 032

26th September, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Economics,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Vinod P. Patil)
I/c REGISTRAR

AC. 26/07/2019
Item No. 4.27

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**S.Y.B.A.** **Semester- IV** **Economics- Paper- V** **Macroeconomics – II**
2	Eligibility for Admission	HSC (Science)
3	Passing Marks	40 Percentage (Pass Class)
4	Ordinances / Regulations (if any)	-
5	No. of Years / Semesters	2 Semesters
6	Level	U.G
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year: 2020-21

Date: Signature :

Chairman/ Chairperson : _____

Dean Faculty of Humanities : _____

AC- 26/07/2019
Item No.- 4.27

UNIVERSITY OF MUMBAI

Revised Syllabus for the S.Y.B.A. (Sem IV)
Paper V

Macro Economics – II

Course: Economics

(As Per Choice Based Credit System with effect from the academic year 2020-21)

Macro Economics - II

S.Y.B.A. Semester – IV Paper V
(Academic Year: 2020 - 21)

Preamble: This course is designed to make students aware of macroeconomic terminologies and make them familiar with macroeconomic terms and concepts in order to understand economics at aggregate level. It also aims to make the students aware about recent developments in macroeconomic literature.

Module - I: Inflation **(12 Lectures)**

The Economics of Depression, Hyper Inflation**;** Inflation: Features and Causes, Demand Pull Inflation and Cost Push Inflation, Effects of Inflation; Nature of Inflation in Developing Economy; Phillips Curve; Stagflation: Meaning, Causes and Consequences

Module – II: Economic Policy **(12 Lectures)**

Monetary Policy: Objectives, Instruments, Limitations, Role of Monetary Policy in Developing Economies; Fiscal Policy - Objectives, Instruments, Limitations and Role of Fiscal Policy in Developing Economies

Module – III: Post Keynesian Economics **(12 Lectures)**

The IS-LM Model of Integration of Commodity and Money Market; IS Curve: Derivation of IS Curve, Shift in IS Curve, Equilibrium in Goods Market; LM Curve: Derivation of LM Curve, Shift in LM Curve, Equilibrium in Money Market; Simultaneous Equilibrium in Goods and Money Market

Module – IV: External Sector **(12 Lectures)**

Balance of Payment: Structure, Disequilibrium in Balance of Payment, Types, Causes and Measures to Correct Balance of Payment Disequilibrium; Foreign Exchange Market: Determination of Exchange Rate: Fixed and Flexible Exchange Rate; Spot and Forward Exchange Rate; Exchange Rate Policy

Reference

1 Richard Froyan, (2012), Macroeconomics: Theories and policies, Pearson Education.
2 Eroll D'Souza, (2008), Macroeconomics, Pearson Education.
3 Suman Kalyan Chakravarty, (2010), Macroeconomics, Himalaya Publishing House.
4 N. Gregory Mnakiw, (2015), Principle of Macroeconomics Cengage Learning.
5 Francis Cherunilam, (1999), International Economics, Tata McGraw-Hill.
6 Bo Soderstein, (1994), International Economics, Palgrave Macmillan.

University of Mumbai

No. UG/ 126 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Science & Technology, Humanities Faculties is invited to this office Circular No. UG/258 of 2011, dated 18th August, 2011 relating to the revised syllabus as per the (CBSGS) for First Year of B.Sc. programme and for Second Year of S.Y.B.A. programme in Economics (paper II).

They are hereby informed that the recommendations made by the Board of Studies in Economics at its meeting held on 7th June, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 **vide** item No.4.26 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.A. (Sem. III) Public Finance – Paper IV in Economics has been brought into force with effect from the academic year 2020-21, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
26th September, 2019

(Dr. Vinod P. Patil)
I/c REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.26/26/07/2019

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No. UG/ 126 -A of 2019-20 MUMBAI-400 032 26th September, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Economics,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Vinod P. Patil)
I/c REGISTRAR

AC. 28/07/2020
Item No. 4.25

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**S.Y.B.A.** **Semester- III** **Economics- Paper- III** **Macroeconomics – I**
2	Eligibility for Admission	HSC (Science)
3	Passing Marks	40 Percentage (Pass Class)
4	Ordinances / Regulations (if any)	-
5	No. of Years / Semesters	2 Semesters
6	Level	U.G
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year: 2020-21

Date:

Signature :

Chairman/ Chairperson : _____

Dean Faculty of Humanities : _____

AC- 26/07/2019
Item No.- 4.26

UNIVERSITY OF MUMBAI

Revised Syllabus for the S.Y.B.A. (Sem III) Paper IV

Public Finance

Course: Economics

(As Per Choice Based Credit System with effect from the academic year 2020-21)

SYBA - SEMESTER III
Economics – Paper IV
Public Finance

Preamble

Public Finance is the study of government policy from the point of economic efficiency and equity. The role and functions of the government have been changing throughout time. The existence of externalities, acceleration of economic growth, raising the level of employment, the need and concern for adjustment in the distribution of income and wealth etc. require the use of package of policies which require tax systems, expenditure programmes, rising of debt, issues of deficit etc. This paper deals with basic concepts which explain the need for government intervention. It exposes the student to public budget through issues of taxation, expenditure, debt and concepts of deficit. The last Unit is related to topics concerning Indian Public Finance.

Unit – I Introduction (12 Lectures)

Meaning and Scope of Public Finance; Public Finance versus Private Finance; Market Failure: Public Goods and Private Goods, Externalities, Efficiency versus Equity; Principles of Sound Finance and Functional Finance; Allocation, Distribution, Stabilisation and Growth Functions of the Government

Unit - II Fiscal Policy: Budget and Taxation (12 Lectures)

Dalton's and Musgrave Versions of the Law of Maximum Social Advantage; Role of Government in a Modern Economy; Types of Public Budget; Structure of Public Budget; Role of Taxation; Merits and Demerits of Direct and Indirect Tax Policy; Features of Good Tax System; Concept of Impact, Incidence and Shifting of Taxation; Elasticity and Determination of Tax Burden

Unit III Fiscal Policy: Public Expenditure and Debt (12 Lectures)

Canons of Public Expenditure; Classification of Public Expenditure; Wagner's Law of Public Expenditure; Public Expenditure as an Instrument of Fiscal Policy; Meaning and Types of Public Debt; Burden of Public Debt; Principles of Public Debt Management; Concepts of Deficits

Unit IV Indian Public Finance (12 Lectures)

Budget of The Government of India (Previous Financial Year); Sources of Public Receipts (Tax And Non-Tax, Introduction To GST); Components of Public Expenditure; Sources of Public Borrowing and Debt Liabilities; Deficits; Appraisal of FRBM Act 2004; Fiscal Federalism: Fourteenth Finance Commission Recommendations

References:

1. J. Hindriks, G. Myles, (2006), Intermediate Public Economics, MIT Press.
2. Harvey Rosen, (2005), Public Finance, Seventh Edition, McGraw Hill Publications.

3. KaushikBasu and Maertens (ed), (2013), The New Oxford Companion to Economics in India, Oxford University Press.
4. Sury M.M., (1990), Government Budgeting in India, Commonwealth Publishers.
5. Bhatia H.L., (2012), Public Finance, Vikas Publications.
6. Report of the Fourteenth Finance Commission,Government of India.

UNIVERSITY OF MUMBAI
No. UG/ 84 of 2018-19

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office circular No. UG/115 of 2016-17, dated 25th October, 2016 relating to syllabus of Bachelor of Arts.

They are hereby informed that the recommendations made by the Board of Studies in Psychology at its meeting held on 8th June, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.56 and that in accordance therewith, the revised syllabus as per the (CBCS) for the F.Y.B.A. in Psychology – Sem I & II has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
19th July, 2018

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.56/14/06/2018

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No. UG/ 84 -A of 2018 MUMBAI-400 032 19th July, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Psychology,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
6) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

Revised Syllabi for Psychology Core Courses (Major Elective) at the F.Y.B.A.
Choice Based Credit System (CBCS)
Brought into force with effect from the academic year 2018-2019

Code	Sem.	Course Title	Credits	Marks
UAPSY 101	1	Fundamentals of Psychology-Part I	3	100
UAPSY201	2	Fundamentals of Psychology-Part II	3	100

Objectives: -
1. To impart knowledge of the basic concepts and modern trends in Psychology.
2. To foster interest in the subject of Psychology and to create a foundation for further studies in Psychology.
3. To make the students aware of the applications of Psychological concepts in different areas of day to day life.

Semester 1. Fundamentals of Psychology: Part I (Credits = 3)
4 lectures per week

Unit 1. The science of Psychology
a) The history of Psychogy.
b) The Fields of Psychology Today.
c) Scientific research.
d) Ethics of Psychological Research.
e)Applying Psychology to Everyday life.

Unit 2.The Biological Perspective.
a)Neurons and Nerves : Building the Network.
b) An overview of the Nervous System.
c) Distant connections:The Endocrine Glands.
d) Looking inside the Living Brain.
e)From the Bottom up :The structures of the Brain.
f) Classic studies in Psychology.
g) Applying Psychology to Everyday life.

Unit 3.learning.
a) Definition of Learning.
b) Classical conditioning, and Operant conditioning
c) Cognitive learning Theory.
d) Observational Learning.

Unit 4.Memory
a)What is memory?
b) The Information Processing Model:Three Memory Systems.
c)Retrieval of Long –term Memories.

d)Forgetting.
e) Neuroscience of memory.
f) Applying Psychology to Everyday life.

Semester 2. Fundamentals of Psychology: Part II (Credits = 3)

4 lectures per week

Unit 1. Cognition:Thinking ,Intelligence,and Language.
a)How People think.
b)Intelligence.
c) Language
d) Applying Psychology to Everyday life.

Unit 2.Motivation and Emotion.
a)Approaches to understanding Motivation.
b)What ,Hungry again? Why People Eat.
c) Emotion.
d)Culture and Emotions.
e) Applying Psychology to Everyday life.

Unit 3. Theories of Personality.
a)Psychodynamic Perspective.
b)Psychoanalysis in the East .
c) The Behavioural and Social Cognitive View of Personality.
d)The Third Force :Humanism and Personality.
e)Trait Theories:Who are you?
f) Modern Trait Theories:The Big Five and current thoughts on the trait Perspective.
g)Personality :Genetics and Culture.
h)Assessment of Personality.
i) Applying Psychology to Everyday life.

Unit 4. Statistics in Psychology.
a)What are Statistics?
b)Descriptive Statistics.
c) Inferential Statistics.

Book for Study

Ciccarelli,S.K.,White ,J.N.,& Mishra,G.(2018) .Psychology. 5th Edition; Indian Adaptation. Pearson India Education Services Pvt.ltd.

Additional Books for Reference

1) Baron, R. A., &Kalsher, M. J. (2008). Psychology: From Science to Practice. (2nd ed.). Pearson Education inc., Allyn and Bacon
2) Ciccarelli, S. K. & Meyer, G. E. (2008). Psychology.(Indian sub-continent adaptation). New Delhi: Dorling Kindersley (India) pvt ltd.
3) Ciccarelli, S. K., & White, J. N. (2017). Psychology.4th edi. New Jersey: Pearson education
4) Feist, G.J, & Rosenberg, E.L. (2010). Psychology: Making connections. New York: McGraw Hill publications

5) Feldman, R.S. (2013). Psychology and your life.2nd edi. New York: McGraw Hill publications
6) Feldman, R.S. (2013). Understanding Psychology.11th edi. New York: McGraw Hill publications
7) King, L.A. (2013). Experience Psychology.2nd edi. New York: McGraw Hill publications
8) Lahey, B. B. (2012). Psychology: An Introduction. 11th edi. New York: McGraw-Hill Publications
9)Myers, D. G. (2013).Psychology.10th edition; International edition. New York: Worth Palgrave Macmillan, Indian reprint 2013
10)Schachter, D. L., Gilbert, D. T., & Wegner, D. M. (2011). Psychology. New York: Worth Publishers.
11)Wade, C. &Tavris, C. (2006). Psychology. (8th ed.). Pearson Education inc., Indian reprint by Dorling Kindersley, New Delhi

Modified Pattern of Question Paper for Semester End Assessment implemented from 2018-2019 For Psychology courses at F.Y.B.A.

Duration of examination = **3 hours** Total Marks = **100 (per semester)**

All 5 questions carry **20** marks and are compulsory.
There will be internal choice in each Question.

Q1.Attempt any two questions (unit 1) 20marks

A
B
C

Q2.Attempt any two questions (unit 2) 20marks

A
B
C

Q3.Attempt any two questions (unit 3) 20marks

A
B
C

Q4.Attempt any two questions (unit 4) 20marks

A
B
C

Q5.Attempt any two questions (unit 1 ,2,3,4 one from each unit) 20 marks

A
B
C
D

Semester II
Use of simple calculator shall be permitted.(instruction to be included in the question paper).

Question 4 and Question 5(D)will be based on unit 4 Statistics in Psychology. One Theory question from the contents of the chapter carrying 10 marks and 03 questions for calculations.

Frequency distribution table to be made with 30-35 scores given and a theory question

Calculation of the Mean Median and the Mode with the help of 10 -12 scores given and a theory question.

Calculation of the Range ,Standard deviation and Z Score with the help of 10 -12 scores given.

Syllabus for the S.Y.B.Sc. Program: B.Sc. Course:BOTANY

SEMESTER III
THEORY

Course Code	Title	Credits
USBO301	**PLANT DIVERSITY**	**2 Credits (45 lectures)**
Unit I : Thallophyta (Algae) & Bryophyta • General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance. • Structure, life cycle and systematic position of ***Sargassum*** • General Account of Class Anthocerotae and Musci • Structure, life cycle and systematic position of o ***Anthoceros*** o ***Funaria***		**15 Lectures**
Unit II: Angiosperms Systematics: Objectives and Goals of Plant systematic • Plant Nomenclature • Taxonomy in relation to Anatomy Palynology Chemical constituents Embryology Cytology Ecology o With the help of Bentham and Hooker's system **of Classification for flowering plants** study the vegetative, floral characters and economic importance of the following families: o Leguminosae o Asterace o Amaranthaceae o Palmae		**15 Lectures**
Unit III :Modern Techniques to Study Plant Diversity Preservation methods :Dry and Wet method • Microscopy – Principle and working of Light, and electron microscope. • Chromatography- Principles and techniques in paper and thin layer chromatography. • Principles and techniques of Horizontal and Vertical electrophoresis.		**15 Lectures**

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

SEMESTER III
PRACTICAL

Semester III USBOP3	**Cr**
PRACTICAL Paper I – Plant Diversity II	**1**

Algae & Bryophyta

1. Study of stages in the life cycle of *Sargassum* from fresh/ preserved material and permanent slides.
2. Economic importance and range of thallus in Phaeophyta

3 Study of stages in the life cycle of *Anthoceros* from fresh/ preserved material and permanent slides.

4 Study of stages in the life cycle of *Funaria* from fresh/ preserved material and permanent slides.

Angiosperms

5. Study of plants for anatomy in relation to taxonomy
6. Study of plants for Phenols and Flavanoids (chemotaxonomy)
7. Study of one plant from each family prescribed for theory: morphological peculiarities and economic importance of the members of these families.

Techniques to study Plant Diversity

8. Preparation of herbarium and wet preservation technique
9. Chromatography: Separation of amino by circular paper chromatography
10. Separation of Carotenoids by thin layer chromatography
11. Horizontal and Vertical Gel Electrophoresis – Demonstration

Syllabus for the S.Y.B.Sc. Program: B.Sc. Course:BOTANY

SEMESTER IV
THEORY

Course Code	Title	Credits
USBO401	**PLANT DIVERSITY**	**2 Credits (45 lectures)**
Unit I : Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of Ascomycetae • Structure, life cycle and systematic position of *Erysiphe* and *Xylaria* • Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew and Late blight of potato • Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.		**15 Lectures**
Unit II: Pteridophyta and Paleobotany Pteridophyta- • Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed) • Structure, life cycle and systematic position of *Selaginella* • Paleobotany- The geological time scale; Formation and types of fossils; Structure and systematic position of form genus *Rhynia*		**15 Lectures**
Unit III : Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed) • Structure life cycle and systematic position of *Pinus* • Structure and systematic position of the form genus *Cordaites*		**15 Lectures**

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

SEMESTER IV
PRACTICAL

Semester III USBOP4	**Cr**
PRACTICAL Paper I – Plant Diversity II	**1**

Fungi and Plant Pathology

1 Study of stages in the life cycle of *Erysiphe* from fresh/ preserved material and permanent slides.

2 Study of stages in the life cycle of *Xylaria* from fresh/ preserved material and permanent slides.

3 Study of fungal diseases as prescribed for theory.

4 Study of Lichens (crustose, foliose, & fruiticose).

Pteridophyta and Palaeobotany

5-6 Study of stages in the life cycle of *Selaginella* from fresh/ preserved material and permanent slides.

7 Study of form genera *Rhynia* with the help of permanent slides/ photomicrographs.

Gymnosperms

8- Study of stages in the life cycle of *Pinus* from fresh/ preserved material and permanent slides.

9- Study of the form genus *Cordaites* with the help of permanent slide/ photomicrographs.

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Course Code	SEM III- Title	Credits
USBO302	**FORM AND FUNCTION II**	**2 Credits (45 lectures)**
Unit II : Cell Biology • Ultra Structure and functions of the following cell organelles: o Mitochondrion(membranes, cristae, F1 particles and matrix) o Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits) • Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus(nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA		**15 Lectures**
Unit III : Cytogenetics • **Variation in Chromosome structure (Chromosomal Aberrations)** Definition, Origin, Cytological and Genetic Effects of the following: Deletions, Duplications, Inversions and Translocations. • **Sex determination, Sex linked, sex influenced and sex limited traits :** **Sex determination-** Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. **Sex linked-** eye colour in *Drosophila*, Haemophilia, colour blindness **Sex influenced**- baldness in man • **Extranuclear Genetics** Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in *Chlamydomonas*. o Male sterility in maize		**15 Lectures**
Unit III : Molecular Biology • **DNA replication** : Modes of Replication, Messelson and Stahl Experment, **DNA replication in prokaryotes and eukaryotes**- enzymes involved and molecular mechanism of replication. • **Protein Synthesis**: o Central dogma of Protein synthesis o Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.		**15 Lectures**

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Course Code	SEM IV-Title	Credits

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

USBO402	FORM AND FUNCTION II	2 Credits (45 lectures)
Unit I : Anatomy • Normal Secondary Growth in Dicotyledonous stem and root. • Growth rings, periderm, lenticels, tyloses, heart wood and sap wood. • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition o I-girders in aerial and underground organs • Types of Vascular Bundles.		**15 Lectures**
Unit II : Plant Physiology and Plant Biochemistry • **Respiration: Aerobic:** Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration. • **Photorespiration** • **Photoperiodism:** Phytochrome Response and Vernalization with reference to flowering in higher plants, Physico-chemical properties of phytochrome, Pr-Pfr interconversion, role of phytochrome in flowering of SDPs and LDPs; • **Vernalization** mechanisms and applications.		**15 Lectures**
Unit III : Ecology and Environmental Botany • Biogeochemical Cycles- Carbon, Nitrogen and Water. • Ecological factors: Concept of environmental factors. Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile. • Community ecology- Characters of community - Quantitative characters and qualitative characters		**15 Lectures**

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Semester III USBOP3 PRACTICAL Paper II – FORM AND FUNCTION- II	Cr 1

Cell Biology

1 Study of the ultra-structure of cell organelles prescribed for theory from Photomicrographs

2 Estimation of DNA from plant material (one Std & one Unknown, No Std Graph)

3 Estimation of RNA from plant material (one Std & one Unknown, No Std Graph)

Cytogenetics

4 Study of inheritance pattern with reference to Plastid Inheritance

5 Study of cytological consequences of chromosomal aberrations (Laggards, Chromosomal Bridge, Ring chromosome, Chromosomal ring) from permanent slides or photomicrographs.

6 Study of mitosis and meiosis from suitable plant material

Molecular Biology

7 DNA sequencing- Sanger's method

8 Determining the sequence of amino acids in the protein molecule synthesised from the given m-RNA strand (prokaryotic and eukaryotic)

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

SEMESTER IV USBOT P4 PRACTICALS Paper II – FORM AND FUNCTION- II	Cr 1

Anatomy

1 Study of normal secondary growth in the stem and root of a Dicotyledonous plant

2 Types of mechanical tissues, mechanical tissue system in aerial, underground organs.

3 Study of conducting tissues- Xylem and phloem elements in Gymnosperms and Angiosperms as seen in LS and through maceration technique.

4 Study of different types of vascular bundles.

5 Growth rings, periderm, lenticels, tyloses, heart wood and sap wood

Plant Physiology and Plant Biochemistry

6 Q_{10} – germinating seeds using Phenol red indicator

7 NR activity – *in-vivo*

8 Estimation of proteins by Lowry's method (Prepare standard graph).

Ecology and Environmental Botany

9 Study of the working of the following Ecological Instruments- Soil thermometer, Soil testing kit, Soil pH, Wind anemometer.

10 Mechanical analysis of soil by the sieve method & pH of soil.

11 Quantitative estimation of organic matter of the soil by Walkley and Blacks Rapid titration method.

12 Study of vegetation by the list quadrat method

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER SEMESTER - III

TIME - 3 hours PAPER – II Total Marks – 50

Q.1. Make a squash/ smear preparation of specimen 'A'. Draw and comment on your observations and show the slides to examiners. (10)

Q.2. To estimate DNA/ RNA from the given sample 'B'. (10)

Q.3. Determine the sequence of bases in a DNA strand by Sanger's method from the given data **'C'**

OR

Determine the sequence of amino acids in the polypeptide synthesized from the given m-RNAstrand **'C'**
(10)

Q.4. Identify and describe the specimen/ photograph - D, E and F (15)

Q.5. Journal/Field Report. (05)

KEY :

A. – Mitosis/ Meiosis

B. Germinating seeds/Onion

C. DNA seq/AA seq.

D. Cell organelles

E. Plastid inheritance

F. Chromosomal aberrations

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

UNIVERSITY OF MUMBAI

S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER SEMESTER - IV
TIME - 2 hours 15 min PAPER – II Total Marks – 50

Q.1. a). Make a temporary stained preparation of T.S. of specimen **'A'** and comment on the secondary growth/ mechanical tissue system/ Macerate the given material 'A' and describe the conducting tissue seen. (10)

Q.2. Perform the Physiological experiment **'B'** allotted to you. (13)

Q.3. Perform the Ecological experiment **'C'** allotted to you. (13)

Q.4. Identify and describe the specimen/ slide/ photograph - **'D' 'E' and 'F' .** (06)

Q.5. Viva - Voce. (05)

KEY :

A. – Dicot stem/ dicot root / Mechanical Tissue (*Coleus stem, Typha leaf, Maize stem and* Maize root /*Annona / Magnolia* for maceration).

B. – Q_{10} – germinating seeds using Phenol red indicator
NR activity – *in-vivo*
Estimation of proteins by Lowry's method

C- Mechanical analysis of soil by the sieve method & pH of soil
Estimation of organic matter of the soil
Study of vegetation by the list quadrat method

D - Vascular bundles
E. – Growth rings, periderm, lenticels, tyloses, heart wood and sap wood
F. – Ecological Instrument

PROPOSED SYBSC SYLLABUS FOR ACADEMIC YEAR 2017-18

Course Code	Title	Credits
USBO303	CURRENT TRENDS IN PLANT SCIENCES I	2 Credits (45 lectures)

Unit1: Pharmacognosy and phytochemistry — **15 Lectures**

- Introduction to pharmacopoeia
- Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia
- Study of Monograph from pharmacopoeia
- Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations
- Adulterants: *Saraca asoca, Polyalthia longifolia*
  Terminalia arjuna, Terminalia tomentosa
  Bacopa monnieri, Centella asiatica
  Abrus, Glycyrrhiza
  Phyllanthus amarus (Bhuiamla)

Unit 2: Forestry and Economic Botany — **15 Lectures**

- Forestry: Outline of types of forest in India
- Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture
- Economic Botany:
- Types of fibers: Jute and cotton,
- Current trends in Fiber industries
- Spices and condiments: Saffron and cardamom
- Commercial market of spices

Unit 3: Industry based on plant products — **15 Lectures**

- Aromatherapy- Introduction, Uses with few examples.
  Jojoba, lemon, jasmin
- Botanical and nutraceuticals -*Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia, Chlorella,* and *Kale.*
- Enzymes industry: Cellulases, Papain, Bromelain
- Biofuels.

	Semester III USBOP3 Cr 1 **PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I**
1	Study of *Phyllanthus amarus* *Saraca asoka* *Bacopa monieri*
2	Study of biodiversity (Visit to National Park/ Botanical Garden) Sources of : Fibres & Paper Spices & condiments Preparation of herbal cosmetics (Face pack/ De-tanning cream)
3	Estimation of crude fibre in cereals & their products
4	Preparation & evaluation of probiotic foods
5	Evaluation of nutraceutical value of mushroom/ wheat germ

Course Code	Title	Credits
USBO403	CURRENT TRENDS IN PLANT SCIENCES I	2 Credits (45 lectures)

Unit I : Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture **Gardening:** • Locations in the garden- edges, hedges, lawn, flower beds, avenue, water garden (with names of two plants for each category). Focal point. • **Types of garden** o Formal and informal gardens o National Park: Sanjay Gandhi National Park. o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden).	**15 Lectures**
Unit II : Biotechnology • **Introduction to plant tissue culture** o Laboratory organization and techniques in plant tissue culture o Totipotency o Organogenesis o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture. • **R-DNA technology-** o Gene cloning o Enzymes involved in Gene cloning o Vectors used for Gene cloning.	**15 Lectures**
Unit III : Biostatistics and Bioinformatics • **Biostatistics:** o The chi square test. o Correlation – Calculation of coefficient of correlation. • **Bioinformatics** o Information technology: History and tools of IT, Internet and its uses**.**	**15 Lectures**

○ Introduction to Bioinformatics- goal, need, scope and limitation ○ Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez, ○ BLAST ○ Bioinformatics programme in India.	

Semester III USBOP3 **Cr 1** **PRACTICAL - Paper III CURRENT TRENDS IN PLANT SCIENCES I**
Horticulture 1 Study of five examples of plants for each of the garden locations as prescribed for theory 2 Preparation of garden plans – formal and informal gardens 3 Bottle and dish garden preparation.
Biotechnology 4 Various sterilization techniques 5 Preparation of Stock solutions, Preparation of MS medium. 6 Seed sterilization, callus induction 7 Regeneration of plantlet from callus. 8 Identification of the cloning vectors – pBR322, pUC 18, Ti plasmid.
Biostatistics and Bioinformatics 9 Chi square test 10 Calculation of coefficient of correlation 11 Web Search – Google, Entrez. 12 BLAST

UNIVERSITY OF MUMBAI
No. UG/92 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office Circular No. UG/228 of 2009, dated 16th June 2009 relating to syllabus of the Bachelor of Science (B.Sc.) degree course.

They are hereby informed that the recommendations made by the Board of Studies in Biochemistry at its meeting held on 9th April, 2018 have been accepted by the Academic Council at its meeting held on 14th June, 2018 **vide** item No. 4.37 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.Sc. in Biochemistry (Sem - III & IV) has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
2nd ~~July~~ August, 2018

To

The Principals of the affiliated Colleges & Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.37/14/06/2018

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No. UG/ 92 -A of 2018 MUMBAI-400 032 2nd August ~~July~~, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Biochemistry,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

UNIVERSITY OF MUMBAI

Syllabus for the S.Y.B.Sc.
Program: B.Sc.
Course: Biochemistry

(Choice Based Credit System)

(To be implemented from the Academic year 2018-2019

S.Y.B.Sc. Bio-Chemistry Syllabus
Choice Based Credit System
To be implemented from the Academic year 2018-2019
Summary
SEMESTER III

Course Code & title	UNIT	TOPICS	Credits	L / Week
US BCH 301 Bio-organic chemistry & biophysical methods	I	Acids, bases, buffers and ionic equilibria	2	1
	II	Physicochemical principles		1
	III	Microscopy		1
US BCH 302 Fundamentals of Genetics and Physiology	I	Genetics I	2	1
	II	Blood and Body fluids		1
	III	Biological transport mechanisms		1
US BCH 303 Applied Biochemistry I	I	Introduction to microbiology and cell culture	2	1
	II	Fermentation and downstream processing		1
	III	Industrial biotechnology		1
US BCH P3	Practical's based on both courses in theory		3	9

SEMESTER IV

Course Code & Title	UNIT	TOPICS	Credits	L / Week
US BCH 401 Bio-organic chemistry & biophysical methods	I	Enzymology	2	1
	II	Plant growth regulators and endocrinology		1
	III	Approaches to biochemical investigations		1
US BCH 402 Fundamentals of Genetics and Physiology	I	Genetics II	2	1
	II	Movement and locomotion		1
	III	Neurophysiology		1
US BCH 403 Applied Biochemistry II	I	Trends in biotechnology	2	1
	II	Introduction to pharmacology		1
	III	Resource management		1
US BCH P4	Practical's based on both courses in theory		3	9

S.Y.B.Sc. Bio-Chemistry Syllabus
Choice Based Credit System
To be implemented from the Academic year 2018-2019

SEMESTER III

Course Code	Title	Credits
US BCH 301	**Bio-organic chemistry & biophysical methods**	**2 Credits (45 lectures)**
Unit I:	**Acids, bases, buffers and ionic equilibria**	**15 Lectures**
1.1	Definition – pH, pK, pKw, isoelectric pH, buffer, buffering capacity	
1.2	Derivations: Ionic product of water, Hendersen–Hasselbalch equation,	
1.3	Relation between pI, $pKa_1$and $pKa_2$for a neutral, acidic and basic amino acid	
1.3.1	Ionization and titration curves of glycine, lysine and aspartic acid; pKa, pHm, and pI values of these amino acids	
1.3.2	Sorensen's reaction and formol titration of amino acids	
1.4	Physiological buffers: Hb - HHb, carbonate-bicarbonate, phosphate and protein	
1.5	Numerical on above concepts.	
Unit II:	**Physicochemical principles**	**15 Lectures**
2.1	Diffusion and osmosis	
2.1.1	Ways of expressing solute concentration - mole, molal, normal, percent, activity & ionic strength.	
2.1.2	Diffusion & diffusion coefficient and factors affecting diffusion of solute in solution	
2.1.3	Osmosis - Vant Hoff's law of osmotic pressure law & mathematical expression (no derivation), mechanism of osmosis, role of osmosis in physiology.	
2.1.4	Renal dialysis: Principles and process	
2.2	Colloids and viscosity	
2.2.1	Colloidal state in relation to surface forces, surface area, electrical charge, precipitation and	

	flocculation.	
2.2.2	Surface tension and its measurement, factors affecting surface tension Eg. Role of bile in digestion	
2.2.3	Viscosity - definition, measurement; Donnan membrane equilibrium, relation between Donnan equilibrium and osmotic pressure.	
Unit III:	**Microscopy**	**15 Lectures**
3.1	History, Basic principles of microscopy, of light and colour.	
3.2	Dissection and compound microscope: Construction and parts of a microscope, function of each part, levels of magnification, concept of refractive index and role of oil in magnification	
3.3	Specialized microscopy I	
3.3.1	Differential interference contrast (DIC),	
3.3.2	Phase contrast,	
3.3.3	Dark Field	
3.4	Specialized Microscopy II	
3.4.1	Simple fluorescence microscopy	
3.4.2	Confocal microscopy	
3.4.3	Electron microscopy • Principle, applications and comparative study • Types - SEM and TEM	

Course Code	Title	Credits
USBCH302	**Fundamentals of Genetics and Physiology**	**2 Credits (45 lectures)**
Unit I:	**Genetics: I**	**15 lectures**
1.1	**History**: Contributions of Mendel, Bateson, Hardy-Weinberg, Garrod, Morgan, Griffith, Beadle and Tatum, Avery, Mac Leod, Mc Carthy, Lederberg, Tatum, Barbara Mclintock, Hershey & Chase, Watson &Crick.	
1.2	**Mendelian genetics**: Mendel's experiments - Monohybrid, Dihybrid crosses, Laws of inheritance	
1.3	Dominance, recessivity, co dominance, incomplete (semi) dominance, lethal genes	

1.4	Gene interaction -Epistasis, types of epistasis, multiple alleles, maternal effects	
1.5	Numerical on above concepts	
Unit II:	**Blood and Body Fluids**	**15 lectures**
2.1	**Fluid compartments of the body**–ICF and ECF	
2.2	**Blood**: Composition, characteristics and function; role of plasma proteins, Starlings hypothesis; blood clotting **and** factors involved	
2.3	**Bile**: Composition, characteristics and function; storage	
2.4	**Urine**: Composition–normal and abnormal constituents; formation of urine.	
2.5	**Lymph**: Composition, Formation and Circulation	
Unit III:	**Biological transport mechanisms**	**15 lectures**
3.1	**Transport in plants**: Role of xylem and phloem	
3.2	**Transport in blood:**	
3.2.1	Transport of gases CO_2 and O_2, Role of hemoglobin, O_2 dissociation curves, Bohr effect Chloride shift	
3.2.2	Transport of Metabolites: transport of lipids – lipoproteins and their types, role of plasma protein, albumin in transport of metabolites and drugs	
3.2.3	Transport of Ions: Fe -Ferritin and transferrin and calcium	
3.3	**Transport** a**cross cell membrane*s***	
3.3.1	Channel proteins and Carrier proteins	
3.3.2	Passive transport (simple and facilitated diffusion) with suitable examples; concept of symport, antiport, uniport, Endocytosis and Exocytosis – with one example each	
3.3.3	Active transport: primary–Na^+&K^+ pump, secondary Glucose-amino acid transport, types of glucose transporters (GLUT 1 to GLUT 4), aquaporins, ion channel inhibitors like gramicidin and valinomycin	

Course Code	Title	Credits
USBCH 303	**Applied Biochemistry I**	**(45 lectures)**
Unit I:	**Microbiology in Human Health and Diseases**	**15 lectures**
1.1	Beneficial Microorganism: Lactobacillus, Normal flora of human gut, Probiotics, Yeast, Nitrogen fixing bacteria (Rhizobium and Azotobacter)	
1.2	Harmful microorganisms:	
1.2.1	Air borne- *Mycobacterium tuberculae*(Tuberculosis), *Corynebacterium diptheriae*(Diptheria), *Candida* sp., *Haemophilus influenza*e (Influenza), morbillivirus (measles)	
1.2.2	Water borne- *Shigella sp.* (Dysentery), *Vibrio cholerae* (Cholera), *Salmonella sp.* (Enteric fever), *Hepatitis virus*	
1.2.3	Food borne- *Staphylococcus aureus, Clostridium botulinum (Botulism)*	
1.2.4	Soil borne- *Clostridium tetani*	
1.3	Virology- General structure of a typical virus, classification of viruses based on genome (DNA, RNA); symmetry (helical, icosahedral, complex), host (bacteria, plant, animal, insect); Lytic and Lysogenic cycle	
Unit II:	**Cell and Tissue Culture**	**15 lectures**
2.1	Plant Tissue Culture:	
2.1.1	History, Introduction or definition (explants, callus, dedifferentiation, re-differentiation) concept of totipotency	
2.1.2	Culture techniques; Types of culture (Callus culture, Organ culture, protoplast culture, cell culture)	
2.1.3	Applications: secondary metabolites in plant culture, Micropropagation	
2.2	Animal Cell Culture:	
2.2.1	History, Introduction to Primary cell culture, Cell lines (Finite and continuous)	
2.2.2	Culture techniques used for primary culture,	
2.2.3	Stem cell culture, Animal Organ Culture, Whole embryo culture	
2.2.4	Applications: hybridoma (monoclonal antibody), production of Vaccines	

Unit III:	**Industrial Biochemistry**	**15 lectures**
3.1	Basics of fermentation	
3.1.1	Typical Fermenter, Types of Fermenters (CSTF, Bubble cap, Airlift, Fluidized Bed reactor)	
3.1.2	Industrial production of wine, penicillin	
3.2	Immobilized Enzyme: Introduction, Methods of immobilization (entrapment, adsorption, covalent binding, microencapsulation, cross linking)	
3.2.1	Stabilization of soluble enzyme (solvent and substrate stabilization, enzyme stabilization by polymer. Salts and chemical modification)	
3.3.2	Applications	
3.3	Biosensors: Features of Biosensors, classification based on transducers, applications	
3.4	Single Cell proteins and their applications	

References

Semester III

1. Hall John E ; Guyton : Textbook of Medical Physiology Elsevier publishers
2. Tortora G J, Derrickson B H; Principles of Anatomy and Physiology, Wiley publishers
3. David L. Nelson, Michal M. Cox, Lehniger Principles of Biochemistry, W. H. Freeman & company, New york, 4th edition
4. J. L. Jain, Fundamentals of Biochemistry, S. Chand & company, 2005 edition
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6. U. Satyanarayan, Biochemistry, Books & allied (P) Ltd., Kolkata, 3rd edition
7. Murry, R. K. & others, Harper‟s Biochemistry, Appleton & Lange, california, 21st edition.
8. J.B.Russel, Genetics
9. Benjamin Lewin, Gene VII, Oxford University Press
10. M.W. Strickberger, Genetics
11. William & Wilson
12. Michael J. Pelczar, Jr; E.C.S. Chan; Noel R. Krieg; Microbiology Tata McGraw Hill
13. S S purohit, Biotechnology fundamental and applications
14. U. Satyanarayan; Biotechnology
15. Jogdand, Advances in biotechnology
16. Willium Frazier, Dennis C. Westhoff; Food Microbiology; The McGraw hill Companies
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18. David Freifelder, Microbial genetics
19. Gardner E J, Simmons M J, Snustad P D; Principles of Genetics, Wiley
20. Harvey Lodish , Arnold Berk ,Paul Matsudaira, Chris A., Kaiser, Monty Krieger , Matthew P. Scott , Lawrence Zipursky, James **Darnell,** Molecular Cell Biology, Wiley
21. S.K. Verma and Mohit Verma; Plant physiology, Biochemistry and Biotechnology

SY.B.Sc BIOCHEMISTRY
Practical Syllabus P3

P3 (301)

1) a] Preparation of beta Amylase/Urease/Invertase extract demonstration of the activity Qualitatively.

   b] Determination of the Achromic point of Salivary Amylase.

2) Preparation of Buffers and measurement of pH using pH papers and pH meter.

3) Acid – Base titration of a polyprotic acid [H_2CO_3/H_3PO_4/Glycine hydrochloride]

4) a] A study of some methods of cell rupture: effect of hypo, hyper and isotonic solutions on cells of the onion peel /plant cell (Hydrilla/ Vallisneria/ Spirogyra)

   b] Effect of organic solvents on cell rupture

5) Determination of the Viscosity of sucrose solution using Ostwald's Viscometer.

6) Demonstration of Osmosis through a semi permeable membrane. Potato Osmometer

P3 (302)

1) Mendel's Laws:

   a] Problems based on the laws

   b] case studies based on the laws

2) A study of Human Karyotypes.

3) Isoelectric precipitation of Casein using an indicator.

4) Field visit /Assignment on vermiculture, organic farming, composting, biogas plant followed by a detailed report of at least one [the visit is recommended with the report, but in case it is not possible an assignment is mandatory]

P3 (303)

1) Demonstration of the working of an autoclave and a hot air oven.

2) Optimization of curd – a demonstration.

3) Sterility testing of air by plate exposure technique. [in sterile zone, in lab] and of tap water.

4) A study of various culture inoculation methods. (streak plate, pour plate and spread plate methods).

5) Cell count in a culture medium using optical density

6) Determination of the zone of inhibition of microorganisms using the agar well method and disc method.

7) Flow sheet diagrams of industrial preparation of: a vitamin, an antibiotic, a food item, an enzyme and an alcohol.

Semester IV

Course Code	Title	Credits
USBCH 401	**Bio-organic chemistry & biophysical methods**	**2 Credits 45 lectures**
Unit I:	**Enzymology**	15 lectures
1.1	Definition – Enzyme, coenzyme, cofactor, apoenzyme, holoenzyme, prosthetic group, active site , enzyme specificity, Turnover number, specific activity, Katal, IU.	
1.2	IUB / EC classification upto one digit. Enzyme specificity :Fischers lock & key and Koshlands induced fit theories	
1.3	Activation energy, mechanism of enzyme action (concept of active site, single and bi- substrate reaction), factors affecting enzyme activity – substrate concentration, pH, temperature	
1.4	Enzyme kinetics – Derivation of Michaelis - Menten equation and Lineweaver Burk plot for mono-substrate reactions and numerical problems based on them.	
1.5	Enzyme inhibition – Reversible and Irreversible; competitive and non competitive, (one example of each) Numerical problems on above.	
Unit II:	**Plant growth regulators and endocrinology**	15 lectures
2.1	Plant growth regulators- Structure and function of- auxins, gibberellins, cytokinins, ethylene and abscisic acid.	
2.2	Definition of hormones, hormone receptor, endocrine & exocrine glands	
2.3	Classification of hormones on the basis of:	
2.3.1	Distance of target tissue - autocrine, paracrine, endocrine. Hierarchal organization of the mammalian endocrine system	
2.3.2	Chemistry - One example for each sub class.	
2.4	Chemistry & physiological role of thyroxine, oxytocin & vasopressin, Physiological role of glucocorticoids, FSH, LH, Estrogen, Progesterone (Reproductive cycle) Mode of action of steroid hormones and epinephrine. (amplification cascade Only till the level of protein kinase A) G protein not to be covered.	
Unit III:	**Approaches to Biochemical investigations**	15 lectures
3.1	Whole animal and plant studies - the advantages and	

	disadvantages of any four model systems for biochemical investigation (e.g. *E.coli*, yeast, *Dictyostelium*, *C. elegans*, Drosophila, *Arabidopsis)*	
3.2	Organ & tissue studies	
3.3	Isolated and cultured tissue and cell techniques: isolation, culture and counting of cells.	
3.4	*Cell Fractionation*	
3.4.1	Cell rupture – solid shear, liquid shear, high pressure, ultrasound, osmotic shock, chemical treatment (enzyme, organic solvent), temperature.	
3.4.2	Choice of suspension medium (isotonic & hypotonic solution, PBS) and separation methods.	

Course Code	Title	Credits
USBCH402	**Fundamentals of Genetics and Physiology**	**2Credits 45 lectures**
Unit I:	**Genetics: II**	15 lectures
1.1	**Genome organization**	
1.1.1	Prokaryotic Genome: Nucleoid structure	
1.1.2	Eukaryotic chromosomes: Packaging of DNA(upto Solenoid structure), DNA supercoiling, Topoisomerase, Chromatin structure -Euchromatin, Heterochromatin, structure of condensed chromatin, Centromere, kinetochore, telomere, Comparison of chromosomal structure in prokaryotes and Eukaryotes	
1.2	**Recombination in prokaryotes**	
1.2.1	Transformation: Transformation in *S. pneumoniae*	
1.2.2	Transduction: General features with one example	
1.2.3	Conjugation: Mechanism F+, F- and Hfr strain	
Unit II:	**Movement and locomotion**	15 lectures
2.1	**Movement in plants**	
2.1.1	Movements of Locomotion Spontaneous: Ciliary, Amoeboid, Cyclosis (Rotation, Circulation) Induced: Chemotaxis, Phototaxis, Thermotaxis	
2.1.2	Movements of Curvature: Mechanical: hygroscopic movements Vital:i)Spontaneous-movements of growth(nutation, circumutation, Hyponasty, epinasty); movements of variation ii)Induced–Tropic-hapto/geo/hydrotropism; Nastic–seismonasty, Nyctynasty	
2.2	**Muscle contraction**	
2.2.1	Structural organization of a muscle fibre, myofibril	
2.2.2	Contraction and Relaxation of Muscles; -mechanisms, Other types of contractions–e.g. twitch, tetanus, Isotonic, Isometric regulation of Muscle contraction	
Unit III:	**Neurophysiology**	15 lectures
3.1	**Nervous System Classification:** CNS,PNS; Components: Neurons (3types) and Neuroglia(6types)–structure and function, Axonal transport	

3.2	**Nerve impulse transmission:** Resting Membrane Potential, ion channels [voltage and ligand gated], Action Potential (depolarization, polarization and refraction period), propagation of action potential (salutatory & continuous conduction)	
3.3	**Synaptic transmission**: Physiological anatomy of a synapse;– Electrical & Chemical synapses, Excitatory & inhibitory postsynaptic potentials, Agonists & Antagonists, inactivation of Neurotransmitter	
3.4	**Neurotransmitters**: Structure and function of acetylcholine, catecholamines, GABA, glutamate, glycine	

Course Code	Title	Credits
USBCH 403	**Applied Biochemistry II**	**2 Credits 45 lectures**
Unit I:	**Trends in Biotechnology:**	**15 lectures**
1.1	*Bioremediation:*	
1.1.1	Introduction to terms – Bioremediation, Biotransformation, Xenobiotics, Recalcitrant xenobiotics, Biomagnification, Factors affecting bioremediation	
1.1.2	Types of Bioremediation (*Insitu*, *Exsitu)*; Types of reactions (Aerobic, anaerobic, sequential)	
1.1.3	Applications of Biodegradation - hydrocarbons, (Oil spills) Pesticides and herbicides,Heavy metals (Uranium) contaminated soil and waste land, Ground Water; Genetically Engineered Microbes in bioremediation.	
1.2	Biopesticides:	
1.2.1	Introduction; Types of Biological Control (Classical, inoculation, Inundation);	
1.2.2	Examples each of Bacterial, Viral, Fungal and Protozoal biopesticide .	
1.3	Biofungicide: Examples and applications	
1.4	Biofertilizers: Examples and applications	
Unit II:	**Introduction to Pharmacology**	**15 lectures**
2.1	Scope of pharmacology	
2.2	Sources, Classification, Chemical & physical properties of drug and Nomenclature of drugs	
2.3	Dosage forms and routes of drug administration; Factors affecting dosage and drug delivery	
2.4	Pharmacokinetics: LD 50, ED 50 Half Life, Loading dose, Maintenance dose (Explanation of terms only); Therapeutic index	
2.5	Novel Drug delivery system (NDDS):	
2.5.1	2.5.1 Transdermal and oral modes	
2.5.2	2.5.2 Liposomes and nanoparticles	
Unit III:	**Resource management**	**15 lectures**
3.1	Solid waste: Types of waste, treatment, recycling	

3.2	Waste water- sewage-	
3.2.1	Composition of sewage, types of sewage, detection of pathogenic organism of sewage; preliminary treatment, primary treatment	
3.2.2	Secondary treatment; tertiary treatment, disinfectant	
3.2.3	Sludge treatment and disposal; waste water collection vs sewage treatment in developing countries	
3.3	Biomass and Bio energy production	
3.3.1	Biofuel and Biomass: Fossil fuel; Energy rich crops (sugar and starch; wood-rich; petroleum plants); Animal energy; Sources of biofuel, its cultivation and extraction process	
3.3.2	Biogas: Production, Composition, Applications. Gobar gas. [MSW and LFG, Renewable natural gas, NG vehicle]	

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Semester IV

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3 David Freifelder, Microbial genetics
4 A.H. Patel, Industrial microbiology, Macmillan India Ltd.
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13 M W Strickberger, Genetics
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15 David L. Nelson, Michael M. Cox, Lehninger; Principles of Biochemistry, W H Freeman & Co.
16 Tortora G J, Derrickson B H; Principles of Anatomy and Physiology, Wiley
17 Harvey Lodish , Arnold Berk ,Paul Matsudaira, Chris A., Kaiser, Monty Krieger , Matthew P. Scott , Lawrence Zipursky, James Darnell**,** Molecular Cell Biology, Wiley
18 S.K.Verma and Mohit Verma, Plant physiology, Biochemistry and Biotechnology

S.Y.B.Sc. BIOCHEMISTRY

Practical Syllabus P4

P4 (401)

1) Parts and maintenance of a microscope.
2) A study of electron micrographs of cell organelles.
3) Permanent slides of Muscle tissue
4) Recrystallization of Benzoic acid and determination of its yield.
5) Ammonium sulphate fractionation of protein and its estimation by a suitable method.
6) Field visit/ assignment on any topic from the syllabus.

P4 (402)

1) Blood experiments:
   i] Determination of total RBC count
   ii] Determination of total WBC count
2) Urine analysis :
   i] Normal constituents - Urea, Uric acid, Chloride
   ii] Abnormal constituents – Glucose, Protein Ketone bodies, bile salts and bile pigments.
   iii] Titratable acidity [using neutral red or phenol red]
3) Bile :
   i] Detection of Bilirubin [Iodine test / Gmelin's Nitric acid test / Fouchet's test]
   ii] Detection of Bile salt [Pettenkofer's test. Hays sulphur test]
4) A demonstration of online muscle twitch.
5) Demonstration of plant movement. [A project to be handled in a group. Each group to plan and execute the experiment in any way they choose. Results to be presented to the class during a practical turn.]

P4 (403)

1) Isolation of DNA from Onions and confirmation by DPA test
2) Determination of the Minimum Inhibitory Concentration of any one disinfectant.
3) Determination of the potability of water by conducting a coliform count. [MPN]
4) Gram stain of sewage.
5) Determination of the Chemical Oxygen demand of an effluent / sewage.
6) Preparation of immobilized yeast/ amylase and determination of enzyme activity.

SEMESTER END THEORY ASSESSMENT (100 marks) Duration of the examination shall be of **3 hours**. The theory question paper pattern suggested is as follows:

1. There shall be four questions of 25 marks each.
2. On each unit there will be one question and fourth question will be based on all the units.
3. All questions shall be compulsory with internal choice within the questions.
4. The questions may be subdivided into sub questions as A, B, C etc.

THEORY:

Q1, Q2, Q3 to be based on Unit I, Unit II and Unit III of **25 marks** each and Q4 to be subdivided into A and B of 10 and 15 marks respectively based on Unit I, Unit II and Unit III. **Total 25 marks.**

Options available: (**For Q1, Q2, Q3**) **25 marks each.**

A. Objective: (No Internal options) **04 marks**
Match the following / Answer in one sentence /Define / Give an example / Name the following/ True or false.: Attempt 4 out of 6

B. Answer the following: Attempt 3 out of 6, each of 3 marks, **09 marks**

C. Attempt 2 out of 4, each of 6 marks **12 marks**

Q4 to be subdivided into 2 parts A and B based on Unit I, Unit II and Unit III **Total 25 marks**

A. Define/ Explain the term: Attempt 5 out of 7, each of 2 marks. **10 marks**

B. Attempt 3 out of 6, each of 5 mark with two questions from each unit. **15 marks**

PRACTICAL:

Term End Exam: Practical **40 marks +** Journal **05 marks +** Viva **05 marks= Total 50 marks**

Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

All HODs/ coordinators are instructed to fill the following as per the academic year. Each subject's program outcome/ Course outcome has to be filled. The new syllabus of all subjects has it which can be used for reference. Please fill for the following academic years and mention it correctly, even if the same syllabus was followed for subsequent academic year you will have to fill it. Following is the example for your reference:

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Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

Academic year : 2022-2023

Name of Department: English

Class: S.Y.B.A. English (Ancillary)

Program Outcomes:

To create interest and develop passion amongst learners towards drama (and theatre)
To familiarize learners with the salient elements and characteristics of drama
To introduce learnersto different forms and types of drama
To introduce learners to the trends and characteristics of significant dramatic movements through representative dramas
To equip the learners with the tools and techniquesto critically appreciate drama
To inculcate and propagate human values reflected in the plays among learners
To demonstrate that drama is reflection / representation of life
To Develop analytical skills and critical thinking through close reading of drama

To introduce students to different genres and forms of poetry
To sensitize them to the rhythmical and formal properties of poetry by introducing key elements of poetry
To provide them with basic poetic devices for analyzing poems
To introduce them to the trends and characteristics of significant poetic movements through representative poems
To develop their skills in reading, writing and to critically appreciate poetry
To introduce students to poetry produced in various social and cultural context

- 1. To introduce the students to some major aspects of communication and mass communication. 2. To develop among the students a broad perspective of the past and the present status of Mass Media in India.
- 3. To develop among the students a critical understanding of the Mass Media with regard to their presentation formats, roles and audiences in Indian context.
- 4. To develop among the students a critical understanding of some special roles of different Mass Media in India.
- 5. To help the students to assess the contribution of Indian mass media to national development. 6. To acquaint the students with some issues and laws related to mass media in India.
- 7. To introduce the students to various job and career opportunities in media industry.

Program Specific Outcomes:

- By the end of the course the students should be able to receive and analyse various media products critically and become interested in jobs or career in Media Industry.
-

SEMESTER - III

Course Code: - UAENG301	**Course Title:** Introduction to Drama Paper II

Course Outcomes:

- develop interest and passion for drama (and theatre).
- be familiarized with the salient elements and characteristics of drama.
- be able to identify the different forms and types of drama.
- be capable to identify the varioustrends and characteristics of significant dramatic
- movements through the representative dramas.
- be equipped with the tools and techniquesto critically appreciate drama.
- imbibe human values reflected in the selected plays.
- justify that drama is reflection / representation of life.
- develop analytical skills and critical thinking through close reading of the represnttative
- dramas.

Course Code: UAENG302	**Course Title:** Introduction to Poetry Paper III

Course outcomes:
The students would be able :
Identify different genres and forms of poetry
Identify poetic technique, style and rhetorical devices used in poetry
Critically appreciate poems by separating various component parts and investigating the relationship of the parts to the whole
Demonstrate understanding of wide range of poems from different historical periods, written in a wide range of forms, styles and subject matter
Identify the major poets of world literature and define the importance of their works
Enhance their cultural sensitivity through reading of representative poems from diverse cultural context

Course Code: UAMASSCOM301	**Course Title:** Mass Communication 1

Course outcomes:
The students would be able :

- 1. To introduce the students to some major aspects of communication and mass communication. 2. To develop among the students a broad perspective of the past and the present status of Mass Media in India.
- 3. To develop among the students a critical understanding of the Mass Media with regard to their presentation formats, roles and audiences in Indian context.
- 4. To develop among the students a critical understanding of some special roles of different Mass Media in India.
- 5. To help the students to assess the contribution of Indian mass media to national development. 6. To acquaint the students with some issues and laws related to mass media in India.
- 7. To introduce the students to various job and career opportunities in media industry.

Course Code:	**Course Title:**

Course Outcomes:
The students would be able :

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Course Code:	**Course Title:**

Course outcomes:

The students would be able : •	
Course Code:	**Course Title:**
Course outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
SEMESTER IV	
Course Code: UAENG401	**Course Title: :** Introduction to Drama Paper II Paper II
Course Outcomes: The students would be able : • develop interest and passion for drama (and theatre). • be familiarized with the salient elements and characteristics of drama. • be able to identify the different forms and types of drama. • be capable to identify the varioustrends and characteristics of significant dramatic • movements through the representative dramas. • be equipped with the tools and techniquesto critically appreciate drama. • imbibe human values reflected in the selected plays. • justify that drama is reflection / representation of life. • develop analytical skills and critical thinking through close reading of the represnttative • dramas.	
Course Code: UAENG402	**Course Title:** Introduction to Poetry - Paper III
Course Outcomes: The students would be able : **• Identify different genres and forms of poetry** **• Identify poetic technique, style and rhetorical devices used in poetry** **• Critically appreciate poems by separating various component parts and investigating the relationship of the parts to the whole** **• Demonstrate understanding of wide range of poems from different historical periods, written in a wide range of forms, styles and subject matter** **• Identify the major poets of world literature and define the importance of their works** **• Enhance their cultural sensitivity through reading of representative poems from diverse cultural context**	
Course Code: UAMASSCOM401	**Course Title:** Mass Communication

Course Outcomes:

The students would be able :

- 1. To introduce the students to some major aspects of communication and mass communication. 2. To develop among the students a broad perspective of the past and the present status of Mass Media in India.
- 3. To develop among the students a critical understanding of the Mass Media with regard to their presentation formats, roles and audiences in Indian context.
- 4. To develop among the students a critical understanding of some special roles of different Mass Media in India.
- 5. To help the students to assess the contribution of Indian mass media to national development. 6. To acquaint the students with some issues and laws related to mass media in India.
- 7. To introduce the students to various job and career opportunities in media industry.

Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

-

Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

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Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

-

Course Code:	**Course Title:**

Course Outcomes:

The students would be able :

-

University of Mumbai

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme Second Year Semester III and IV

Under Choice Based Credit, Grading and Semester *System*

With effect from Academic Year- 2017-2018

Board of Studies-Financial Markets

S.Y.B.Com. (Financial Markets)

(To be implemented from Academic Year- 2017-2018)

No. of Courses	Semester III	Credits	No. of Courses	Semester IV	Credits
1	***Discipline Related Elective Courses (DRE)***		***1***	***Discipline Related Elective Courses (DRE)***	
1, 2 & 3	*Any three courses from the following list of the courses	**09**	1,2 & 3	*Any three courses from the following list of the courses	**09**
2	***Ability Enhancement Courses (AEC)***		***2***	***Ability Enhancement Courses (AEC)***	
2A	Ability Enhancement Compulsory Course		2A	Ability Enhancement Compulsory Course	
4	Business Law -1	**03**	4	Business Law -2	**03**
2B	Ability Enhancement Elective Course		2B	Ability Enhancement Elective Course	
5	*Any one course from the following list of courses	**02**	5	*Any one course from the following list of courses	**02**
3	***Core Courses (CC)***		***3***	***Core Courses (CC)***	
6	Management Accounting	**03**	6	Corporate Finance	**03**
7	Computer Skills – 2	**03**	7	Business Economics -2	**03**
	Total Credits	**20**		**Total Credits**	**20**

List of Ability Enhancement Elective courses (AEEC) Courses for Semester III (Any One)		***List of Ability Enhancement Elective courses (AEEC) Courses for Semester IV (Any One)***	
1	Foundation Course in Financial Markets FC III- Money Market	1	Foundation Course in Financial Markets FC IV- Foreign Exchange Markets
2	Foundation Course–Contemporary Issues- III	2	Foundation Course–Contemporary Issues- IV
3	Foundation course in NSS III	3	Foundation course in NSS IV
4	Foundation Course in NCC III	4	Foundation Course in NCC IV
5	Foundation Course in Physical Education III	5	Foundation Course in Physical Education IV

List of Discipline Related Elective(DRE) Courses for Semester III (Any Three)		***List of Discipline Related Elective(DRE) Courses for Semester IV (Any Three)***	
1	Debt Markets-1	1	Debt Markets-2
2	Equity Markets-1	2	Equity Markets-2
3	Commodities Markets	3	Commodities Derivatives
4	Portfolio Management	4	Merchant Banking
5	Treasury Management	5	Personal Financial Planning
Note: Course/ Subject on Debt Markets and Equity Markets selected in Semester III will continue in Semester IV			

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester III

No. of Courses	Semester III	Credits
1	***Discipline Related Elective Courses (DRE)- Select any three***	
A	Debt Market- 1	**03**
B	Equity Market- 1	**03**
C	Commodities Market	**03**
D	Portfolio Management	**03**
E	Treasury Management	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Law - 1	**03**
2B	****Ability Enhancement Elective Courses (AEEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Management Accounting	**03**
7	Computer Skills -2	**03**
	Total Credits	**20**

****List of Ability Enhancement Elective Courses (SEC) for Semester III (Any One)***	
1	Foundation Course - in Financial Markets- FC III –Money Market
2	Foundation Course–Contemporary Issues- III
3	Foundation Course - NSS – III
4	Foundation Course - NCC – III
5	Foundation Course - Physical Education – III

1.Debt Market - 1

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to the debt markets	15
2	Instruments & players in debt markets	15
3	Bonds	15
4	Valuation of bonds	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to the debt markets**
	• Evolution of Debt Markets in India • Primary market & secondary market • Money market & Debt Market in India • Fundamental features of debt instruments • Regulatory framework in the Indian debt market
2	**Instruments & players in debt markets**
	• central government securities: bonds, t-bills, state government bonds, • Open market operations • Securities Trading Corporation of India • Primary dealers in Government Securities • Clearing Corporation of India
3	**Bonds**
	• Features of bonds • Types of bonds • Issuers of bonds • Bond ratings- importance & relevance and rating agencies.
4	**Valuation of bonds**
	• Determinants of the value of bonds • Bond Mathematics • Yield Curve Analysis

2.Equity Markets -1

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Equity Markets- Introduction	15
2	Primary Market	15
3	Secondary Market	15
4	Importance of Equity Markets in developing country like India	15
	Total	**60**

Sr. No.	Modules / Units
1	**Equity Markets- Introduction**
	• Meaning and Definition of equity shares • Growth of Corporate Sector and the simultaneous growth in the number of equity shareholders • Separation of ownership and management in companies • Development of equity culture in India- Current position
2	**Primary Market**
	• IPO - Methods followed, Book Building, Offer for sale • Role of Merchant bankers in fixing the price • Red – Herring Prospectus – it's unique features • ASBA and its features • Green Shoe option • Sweat equity, ESOP • Rights issue of shares, Non voting shares ,ADR, GDR,IDR
3	**Secondary Market**
	• Definition and functions of stock Exchanges • Evolution and Growth of Stock Exchanges in India • NSE, BSE, SME Exchanges and Overseas Stock Exchanges • Recent Development in Stock Exchanges, Merger of SEBI with FOMC • Stock Market Indices
4	**Importance of Equity Markets in developing country like India**
	• Need for attracting more investors towards equity • Need for strengthening secondary markets • Link between Primary Market and Secondary Market

3.Commodities Markets

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Commodity Market	15
2	Commodity market in India.	15
3	Commodity Exchanges	15
4	Strengthening Commodity Market in India	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Commodity Market**
	• Emergence of Commodity Market • Dynamics of global commodity markets
2	**Commodity Market in India**
	• Commodity Exchanges in India • Role of Information in Commodity Markets • Linkages between equity markets and commodity markets • Commodity markets - Logistics and Warehousing
3	**Commodity Exchanges**
	• Function & Role • Trading & Clearing methods • Commodity futures • Commodity Specific Exchanges Vs Multi Commodity Exchanges
4	**Strengthening commodity markets in India.**
	• Role of Government • Role of Commodity Exchanges • Other Institutions • Training & development of Dealers

4. Portfolio Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to portfolio management	15
2	Portfolio Management Strategies	15
3	Portfolio Analysis	15
4	Portfolio Revision and performance management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to portfolio management**
	Investment process, Investment categories, defining investment goals and objectives, Investment constraints Process of asset allocation, different approaches to allocation decision, overview of allocation techniques
2	**Portfolio Management Strategies**
	Active strategy, passive strategy, semi active strategy, duration shift and immunization, efficient market hypotheses, top down and bottoms up
3	**Portfolio Analysis**
	Analysis: Diversification, portfolio risk and return, single index model, The sharpe index model, Portfolio Beta Selection: Markowitz Risk- Return optimization, concept of utility, Sharpe optimization model, Geometric mean model, Safety First model, Stochastic Dominance Model
4	**Portfolio Revision and performance management**
	Revision: Portfolio rebalancing, portfolio upgrading, Formula plans, constant ratio plan, variable ratio plan, selection and revision of equity portfolio Performance measurement: Methods of calculating rate of return, Money weighted rate of return, Time weighted rate of return, Linked internal rate of return, Buying the index approach, Sharpe's- Treynor's – Jensen's performance measure of portfolio

5.Treasury Management

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Understanding Treasury Management	15
2	Classification of treasury markets and Treasury Services	15
3	Cross currency forwards, present and future value	15
4	Treasury Risk Management	15
	Total	**60**

1	**Understanding Treasury Management**
	Treasury- it's evolution, importance, ideal treasury department, front office, mid office and back office Theories of treasury management Functions of treasury department Liquidity management in treasuries Banking relationship Credit management Treasury objectives and approaches
2	**Classification of treasury market and Treasury Services**
	Domestic or National Treasury Market Forex or International Treasury Features, products, dimensions, ideal ticket size, regulatory framework Treasury Services: Bank Treasury, Government Treasury, Corporate Treasury
3	**Cross Currency forwards, present and future value**
	Calculation of premium, discount etc, pre utlisation of contracts Exchange rate movement- volatility of major currencies Exchange rate and interest rate arbitrage- NDF Markets Cross Currency futures FEDAI Guidelines for merchant quotes
4	**Treasury Risk Management**
	Treasury risk management policy, control and reporting requirements Open position- day end, day light and overnight position limits- limit orders with other banks Mismatch of positions- gap limits- individual and aggregate, stop loss limits, VAR and Capital positions Developing risk framework for organization

4.Business Law-1

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Contract Act	15
2	Special Contracts	15
3	Sale of Goods Act	15
4	Negotiable Instruments Act	15
	Total	**60**

1	**Indian Contract Act**
	Indian Contract Act 1872 Definitions (S.2): Agreement, kinds of Agreements, Contract- kinds ofcontracts: Valid, Void, Voidable, Contingent and Quasi Contract and Econtract,distinguish between Agreement and Contract. Offer or Proposal- definition, Essentials of Valid proposal or offer, counteroffer, Standing or open offer, distinguish between offer and invitation to offer, Acceptance-definition, Essentials of a valid acceptance, Promise, Communication of Offer and acceptance and Revocation. Capacity to contract (Ss.10-12), Consent and Free Consent (Ss.13-22) Consideration (S.2 and 25) and Void Agreements (Ss.24-30)
2	**Special Contracts**
	Law of Indemnity and Guarantee (Ss.124-125, Ss-126-129,132-147) Law of Bailment and pledge (Ss. (Secs148,152-154,162, 172,178,178A and 179) Law of Agency (S. 182-185& 201-209only)
3	**Sale of Goods Act**
	Introduction, Definitions (Sec-2), Formalities of the contract of sale (Ss. 4-10), Distinction between 'sale' and 'agreement of sell, Distinction between 'sale and hire-purchase agreement' Conditions and Warranties (11-17) Transfer of property as between the seller and the buyer (sec-18-26) Rights of an unpaid seller (Secs-45-54)
4	**Negotiable Instruments Act**
	Meaning and Characteristics of Negotiable Instrument, Operational rules of Evidence –Presumptions, classification of Negotiable Instruments. Promissory Notes and Bills of Exchange(Ss. 4,5,108-116) Essential elements of Promissory Note and Bill of Exchange, Distinguish Between Promissory note and Bill of Exchange. Acceptor and Acceptance, definition of Acceptor, Acceptance for honour, Absolute and qualified or conditional acceptance, Drawer, Drawee in case of Need(Ss.7,115&116) Payee,Cheques, Types of Cheque and Penalties in case of dishonour of certain cheques, distinguish between cheque and Bill of exchange, (Sec: 6,123-131A,138-147) Miscellaneous Provisions:(Secs:8-10,22,99-102,118-122,134-137)Holder(S.8), Holder in Due Course(S.9), Rights and privileges of H.D.C.Payment in due course (S.10), Maturity of an Instrument (S.22), Noting(S.99), Protest (S.100-102). Bills in Set. (Sec.13)

5.Foundation Course in Financial Markets FC – III- Money Market

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Money Markets	15
2	Regulatory framework of Money Market	15
3	Money Market instruments	15
4	Recent Developments in Money markets	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to money markets**
	Meaning of Money Market, features of money markets, importance of money market: Role of Primary dealers in money markets, Development of trade & industry, Development of capital market, Smooth functioning of commercial banks, Effective central bank control, Formulation of suitable monetary policy, source of finance to government
2	**Regulatory framework of money markets**
	Regulatory framework of RBI, FIMMDA (Fixed Income, Money Market and Derivatives Association) and Foreign Exchange Dealers Association of India (FEDAI), conDS, NDS-OM
3	**Money Market Instruments**
	Conventional: Treasury bills, Money at call and short notice in the call loan market, Commercial bills, promissory notes in the bill market. Modern: Commercial papers, Certificate of deposit, Inter-bank participation certificates, Repo instrument, Banker's Acceptance. Money Market mutual fund: meaning, advantages and disadvantages, regulatory framework for money market mutual funds, various money market funds operational in Indian market
4	**Recent Developments in Money Markets**
	Recent development in Money Market: Integration of unorganized sector with the organized sector, widening of call Money market, Introduction of innovative instrument, Offering of Market rates of interest, Promotion of bill culture, Entry of Money market mutual funds, Setting up of credit rating agencies, Adoption of suitable monetary policy, Establishment of DFHI, Setting up of security trading corporation of India ltd. (STCI)

Foundation Course- Contemporary Issues- III

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Human Rights Provisions, Violations and Redressal	12
2	Dealing With Environmental Concerns	11
3	Science and Technology I	11
4	Soft Skills for Effective Interpersonal Communication	11
	Total	**45**

Sr. No.	Modules / Units
1	**Human Rights Violations and Redressal**
	A. Scheduled Castes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **B.** Scheduled tribes- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **C.** Women- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **D.** Children- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(2 Lectures)** **E.** People with Disabilities, Minorities, and the Elderly population- Constitutional and legal rights, Forms of violations, Redressal mechanisms. **(4 Lectures)**
2	**Dealing With Environmental Concerns**
	A. Concept of Disaster and general effects of Disasters on human life- physical, psychological, economic and social effects. **(3 Lectures)** **B.** Some locally relevant case studies of environmental disasters. **(2 Lectures)** **C.** Dealing with Disasters - Factors to be considered in Prevention, Mitigation (Relief and Rehabilitation) and disaster Preparedness. **(3 Lectures)** **D.** Human Rights issues in addressing disasters- issues related to compensation, equitable and fair distribution of relief and humanitarian approach to resettlement and rehabilitation. **(3 Lectures)**
3	**Science and Technology – I**
	A. Development of Science- the ancient cultures, the Classical era, the Middle Ages, the Renaissance, the Age of Reason and Enlightenment. **(3 Lectures)** **B. Nature of science**- its principles and characteristics; Science as empirical, practical, theoretical, validated knowledge. **(2 Lectures)** **C. Science and Superstition**- the role of science in exploding myths, blind beliefs and prejudices; Science and scientific temper- scientific temper as a fundamental duty of the Indian citizen. **(3 Lectures)** **D. Science in everyday life**- technology, its meaning and role in development; Interrelation and distinction between science and technology. **(3 Lectures)**
4	**Soft Skills for Effective Interpersonal Communication**
	Part A **(4 Lectures)** I) Effective Listening - Importance and Features. II) Verbal and Non-Verbal Communication; Public-Speaking and Presentation Skills. III) Barriers to Effective Communication; Importance of Self-Awareness and Body Language. **Part B** **(4 Lectures)** I) Formal and Informal Communication - Purpose and Types. II) Writing Formal Applications, Statement of Purpose (SOP) and Resume. III) Preparing for Group Discussions, Interviews and Presentations. **Part C** **(3 Lectures)** I) Leadership Skills and Self-Improvement - Characteristics of Effective Leadership. II) Styles of Leadership and Team-Building.

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12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.

Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

5. 2 Foundation Course National Service Scheme Studies (NSSS)

National Service Scheme Studies Paper-III

Modules at a Glance

Sr. No.	Modules	No of Lectures
1	Value System & Gender sensitivity	12
2	Disaster preparedness & Disaster management	10
3	Health, hygiene & Diseases	13
4	Environment & Energy conservation	10
	Total	**45**

Sr. No.	Modules / Units
1	**Value System & Gender sensitivity**
	UNIT - I – Value System Meaning of value, Types of values- human values and social responsibilities- Indian value system- the concepts and its features **UNIT - II - Gender sensitivity and woman empowerment** Concept of gender- causes behind gender related problems- measures Meaning of woman empowerment- schemes for woman empowerment in India
2	**Disaster preparedness & Disaster management**
	UNIT - I - Basics of Disaster preparedness Disaster- its meaning and types Disaster preparedness- its meaning and methods **UNIT - II - Disaster management** Disaster management- concept- disaster cycle - role of technology in disaster response- role of as first responder – the study of 'Avhan' Model
3	**Health, hygiene & Diseases**
	UNIT - I - Health and hygiene Concept of complete health and maintenance of hygiene **UNIT - II - Diseases and disorders- preventive campaigning** Diseases and disorders- preventive campaigning in Malaria, Tuberculosis, Dengue, Cancer, HIV/AIDS, Diabetes
4	**Environment & Energy conservation**
	UNIT - I Environment and Environment enrichment program Environment- meaning, features , issues, conservation of natural resources and sustainability in environment **UNIT - II Energy and Energy conservation program** Energy- the concept, features- conventional and non- conventional energy Energy conservation- the meaning and importance

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5.3 Foundation Course of NCC

NCC Paper-III

Modules at a Glance

Sr. No.	Modules	No of Lectures
1	**National Integration & Awareness**	10
2	**Drill: Foot Drill**	10
3	**Adventure Training and Environment Awareness and Conservation**	05
4	**Personality Development and Leadership**	10
5	**Specialized subject (ARMY)**	10
	Total	**45**

Sr. No.	Modules / Units
1	**National Integration & Awareness**
	Desired outcome: The students will display sense of patriotism, secular values and shall be transformed into motivated youth who will contribute towards nation building through national unity and social cohesion. The students shall enrich themselves about the history of our beloved country and will look forward for the solutions based on strengths to the challenges to the country for its development. • Freedom Struggle and nationalist movement in India. • National interests, Objectives, Threats and Opportunities. • Problems/ Challenges of National Integration. • Unity in Diversity
2	**Drill: Foot Drill**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, turnout, develop the quality of immediate and implicit obedience of orders, with good reflexes. • Side pace, pace forward and to the rear • Turning on the march and whiling • Saluting on the march • Marking time, forward march and halt in quick time • Changing step • Formation of squad and squad drill
3	**Adventure Training, Environment Awareness and Conservation**
3A	**Adventure Training**
	Desired outcome: The students will overcome fear & inculcate within them the sense of adventure, sportsmanship, espirit-d-corp and develop confidence, courage, determination, diligence and quest for excellence. • Any Two such as – Obstacle course, Slithering, Trekking, Cycling, Rock Climbing, Para Sailing, Sailing, Scuba Diving etc.
3B	**Environment Awareness and Conservation**
	Desired outcome: The student will be made aware of the modern techniques of waste management and pollution control. • Waste management • Pollution control, water, Air, Noise and Soil
4	**Personality Development and Leadership**
	Desired outcome: The student will inculcate officer like qualities with desired ability to take right decisions. • Time management • Effect of Leadership with historical examples • Interview Skills • Conflict Motives- Resolution
Sr. No.	**Modules / Units**
5	**Specialized Subject: Army Or Navy Or Air**
	Army

	Desired outcome: It will acquaint, expose & provide knowledge about Army/ Navy/ Air force and to acquire information about expanse of Armed Forces ,service subjects and important battles **A. Armed Force** • Task and Role of Fighting Arms • Modes of Entry to Army • Honors and Awards **B. Introduction to Infantry and weapons and equipments** • Characteristics of 5.56mm INSAS Rifle, Ammunition, Fire power, Stripping, Assembling and Cleaning • Organization of Infantry Battalion. **C. Military history** • Study of battles of Indo-Pak War 1965,1971 and Kargil • War Movies **D. Communication** • Characteristics of Walkie-Talkies • Basic RT Procedure • Latest trends and Development (Multi Media, Video Conferencing, IT) ***OR*** **<u>Navy</u>** **A. Naval orientation and service subjects** • Organization of Ship- Introduction on Onboard Organization • Naval Customs and Traditions • Mode of Entry into Indian Navy • Branches of the Navy and their functions • Naval Campaign (Battle of Atlantic, Pearl Harbour, Falkland War/Fleet Review/ PFR/ IFR)s **B. Ship and Boat Modelling** • Types of Models • Introduction of Ship Model- Competition Types of Model Prepare in NSC and RDC • Care and handling of power-tools used- maintenance and purpose of tools

Sr. No.	Modules / Units
	C. Search and Rescue • Role of Indian Coast Guard related to SAR **D. Swimming** • Floating and Breathing Techniques- Precautions while Swimming ***OR*** **AIR** **A. General Service Knowledge** • Organization Of Air Force • Branches of the IAF. **B. Principles of Flight** • Venturi Effect • Aerofoil • Forces on an Aircraft • Lift and Drag **C. Airmanship** • ATC/RT Procedures • Aviation Medicine **D. Aero- Engines** • Types of Engines • Piston Engines • Jet Engines • Turboprop Engines

5.4 Foundation Course of Physical Education

with Effect from the Academic Year 2017-2018

Physical Education Paper-III

Modules at a Glance

Sr. No.	Modules	No of Lectures
1	**Overview of Nutrition**	10
2	**Evaluation of Health, Fitness and Wellness**	10
3	**Prevention and Care of Exercise Injuries**	10
4	**Sports Training**	15
	Total	**45**

Sr. No.	Modules / Units
1	**Overview of Nutrition**
	• Introduction to nutrition & its principles • Role of Nutrition in promotion of health • Dietary Guidelines for Good Health • Regulation of water in body and factors influencing body temperature.
2	**Evaluation of Health, Fitness and Wellness**
	• Meaning & Concept of holistic health • Evaluating Personal health-basic parameters • Evaluating Fitness Activities – Walking & Jogging • Myths & misconceptions of Personal fitness
3	**Prevention and Care of Exercise Injuries**
	• Types of Exercise Injuries • First Aid- Importance & application in Exercise Injuries • Management of Soft tissues injuries • Management of bone injuries
4	**Sports Training**
	• Definition, aims & objectives of Sports training • Importance of Sports training • Principles of Sports training • Drug abuse & its effects

INTERNAL ASSESSMENT (PRACTICUM)
(25 Marks)

SEMESTER –III

(*Continuous Evaluation during practical sessions conducted for 27 hours)*

a. A learner willing to participate in inter-collegiate/ inter university competitions of any game and sports conducted by the University of Mumbai will be evaluated for 15 marks on the basis of his attendance, sincerity and performance during the training / practice / coaching sessions / camps conducted by the college/University for at least 10 days. It is expected that the colleges should organize training / practice / coaching sessions / camps of various games and sports as per the choice of the learner. However, due to unavailability of the same in his / her college if a learner participates in the training / practice / coaching sessions / camps organized by other organizations or clubs of sports and games, may be considered for evaluation for 15 marks on the basis of the proofs of attendance and participation submitted by a learner.

b. A learner will be taught the following yogic practices by conducting practicals for at least 10 sessions (one hour each) and will be assessed by the concern teacher for marks out of **10** on the basis of his attendance, sincerity and performance.

- **Yogic Practices :-** Shirshasana, Sarvangasana, Matsyasana, Halasana,Bhujangasana, Shalbhasana, Dhanurasana, Ardhamatsendrasana, Pashchimotanasana, Mayurasana, Shavasana,Yoga Mudra & Uddiyan Bandh, Nauli, Kapalbhati, Ujjayyi Pranayam, Bhastrika, Omkar and Dhyana.

  (Note:- The above yoga practical sessions should be conducted in a such way that every learner must realize its effects as well as should make it as a part of his/her life style).

6.Management Accounting

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Management Accounting	5
2	Analysis and Interpretation of Accounts	15
3	Ratio analysis and interpretation based on Vertical Financial Statements	15
4	Cash Flow statements	15
5	Working Capital concept	10
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction to Management Accounting**
	Meaning, nature, scope and functions of Management accounting- Role of Management Accounting in decision making- Management accounting and Financial Accounting
2	**Analysis and interpretation of Accounts**
	Vertical form of Balance sheet and Profit & Loss account suitable for analysis Trend Analysis Comparative Statements Common size statement Simple problems based on the above
3	**Ratio analysis and interpretation based on Vertical financial Statements as above**
	a) Balance sheet Ratios Current Ratio Liquid Ratio Stock Working capital Ratio Proprietary Ratio Debt Equity Ratio Capital Gearing Ratio b) Revenue Statement Ratios Gross Profit Ratio Expenses Ratio Operating Ratio Net Profit Ratio Stock Turnover Ratio c) Combined Ratios Return on Capital Employed (including long term borrowings) Return on Proprietor's Fund (shareholders' fund and Preference Capital) Return on Equity Capital Dividend Payout Ratio Debt Service coverage Ratio Debtors Turnover Ratio Creditors Turnover Ratio
4	**Cash flow Statements**
	Preparation of cash flow statements with reference to Accounting Standard No 3 – Indirect Method Only
5	**Working Capital- Concept**
	Estimation of working capital requirements in case of trading and manufacturing organisations

7.Computer Skill -2

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Advanced Spread sheet	15 + 5 practical
2	Data Based Management systems	15 + 5 practical
3	Modern E Business Software systems	10
4	Other Emerging Technologies	10

Note: The syllabus for computer skills does not prescribe any particular product. College may opt for any suitable software which may be paid, subscribed or may be an open source free software

Sr. No.	Modules / Units
1	**Advanced Spreadsheet**
	Pivot, Advanced formulae, Lookups, Macros, Working with other programmes, Inserting a spreadsheet sheet in word document, modifying an inserted spreadsheet, Inserting a linked chart in a Word Document, Inserting graphic in a spreadsheet
2	**Data Based Management Systems**
	Concepts, Tables, Fields, Datatypes RDBMS Primary Key, Foreign Key
3	**Modern E Business Software Systems**
	Introduction : Enterprise Resource Planning – ERP Supply chain Management- SCM Customer Relationship Management- CRM Sales Force Automation- SFA
4	**Other emerging technologies**
	Online trading software Net-banking Online banking software

B.Com. (Financial Markets) Programme

Under Choice Based Credit, Grading and Semester System

Course Structure

(To be implemented from Academic Year- 2017-2018)

Semester IV

No. of Courses	Semester IV	Credits
1	***Discipline Elective Courses (EC)- Select any three***	
A	Debt Markets-2	**03**
B	Equity Markets-2	**03**
C	Commodities Derivatives	**03**
D	Merchant Banking	**03**
E	Personal Financial Planning	**03**
2	***Ability Enhancement Courses (AEC)***	
2A	***Ability Enhancement Compulsory Course (AECC)***	
4	Business Law - 2	**03**
2B	****Ability Enhancement Elective Courses (AEEC)***	
5	Any one course from the following list of the courses	**02**
3	***Core Courses (CC)***	
6	Corporate Finance	**03**
7	Business Economics - 2	**03**
	Total Credits	**20**

****List of Ability Enhancement Elective courses (AEEC) Courses for Semester IV (Any One)***	
1	Foundation Course in Financial Markets FC IV- Foreign Exchange Markets
2	Foundation Course – Contemporary Issues- IV
3	Foundation course in NSS IV
4	Foundation Course in NCC IV
5	Foundation Course in Physical Education IV

1.Debt Markets -2

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Basic Concepts and Fixed Income Mathematics	15
2	Pricing of Fixed Income Securities	15
3	Tracking Fixed Income Markets	15
4	Portfolio Management- Fixed Income	15
	Total	**60**

Sr. No.	Modules / Units
1	**Basic Concepts of Fixed Income Securities**
	a) Features of Fixed Income Securities b) Risk and Return Analysis in Fixed Income Securities c) Type of Fixed Income Securities including hybrid instruments
2	**Pricing of Fixed Income Securities**
	a) Valuation of fixed income securities including embedded option b) Duration and Convexity i. Duration ii. Convexity including modified and Maculay Duration c) Price value of basis points (PVBP) d) Spot Rate e) Forward rate f) Bootstrapping
3	**Tracking Fixed Income Markets**
	a) Tracking bond markets b) The bond traders arsenal of economic indicators i. Inflation ii. Monetary policy iii. Government deficits iv. Currency valuation c) The subprime crisis and the role of debt markets in the crisis – Then and now
4	**Portfolio Management- Fixed Income**
	a) Fixed Income Portfolio Management- Domestic and International b) Bond portfolio management strategies i. What is a bond portfolio strategy ii. Types of bond management strategy iii. Active, passive, neutral strategy

2. Equity Markets-2

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Developments in the Indian Equity Market	15
2	Valuation of Equities	15
3	Statistical Analysis of Share price movement	15
4	Dealings in Stock Exchanges	15
Total		**60**

Sr. No.	Modules / Units
1	**Developments in the Indian Equity Market**
	i. Domestic savings & investments ii. Disinvestments, FDI & Foreign Portfolio Investment (FPI) iii. Role of Retail Investors iv. Share Price & Share Price Volatility v. Role of SEBI
2	**Valuation of Equities**
	i. Factors affecting Share Prices ii. Balance sheet valuation iii. Dividend discount model (zero growth, constant growth & multiple growth) iv. Price earning model v. Fundamental Analysis- Economy, Industry and Company Model vi. Macro Economic factors vii. Market related factors
3	**Statistical Analysis of Share price movement**
	i. Efficient Market Hypothesis ii. Stochastic Models iii. Brownian Motion iv. BETA
4	**Dealings in Stock Exchanges**
	i. Role of Brokers ii. Stock Market Quotations iii. Procedure for buying & selling iv. BOLT - On Line Trading/ NEAT System v. Clearing & Settlement vi. Order Matching

3. Commodities Derivatives

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction of Derivatives	15
2	Pricing commodity derivatives	15
3	Trading: Basic Concepts	15
4	Regulatory Framework	15
	Total	**60**

Sr. No.	Modules / Units
1	**Introduction of Derivatives**
	Derivatives definition, Types of derivatives, Products, Participants and Functions, Exchange traded vs. OTC Derivatives -How Commodity Derivatives differ from financial Derivatives - Warehousing, Quantity of underlying assets, Global Commodity Exchanges, Commodity Exchanges in India, Commodities permitted for trading, Kabra committee Report, Commodity specific issues - Cropping and Growth patterns, Global Domestic demand -supply dynamics, Price trends and Factors that influence prices,
2	**Pricing commodity derivatives**
	Investment assets vs. Consumption assets-The Cost of Carry Model - Pricing futures contracts on investment commodities-Pricing futures contracts on consumption commodities-The futures basics- Concept of Hedging, Speculation, Arbitrage
3	**Trading: Basic Concepts**
	Basic concepts such as Margins, Circuit filters - delivery norms – Contracts specifications, Trading system, and Entities in the trading system, Trader workstation, Order types and conditions, Exposure limits, Commodities to be traded: Types of commodities: Bullion (silver and Gold), Agricultural commodities. Clearing, settlement and Risk Management: Calendar and Settlement schedule, Position determination, Settlement mechanism, Daily mark to market settlement, Settlement price - Daily settlement price, Final settlement price, Margining - Initial margin, Daily mark to Market margin, Open interest limits, Second line of Defense, NSCCL span. Final Settlement: Cash settlement, Physical settlement (warehousing) Exception handling: Funds shortages, Delivery shortages.
4	**Regulatory Framework**
	Rules governing Commodity derivatives-Derivatives Exchange, Rules Governing Intermediaries, Investor Grievances, Arbitration Rules.

4. Merchant Banking

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Introduction to Merchant Banking	15
2	Initial Public Offering (IPO)	15
3	Issue of DRs, ADRs and CPs	15
4	Issue of Bond and Debentures	15
Total		**60**

Sr. No.	Modules / Units
1	**Introduction to Merchant Banking**
	Introduction to Merchant banking, Importance, need, functions, Merchant banking services - Project counselling, Loan syndication and Corporate counselling; Pre-issue merchant banking activities - Obtaining stock exchange approvals, action as per SEBI guide lines, Finalizing the appointments with - manager/advisers, Underwriters, Brokers, Bankers, Advertising agency, Drafting and approval of prospectus; Post-issue merchant banking activities – Issue subscription, Allotment of shares, Refunds, Periodical reports to SEBI.
2	**Initial Public Offering (IPO)**
	Initial Public Offering - Issuance Process, Role of registrar, SEBI guidelines for IPO eligibility, IPO grading, Draft Red Herring Prospectus (DRHP), Listing agreement, Pricing the issue, Book building process, Allotment; SEBI Guidelines in Drafting the Offer Document; Pre and Post launch activities in IPO, SEBI Guidelines on QIP, Rights and Bond Issues
3	**Issue of DRs, ADRs and CPs**
	Types and Process of Issuing of Depository Receipts (DRs) - American Depository Receipts (ADRs), Global Depository Receipts (GDRs), European Depository Receipts (EDRs), Indian Depository Receipts (IDRs), ADR structure and norms, Indian Depository Receipts (IDRs) and Guidelines; Procedure for issue of Commercial Paper – Credit Rating, Redemption process.
4	**Issue of Bond and Debentures**
	Procedure for Issue of Bond and Debentures, Foreign currency convertible bonds

5. Personal Financial Planning

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Personal Financial Planning Process	15
2	Personal Financial Statement Analysis	15
3	Financial Mathematics	15
4	Investor Psychology	15
	Total	**60**

Sr. No	Modules /Units
1	**Personal Financial Planning Process**
	i. Establish and Define the Relationship with the Client ii. Collect Client's Information iii. Analyse client's financial status, Risk Profile and Determine Financial Goals iv. Develop Financial Planning Recommendations and Present them to the Client v. Implement Client's Financial Planning Recommendations vi. Monitor and Review the Client's Situation
2	**Personal Financial Statement Analysis**
	i. Cash inflows and outflows – Cash Management ii. Income and expenditure statement iii. Budgeting and forecasting iv. Monitoring budgets and provisions for savings v. Personal Balance sheet and Net Worth
3	**Financial Mathematics**
	i. Calculation of Returns-Nominal Rate of Return, Effective Rate of Return, Internal Rate of Return, and Compounded Annual Growth rate (CAGR), Real Rate of Return, Rate of Return after adjusting taxes, Analysis of Return. ii. Time value of money iii. Loan Calculations iv. Total Asset, Net Worth and Financial Ratios
4	**Investor Psychology**
	i. Value investing and Behavioural Finance ii. Role of emotions in finance decision making –Common errors iii. Skewness of Asset Allocation due to cultural or historical bias iv. Basic investment style and its drawbacks

Revised Syllabus of Courses of B.Com. (Financial Markets)
Programme at Semester IV
with Effect from the Academic Year 2017-2018

4. Business Law - 2

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Indian Companies Act, 2013	15
2	Intellectual Property Rights, Copyrights and trade marks	15
3	Indian Partnership Act, 1932 and Limited Liability Partnership, 2008	15
4	Securities Contract Regulation Act and SEBI	15
	Total	**60**

Sr. No.	Modules / Units
1	**Indian Companies Act, 2013**
	a) Company and its formation : Definition and Nature of Company, Advantages and Disadvantages of a Company, Lifting of Corporate Veil with cases, Promoters and preliminary contracts(S.92-93), Types of Companies (Meaning and Concepts Only), Chartered Companies Statutory Companies, Registered companies under the Act. OPC (S. 3(1)), Companies limited by shares, Companies Limited by guarantee, Private Company, Public Company, Producer Companies (Sec581 A to 581 Z-), Formation of Companies with charitable objects (Sec. 8), Holding Company and Subsidiary company, Small Company (S. 2(85)), Dormant Company (S.455), Documents and procedure for Incorporation of Company, Effect of Incorporation.(S.9) b) Membership of a company : Who can become member, Modes of acquiring membership, Cessation of membership, Rights and Liabilities of members. c) Memorandum of Association and Articles of Association : Meaning, Concept, Clauses, effects of Memorandum and articles, Doctrine of Ultra Vires, Doctrine of Indoor Management, and Doctrine of Constructive Notice. d) Prospectus. Meaning (S.2), When to be issued, When not required, Various kinds of prospectus, Legal framework for issuance of Prospectus, Contents of Prospectus, Private Placements. e) Classification of Directors, Women directors, Independent Director, Small shareholder's director, Disqualification of a director, Director Identification Number, appointment, Legal position, Powers and Duties, Position of director as key Managerial Personnel, Managing Director, manager. f) Meetings : Various types of meeting of shareholders and board, Convening and Conduct of meetings, Postal Ballot, Meetings through Video Conferencing, E-voting.
2	**Intellectual Property Rights, Copyrights and trade marks**
	a) Intellectual Property rights in India Introduction and Types b) Patents - Meaning, Salient features of Patent Conditions for an invention to be patented, What is Patentable, What is not patentable? Procedure for Obtaining a Patent, Opposition to Grant of Patent (S. 25, 26), Term of Patent, How does a patent expire? , Remedies available to the Patent Owner for Infringement of Patent Rights. c) Copyrights -Meaning (S. 14) Copy right Board and registration of Copy right (S. 11, S.44-50), Term of Copy right (S. 22-29), What works are protected, rights, Who owns the Rights and Duration, Meaning of Fair use, Infringement of Copy rights and remedies (S. 51-55,57,58,63,64,65). d) Trade- marks, Meaning - Concept, functions of Trade mark, Types of Trade Marks, Trademarks that cannot be registered , Registration of Trade Mark, Procedure for Registration of TM, Infringement and remedies, Passing off, Service Marks.

3	**Indian Partnership Act, 1932 and Limited Liability Partnership, 2008**
	a) Indian Partnership Act, 1932 (Sections,4,5,6,7,8,14 & 39-55) : Definition, Essentials, Types of Partnerships and Types of Partners Test of partnership, and Sharing of profits is not the real test of partnership (Sec6), Partnership deed, and Property of the Firm, b) Reconstitution of Partnership firms, Dissolution of the firm. Limited Liability Partnership, 2008 : Definitions (S.2), Body Corporate, Business, Partner -Concept, Salient features, Nature of LLP (Ss-3-10)Distinction between LLP and partnership, and LLP and LLP and Company Extent and limitation of liability of LLP and its partners (Ss. 26-31) , Conversion to LLP (Ss. 55-58), Winding up and Dissolution of the LLP (Ss. 63-65)
4	**Securities Contract Regulation Act and SEBI**
	a) Securities contract Regulation Act 1956 Terms-Recognition of stock exchange-Listing Agreement-Delisting-Security Appellate Tribunal-Cancellation of recognition- bye laws- types of contracts. Securitization & Reconstruction of Financial Assets and Enforcement of Security Interest Act(SARFAESI) 2002 : Objectives-Terms-process-registration-acquisition-assets reconstruction-takeover management-offences and penalties-authorities. b) **Security Exchange Board of India** • SEBI : Objectives-terms-establishment-powers-functions-accounts and audit-penalties-registration. • Issues of Disclosure Investors Protection Guidelines: Pre & Post obligations-conditions for issue-Debt Security-IPO-E-ipo-Employee option-right-bonus-preferential allotment- intermediary-operational-promoter lock in period requirements-offer document

5. Foundation Course in Financial Markets FC IV – Foreign Exchange Markets

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Foreign Exchange Market: An Introduction	15
2	Introduction to Indian Foreign Exchange Market	15
3	Operational Aspects of foreign exchange market and foreign exchange contracts	15
4	Foreign Exchange Arithmetic and Risk Management	15
	Total	**60**

Sr. No.	Modules / Units
1	**Foreign Exchange Market: An Introduction**
	FOREX trading volume, FOREX trading locations, Details about major traded currencies, Evolution of foreign exchange ,Market and Foreign Exchange System Market Participants: Banks and Financial Institutions, Merchants, other customers, speculators and hedgers, Central Bank, Forex dealers and market makers and brokers, FOREX – trading and SWIFT Robots
2	**Introduction to Indian Foreign Exchange Market**
	FOREX market in India: A historical perspective FERA Vs. FEMA, Pre-liberalization Exchange Rate Regime in India and Hawala market, Brief introduction to currency convertibility in current and Capital account.
3	**Operational aspects of foreign exchange market and foreign exchange contracts**
	a) Floating Rate, Currency Boards &Currency Basket Systems, Brief review on various exchange rate regime, Advantages of free and Fixed Exchange Rate regime, Pros & Cons of managed floating exchange rate regime, Prevalence of Currency Boards Regime, Practice of Currency Basket Regime. b) Foreign Exchange Contracts: Spot and Forward Contracts Cash, Spot trading Trade Date, Settlement PR date Spot trading roll over mechanism. Foreign Exchange Forward contracts, Fixed Maturity Contract, Partially Optional Contract, Fully Optional Contract, Non-Delivery Forward Contracts, Foreign Exchange Futures Contract ,Different Dimensions of Foreign Exchange Future, Contract specification trading at National Stock Exchange of India.
4	**Foreign Exchange Arithmetic and Risk Management**
	Types of Exchange Rates Direct Rate, Indirect Rate and Cross Rate Arbitrage- Geographical and triangular Interest Rate- spot Contracts, forward contracts and SWAP Points Risk Management in Foreign Exchange Market- Need and importance of foreign exchange management methods adopted (Spot and forward, arbitrage, cross currency deals, SWAPS, options and futures

Revised Syllabus of Courses of B.Com. (Financial Markets) Programme at Semester IV with Effect from the Academic Year 2017-2018

Foundation Course- Contemporary Issues- IV

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Significant, Contemporary Rights of Citizens	12
2	Approaches to understanding Ecology	11
3	Science and Technology –II	11
4	Introduction to Competitive Exams	11
	Total	**45**

Sr. No.	Modules / Units
1	**Significant, Contemporary Rights of Citizens**
	A. Rights of Consumers-Violations of consumer rights and important provisions of the Consumer Protection Act, 2016; Other important laws to protect consumers; Consumer courts and consumer movements. **(3 Lectures)** **B. Right to Information**- Genesis and relation with transparency and accountability; important provisions of the Right to Information Act, 2005; some success stories. **(3 Lectures)** **C. Protection of Citizens'/Public Interest**-Public Interest Litigation, need and procedure to file a PIL; some landmark cases. **(3 Lectures)** **D. Citizens' Charters, Public Service Guarantee Acts. (3 Lectures)**
2	**Approaches to understanding Ecology**
	A. Understanding approaches to ecology- Anthropocentrism, Biocentrism and Eco centrism, Ecofeminism and Deep Ecology. **(3 Lectures)** **B. Environmental Principles-1**: the sustainability principle; the polluter pays principle; the precautionary principle. **(4 Lectures)** **C. Environmental Principles-2**: the equity principle; human rights principles; the participation principle. **(4 Lectures)**
3	**Science and Technology –II**
	Part A:Some Significant Modern Technologies, Features and Applications (7 Lectures) i. **Laser Technology**- Light Amplification by Stimulated Emission of Radiation; use of laser in remote sensing, GIS/GPS mapping, medical use. ii. **Satellite Technology**- various uses in satellite navigation systems, GPS, and imprecise climate and weather analyses. iii. **Information and Communication Technology**- convergence of various technologies like satellite, computer and digital in the information revolution of today's society. iv. **Biotechnology and Genetic engineering**- applied biology and uses in medicine, pharmaceuticals and agriculture; genetically modified plant, animal and human life. v. **Nanotechnology**- definition: the study, control and application of phenomena and materials at length scales below 100 nm; uses in medicine, military intelligence and consumer products. **Part B:Issues of Control, Access and Misuse of Technology. (4 Lectures)**

Sr. No.	Modules / Units
4	**Introduction to Competitive Exams**
	Part A. Basic information on Competitive Examinations- the pattern, eligibility criteria and local centres: **i.** Examinations conducted for entry into professional courses - Graduate Record Examinations (GRE), Graduate Management Admission Test GMAT), Common Admission Test (CAT) and Scholastic Aptitude Test (SAT). **ii.** Examinations conducted for entry into jobs by Union Public Service Commission, Staff Selection Commission (SSC), State Public Service Commissions, Banking and Insurance sectors, and the National and State Eligibility Tests (NET / SET) for entry into teaching profession. **Part B. Soft skills required for competitive examinations- (7 Lectures)** **i.** Information on areas tested: Quantitative Ability, Data Interpretation, Verbal Ability and Logical Reasoning, Creativity and Lateral Thinking **ii.** Motivation: Concept, Theories and Types of Motivation **iii.** Goal-Setting: Types of Goals, SMART Goals, Stephen Covey's concept of human endowment **iv.** Time Management: Effective Strategies for Time Management **v.** Writing Skills: Paragraph Writing, Report Writing, Filing an application under the RTI Act, Consumer Grievance Letter.

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8. Murthy, D. B. N., *Disaster Management: Text and Case Studies*, Deep and Deep Publications, New Delhi, 2013.
9. Parsuraman, S., and Unnikrishnan, ed., *India Disasters Report II*, Oxford, New Delhi, 2013
10. Reza, B. K., *Disaster Management*, Global Publications, New Delhi, 2010.
11. Sathe, Satyaranjan P., *Judicial Activism in India*, Oxford University Press, New Delhi, 2003.
12. Singh, Ashok Kumar, *Science and Technology for Civil Service Examination*, Tata McGraw Hill, New Delhi, 2012.
13. Thorpe, Edgar, *General Studies Paper I Volume V*, Pearson, New Delhi, 2017.

Projects / Assignments (for Internal Assessment)

i. Projects/Assignments should be drawn for the component on Internal Assessment from the topics in **Module 1 to Module 4**.

ii. Students should be given a list of possible topics - at least 3 from each Module at the beginning of the semester.

iii. The Project/Assignment can take the form of Street-Plays / Power-Point Presentations / Poster Exhibitions and similar other modes of presentation appropriate to the topic.

iv. Students can work in groups of not more than 8 per topic.

v. Students must submit a hard / soft copy of the Project / Assignment before appearing for the semester end examination.

QUESTION PAPER PATTERN (Semester III)

The Question Paper Pattern for Semester End Examination shall be as follows:

TOTAL MARKS: 75 **DURATION: 150 MINUTES**

QUESTION NUMBER	DESCRIPTION	MARKS ASSIGNED
1	**i.** Question 1 A will be asked on the meaning / definition of concepts / terms from all Modules. **ii.** Question 1 B will be asked on the topic of the Project / Assignment done by the student during the Semester **iii.** In all 8 Questions will be asked out of which 5 have to be attempted.	**a)** Total marks: 15 **b)** For 1 A, there will be 3 marks for each sub-question. **c)** For 1 B there will be 15 marks without any break-up.
2	Descriptive Question with internal option (A or B) on Module 1	15
3	Descriptive Question with internal option (A or B) on Module 2	15
4	Descriptive Question with internal option (A or B) on Module 3	15
5	Descriptive Question with internal option (A or B) on Module 4	15

5. Foundation Course - NSS IV

Modules at a Glance

Sr. No.	Modules	No of Lectures
1	Entrepreneurship Development	10
2	Rural Resource Mobilization	10
3	Ideal village & stake of GOS and NGO	13
4	Institutional Social Responsibility and modes of Awareness	12
	Total	**45**

Sr. No.	Modules / Units
1	**Entrepreneurship Development**
	UNIT - I Entrepreneurship development Entrepreneurship development- its meaning and schemes Government and self-employment schemes for Entrepreneurship development **UNIT - II - Cottage Industry** Cottage Industry- its meaning, its role in development process Marketing of cottage products and outlets
2	**Rural Resource Mobilization**
	UNIT - I - Rural resource mobilization- A case study of eco-village, eco-tourism, agro-tourism **UNIT - II - Micro financing with special reference to self-help groups**
3	**Ideal village & stake of GOS and NGO**
	UNIT - I - Ideal village Ideal village- the concept Gandhian Concept of Ideal village Case studies on Ideal village **UNIT - II - Government Organisations(GOs) and Non-Government Organisations (NGOs)** The concept and functioning
4	**Institutional Social Responsibility and modes of Awareness**
	UNIT - I - Institutional Social Responsibilities Concept and functioning- case study of adapted village **UNIT - II - Modes of awareness through fine Arts Skills** Basics of performing Arts as tool for social awareness, street play, creative dance, patriotic song, folk songs and folk dance. Rangoli, posters, flip charts, placards, etc**.**

5.Foundation Course - NCC- IV

Modules at a Glance

Sr. No.	Modules	No of Lectures
1	Disaster Management, Social Awareness and Community Development	10
2	Health and Hygiene	10
3	Drill with Arms	05
4	Weapon Training	10
5	Specialized Subject: Army Or Navy Or Air	10
	Total	**45**

Sr. No.	Modules / Units
1	**Disaster Management, Social Awareness and Community Development**
	Disaster Management: **Desired outcome:** The student shall gain basic information about civil defence organisation / NDMA & shall provide assistance to civil administration in various types of emergencies during natural / manmade disasters • Fire Services & Fire fighting • Assistance during Natural / Other Calamities: Flood / Cyclone/ Earth Quake/ Accident etc. **Social Awareness and Community Development:** **Desired outcome:** The student shall have an understanding about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils. • NGOs: Role & Contribution • Drug Abuse & Trafficking • Corruption • Social Evil viz. Dowry/ Female Foeticide/Child Abuse & trafficking etc. • Traffic Control Org. & Anti drunken Driving
2	**Health and Hygiene**
	Desired outcome: The student shall be fully aware about personal health and hygiene lead a healthy life style and foster habits of restraint and self awareness. • Hygiene and Sanitation (Personal and Food Hygiene) • Basics of Home Nursing & First-Aid in common medical emergencies • Wound & Fractures
3	**Drill with Arms**
	Desired outcome: The students will demonstrate the sense of discipline, improve bearing, smartness, and turnout, and develop the quality of immediate and implicit obedience of orders, with good reflexes. • Getting on Parade with Rifle and Dressing at the Order • Dismissing and Falling Out • General Salute, Salami Shastra • Squad Drill • Short/Long tail from the order and vice-versa • Examine Arms
4	**Weapon Training**
	Desired outcome: The student shall have basic knowledge of weapons and their use and handling. • The lying position, Holding and Aiming- I • Trigger control and firing a shot • Range procedure and safety precautions

	• Theory of Group and Snap Shooting • Short range firing, Aiming- II -Alteration of sight
5	**Specialized Subject: Army Or Navy Or Air**
	Army Desired outcome: The training shall instill patriotism, commitment and passion to serve the nation motivating the youth to join the defence forces. It will also acquaint, expose & provide basic knowledge about armed, naval and air-force subjects A. Map reading • Setting a Map, finding North and own position • Map to ground, Ground to Map • Point to Point March B. Field Craft and Battle Craft • Observation, Camouflage and Concealment • Field Signals • Types of Knots and Lashing C. Introduction to advanced weapons and role of technology (To be covered by the guest lecturers) OR Navy **A.** Naval Communication • Semaphore ▪ Phonetic Alphabets ▪ Radio Telephony Procedure ▪ Wearing of National Flag, Ensign and Admiral's Flag. **B.** Seamanship • Anchor work ▪ Types of Anchor, Purpose and Holding ground • Boat work ▪ Demonstrate Rigging a whaler and enterprise boat- Parts of Sail and Sailing Terms ▪ Instructions in Enterprise Class Board including theory of Sailing, Elementary Sailing Tools ▪ Types of Power Boats Used in the Navy and their uses, Knowledge of Anchoring, Securing and Towing a Boat **C.** Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)

Sr. No.	Modules / Units
	OR Air A. Air frames • Fuselage • Main and Tail Plain B. Instruments • Introduction to RADAR C. Aero modelling • Flying/ Building of Aero models **D.** Introduction to advanced weapons and role of technology (To be covered by the guest lecturers)

5.Foundation Course Physical Education- IV

Modules at a Glance

Sr. No.	Modules	No of Lectures
1	**Stress Management**	10
2	**Awards, Scholarship & Government Schemes**	10
3	**Yoga Education**	10
4	**Exercise Scheduling/Prescription**	15
	Total	**45**

Sr. No.	Modules / Units
1	**Stress Management**
	• Meaning & concept of Stress • Causes of Stress • Managing Stress • Coping Strategies
2	**Awards, Scholarship & Government Schemes**
	• State & National level Sports Awards • State Sports Policy & Scholarship Schemes • National Sports Policy & Scholarship Schemes • Prominent Sports Personalities
3	**Yoga Education**
	• Differences between Yogic Exercises & non- Yogic exercises • Contribution of Yoga to Sports • Principles of Asanas & Bandha • Misconceptions about Yoga
4	**Exercise Scheduling/Prescription**
	• Daily Routine Prescription. • Understanding Activity level & Calorie requirement. • Adherence & Motivation for exercise. • Impact of Lifestyle on Health

6. Corporate Finance

Modules at a Glance

Sr. No.	Modules	No. of Lectures
1	Corporate Finance- an overview	15
2	Planning the Corporate Financial Activities	15
3	Capital Structure	15
4	Sources and Methods of raising Corporate Finance	15
	Total	**60**

Sr. No.	Modules / Units
1	**Corporate Finance- an overview**
	Function of Finance in a business enterprise Emergence of corporate finance as an integral part of business finance Need for professional approach in managing corporate finance Role and functions of a Corporate Financial Manager Requirements of an efficient Corporate Financial Manager
2	**Planning the corporate Financial Activities**
	Theories of Capitalisation Owned Capital and borrowed Capital- Cost of Capital Break even analysis
3	**Capital Structure**
	Meaning and Definition of Capital structure Factors affecting Capital structure- trading on equity Watered Capital, over capitalization and under capitalization NPV, IRR, DCF analysis and pay back period
4	**Sources and Methods of Raising Corporate Finance**
	Types and features of corporate securities currently available Management of new issues including pricing of securities Role of commercial banks and investment banks in financing the corporate sector Leasing a s method of corporate finance

Revised Syllabus of Courses of B.Com. (Financial Markets)
Programme at Semester IV
with Effect from the Academic Year 2017-2018

7. Business Economics -2

Modules at a Glance

Module No.	Title	No.of Lecture
1	**Introduction to Macroeconomics**	15
2	**Money, Inflation and Monetary Policy**	15
3.	**Constituents of Fiscal Policy**	15
4	**Open Economy : Theory and Issues of International Trade**	15
	Total no. of lectures	**60**

Sr.	Modules / Units
1	**INTRODUCTION TO MACRO ECONOMICS**
	• **Macroeconomics:** Meaning, Scope and Importance. • **Circular flow of aggregate income and expenditure**: closed and open economy models • **The Measurement of national product:** Meaning and Importance - conventional and Green GNP and NNP concepts - Relationship between National Income and Economic Welfare. • **Short run economic fluctuations :** Features and Phases of Trade Cycles • **The Keynesian Principle of Effective Demand:** Aggregate Demand and Aggregate Supply - Consumption Function - Investment function - effects of Investment Multiplier on Changes in Income and Output
2	**MONEY, INFLATION AND MONETARY POLICY**
	• **Money Supply:** Determinants of Money Supply - Factors influencing Velocity of Circulation of Money • **Demand for Money :** Classical and Keynesian approaches and Keynes' liquidity preference theory of interest • **Money and prices** : Quantity theory of money - Fisher's equation of exchange - Cambridge cash balance approach • **Inflation:** Demand Pull Inflation and Cost Push Inflation - Effects of Inflation- Nature of inflation in a developing economy. • **Monetary policy :** Meaning, objectives and instruments, inflation targeting
3	**CONSTITUENTS OF FISCAL POLICY**
	• **Role of a Government** to provide Public goods- Principles of Sound and Functional Finance • **Fiscal Policy:** Meaning, Objectives - Contra cyclical Fiscal Policy and Discretionary Fiscal Policy • **Instruments of Fiscal policy :** Canons of taxation - Factors influencing incidence of taxation - Effects of taxation - Significance of Public Expenditure - Low Income Support and Social Insurance Programmes - Public Debt - Types, Public Debt and Fiscal Solvency, Burden of debt finance • **Union budget** -Structure- Deficit concepts-Fiscal Responsibility and Budget Management Act.

4	OPEN ECONOMY : THEORY AND ISSUES OF INTERNATIONAL TRADE
	• **The basis of international trade :** Ricardo's Theory of comparative cost advantage - The Heckscher – Ohlin theory of factor endowments - terms of trade - meaning and types - Factors determining terms of trade - Gains from trade - Free trade versus protection • **Foreign Investment :** Foreign Portfolio investment- Benefits of Portfolio capital flows- Foreign Direct Investment - Merits of Foreign Direct Investment - Role of Multinational corporations • **Balance of Payments:** Structure - Types of Disequilibrium - Measures to correct disequilibrium in BOP. • **Foreign Exchange rate** : Spot and Forward rate of Exchange - Hedging, Speculation and Arbitrage -Fixed and Flexible exchange rates- Managed flexibility

Question Paper Pattern

(Practical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A. Sub Questions to be asked 10 and to be answered any 08 B. Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Practical Question ***OR*** Full Length Practical Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Practical question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks. If the topic demands, instead of practical questions, appropriate theory question may be asked.

Question Paper Pattern

(Theoretical Courses)

Maximum Marks: 75

Questions to be set: 05

Duration: 2 1/2 Hrs.

All Questions are Compulsory Carrying 15 Marks each.

Question No	Particular	Marks
Q-1	Objective Questions A) Sub Questions to be asked 10 and to be answered any 08 B) Sub Questions to be asked 10 and to be answered any 07 (*Multiple choice / True or False / Match the columns/Fill in the blanks)	15 Marks
Q-2 Q-2	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-3 Q-3	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-4 Q-4	Full Length Question ***OR*** Full Length Question	15 Marks 15 Marks
Q-5 Q-5	A) Theory questions B) Theory questions ***OR*** Short Notes To be asked 05 To be answered 03	08 Marks 07 Marks 15 Marks

Note:

Theory question of 15 marks may be divided into two sub questions of 7/8 and 10/5Marks.

Business Economics Semester IV

Maximum Marks: 75 Marks

Time: 2:30 Hours

Note: 1) Attempt all Questions

2) All Questions carry equal marks

uestion	Particulars	Marks
Q-1 (from Module I)	**Answer any two** A) Full Length Question B) Full Length Question C) Full Length Question	**15Marks**
Q-2 (from Module II)	**Answer any two** A) Full Length Question B) Full Length Question C) Full Length Question	**15Marks**
Q-3 (from Module III)	**Answer any two** A) Full Length Question B) Full Length Question C) Full Length Question	**15Marks**
Q-4 (from Module IV)	**Answer any two** A) Full Length Question B) Full Length Question C) Full Length Question	**15Marks**
Q-5 (from Module I- IV)	**Objective Question** **A)Conceptual questions (any Four out of six questions)** **B)Multiple Choice Questions (seven questions at least one from each module)**	**15Marks** (8) (7)

Revised Syllabus of Courses of B.Com.(Financial Markets) Programme at Semester III and IV with effect from the Academic Year 2017-2018

Reference Books

Debt Markets

- Bhardwaj, Gautam, (2008), The Future of India's Debt Market, Tata McGraw Hill.
- Suryanarayan, (2002), Debt Market, ICFAI Publication Press.
- Fabozzi, Frank, (2004), Fixed Income Analysis Workbook, 2nd edition , John Wiley & Sons
- Shah, Ajay, Thomas, Sushan and Gorham, Michael, (2008), Indian Financial Markets, Elsevier, USA
- FIMMDA-NSE Debt Market (Basic) Module, Workbook from NSE.
- Dun and Bradstreet, (2008), Fixed Income Securities, Tata McGraw Hill.

Equity Markets

1. Equity Markets in India- Shveta singh & P K Jain
2. Equity and Debt Markets- Hardeep Kaur
3. An Introduction to Equity Markets- David Dasey

Commodity Markets/ Commodity Derivatives

- Commodities Market Module, Workbook from NSE
- Chatnani, (2010), Commodity Markets, 1st edition, Tata McGraw Hill.
- Kleinman, George, (2001), Commodity Futures & Options, 2nd (revised, illustrated edition), Prentice Hall.
- Stephens, John. (2001), Managing Commodity Risk, John Wiley & Sons.
- Indian Institute of Banking & Finance, (2007), Commodity Derivatives, Macmillan India Ltd

Portfolio Management

- Security Analysis and Portfolio Management, Prasanna Chandra, Tata McGraw Hill
- Security Analysis and Portfolio Management, Ravi Kishor, Taxman Publishers
- Financial Management, Khan & Jain, Tata McGraw Hill
- Fundamentals of Investment Management, Hirt and Block, Tata McGraw Hill. Ed 2009.
- Portfolio Management Handbook, Robert A. Strong, Jaico Publishing House, Mumbai
- Portfolio Management : A Strategic approach, Ginger Levin, John Wyzalek: CRC Press
- Modern Portfolio Theory and Investment Analysis: Edwin J Elton, Martin Gruber : Wiley

Treasury Management

- Treasury Management in India; V.A. Avadhani: Himalaya Publishing House.
- Treasury Management; Hudson Robert
- Treasury Management: the Practitioner's guide: Steven M Bragg
- Treasury Fundamentals: Antonio Morelli
- The Handbook of Global Corporate Treasury: Rajiv Rajendra

Money Markets

- Money Market Operations in India- A K Sengupta
- The Indian Money Market- Krishna Kumar sharma
- Stiguam's Money Market- Marcia Stigum
- CNBC Guide to Money and Markets

Business Law

- Indian Contract Act , Sale of Goods Act and Partnership Act – Desai T R – S C – Sarkar and sons
- The Negotiable Instruments Act – Khergamwala J S – N M Tripathy
- The Principles of Mercantile Law – Singh Avtar – Eastern Books Co.
- T P Ghosh on Companies Act 2013: T P Ghosh: Taxmann
- E Book by ICAI on Companies Act 2013
- E Book by Institute of Company Secretaries of India
- Intellectual Property Rights in India: Dr V K Ahuja: Wadhwa Book Company
- SEBI Manual by Taxmann
- SEBI Act : Sumit Agarwal and Robin Joseph Baby: Taxmann
- Securities Contract Regulation Act and Rules
- Practical Guide to Limited Liability Partnership : P L Subramanian : Snow white Publication
- Text book on Indian Partnership Act with Limited Liability Partnership Act Dr Madhusudan Saharay : Universal Law Publishing Company

Management accounting

- Cost Management by Saxena & Vashist
- Cost & Management Accounting by Ravi N.Kishor ,Publication Taxmonth
- Essential of Management Accounting by P.N.Reddy,Himalaye
- Advanced Management Accounting by Robert S Kailar,Holl
- Financial Of Management Accounting by S.R.Varshney,Wisdom
- Introduction of Management Accounting by Charbs T Horngram, PHI Learnng
- Management Accounting by I.m.Pandey, Vikas
- Cost & Management Accounting by D.K.Mattal,Galgotia
- Management Accounting by Khan & Jain,Tata Megaw
- Management Accounting by R.P.Rastogi

Corporate Finance

- Prasanna Chandra: Financial Management (TMH),
- I. M. Pandey – Financial Management (Vikas),
- M. Y. Khan 7 P. K. Jain – Financial Management (TMH),
- Brigham & Houston – Fundamentals of Financial Mgmt., Thomson Cengage Learning
- Fundamentals of Financial Management – Vanhorns & Bhandari- Pearson evaluation.
- Contemporary Financial Management – Kothari & Dutta – Machanilan India Ltd.
- Financial Markets & Institution – Guruswamy – Thomson / Cengage Learining
- Stephen A. Ross, Wester FIELD, Jordan – Fundamentals of Corporate Finance (Mac Graw Hill)
- Vanhorne & Wachowicz, Fundamentals of Financial Management – Pearson
- Damodaran, Corporate Finance – John Wiley & Co.

Foreign Exchange Markets

- Foreign Exchange Market- Dun and Bradstreet
- International Financial Markets and Foreign Exhange- Shashi K Gupta and Parneet Ranjgi
- A Foreign Exchange Primer: Shani Shamah: Wiley
- Understanding the Foreign Exchange Markets: M R Prashant/Pawan Kumar Avadhanam/Jayaditya Sharma Korada:LAP Lambers Academic Publishers
- Foreign Exchange:A Practical guide to FX Markets:Weithers Timothy M Weithers: Wiley

Merchant Banking

- A Manual of Merchant Banking: J.C.Verma : Bharath Publishing House, New Delhi,
- Merchant Banking: H R Machiraju : New Age International Publishers
- Merchant Banking and Financial services : Madhu Vij and Swati Dhavan: Tata Mc Graw Hill
- Merchant Banking and Financial Services: S Guruswamy: Tata McGraw Hill

Personal Financial Planning

1. The only Financial Planning Book that you will ever need: Amar Pandit: TV 18 Broadcast Ltd (CNBC TV18)
2. How to be your own financial planner: Manish Chauhan : TV 18 Broadcast Ltd (CNBC TV18)
3. Value Investing and Behavioral Finance : Parag Parikh:Mcgraw Hills Education

4. Publications by Financial Planning Standard Board
5. E Book by The Financial Planners' Guild India

Computer Skills -2

Fundamentals of Computers – Rajaram V – Prentice Hall

Computer today (3rd edition) – Sanders, Donald H – McGraw Hill
Computers and Common sense – Hunt, Roger and Shelly John – Prentice Hall

Computers – Subramaniam N – Wheeler

Introduction to Computers – Xavier C. – New Age

Computer in Business – Sanders D – McGraw Hill

Computers and Information Management – S C Bhatnagar & V Ramant – Prentice Hall

Internet for Business – Brummer, Lavrej – Cambridge

E-mail for Everyone – Leon Alexis & leon – Methews

Reference Books—NCC

- *Cadet's Hand book – Common subject..all wings, BY DG NCC, New Delhi.*
- *Cadet's Hand book – Specialised Subjects, Army, Navy, Air-force, BY DG NCC, New Delhi.*
- *NCC OTA Precise, BY DG NCC, New Delhi.*
- *"AVAN" Model of Disaster Mang., Vinayak Dalvie, Proceedings of Int. Conf. on Urban Plan. and Env Strat & Challenges, Elphinstone College, Jan 2007.*
- *Humanistic Tradition of India, N.L.Gupta, Mohit Publication, New Delhi*
- *Social psychology, Baron & Byrne, Pearson Publication, 12th Edition self awareness know yourself / insight (110) Group & Individuals (374) Group discussion*
- *Chanakya's 7 Secrets of Leadership, Radhakrishanan Pillai and D.Shivnandhan, Jaico*
- *Social Psychology: Understanding Human Interaction, Baron, Robert A., (302/BAR/BYR),7th Edition*
- *Seven Habits of Highly Effective People., Covey , Stephen*
- *The Habit of Winning., Iyer , Prakash, Penguin , India ; 2011*
- *The Goal, Goldratt , Eliyahu, The Northriver press ; 1994*
- *Freedom Struggle, Chandra Bipin, National Book Trust 1972*
- *Freedom of Religion and The Indian Judiciary, Bachal V.M. , Shubhada Saraswat, (362P)*
- *India 1996- A Reference Annual Govt. of India*
- *Saha Soneri Pane, Vinayak D. Savarkar*
- *Environmental Biology and Toxicology, P.D. Sharma., Rastogi Publication*
- *Environmental Science, S.C. Santra, New Central Book Agency*
- *National Cadet Corps (India), Lambert M. Surhone, Mariam T. Tennoe, Susan F. Henssonow, Betascript Publishing, 2011*
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- *National Cadet Corps of India, Man Mohan Sharma, Vision Books, 1980 Original from the University of Michigan*
- *The National Cadet Corps Act, 1948, as Modify Up to the 1st July 1963, India, Government of India Press, 1963 (Military Law)*

- *Cadet Corps in India: Its Evolution and Impact, Satis Chandra Maikap, Darbari Udyog, 1979 Original from the University of California*
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- *Grooming Tomorrow's Leaders: National Cadet Corps, 1917-2006, R.S. Chhettri, Lancer Publishers, 2006*
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- *Discovery of India, Jawaharlal Nehru*
- *Health and Hygiene, Manoj. J.S., Agra University PublicationYoga for Healing, Venkateswaran P.S., Bombay:- Jaico Publishing House 1989*
- *Yoga Illustrated, New Delhi, Ministry of Information and Broadcasting, 1995*
- *Yoga Practice, 1972, Shivnande Swami, Mumbai:- D.B. Taraporewala 1972*
- *Yoga of Patanjali-1979, Yardi M.R., Bhandarkar Oriental Research Institute- 1974*
- *Sustainable Development (An Alternative Paradigm), Satpathy , N., Karnavati Publications , Ahmedabad*
- *Global Partners for Sustainable Development, Pachauri R.K & Srivastava L., Tata Energy Research Institute, New Delhi ; 1994, 1998*
- *Ecology and the Politics of survival : Conflict over Natural Resources in India, Shiva , Vandana, Sage Publications , California , 1991*

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- National Service Scheme Manual (Revised) 2006, Government of India, Ministry of Youth Affairs and Sports, New Delhi.
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- Avhan Chancellor's Brigade - NSS Wing, Training camp on Disaster Preparedness Guidelines, March 2012
- Rashtriya Seva Yojana Sankalpana - Prof. Dr. Sankay Chakane, Dr. Pramod\Pabrekar, Diamond Publication, Pune
- National Service Scheme Manual for NSS District Coordinators, National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya,
- Annual report of National Service Scheme (NSS) published by Dept. of Higher and Technical Education, Mantralaya,
- NSS Cell, Dept. of Higher and Technical Education, Mantralaya, UTKARSHA- Socio and cultural guidelines
- Case material as a Training Aid for Field Workers, Gurmeet Hans.
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- Training Manual for Field Work published by RGNIYD, Chreeperumbudur
- Prof. Ghatole R.N. Rural Social Science and Community Development.
- Purushottam Sheth, Dr. Shailaja Mane, National Service Scheme
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Ackley.G (1976), Macro Economic Theory and Policy, Macmillan Publishing Co. New York

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- Vaish .M.C. (2010) Macro Economic Theory 14th edition, Vikas Publishing House(P)Ltd

Academic Council

Item No.

UNIVERSITY OF MUMBAI

Syllabus for the S.Y.B.Sc.

Program:B.Sc.

Course: Physics

(Credit Based Semester and Grading System with effect from the academic year 2016–2017)

Revised Syllabus in Physics (Theory and Practical)

Asper credit based system
Second Year B.Sc.2016–2017.

The revised syllabus in Physics as per credit based system for the Second Year B.Sc. course will be implemented from the academic year 2016–2017.

Objectives:

- To develop analytical abilities towards real world problems
- To familiarize with current and recent scientific and technological developments
- To enrich knowledge through problem solving, hands on activities, study visits, projects etc.

Semester	Paper	Title	Credits
I	**USPHP-301**	Mathematical Methods, Mechanics And Properties Of Matter	2
III	**USPHP-302**	Electricity and Magnetism	2
III	**USPHP-303**	Thermodynamics	2
III	**USPHP-3P**	Practical course-3 (Group A,B,C and Skill)	3
		Total	9
IV	**USPHP-401**	Optics	2
IV	**USPHP-402**	Electronics	2
IV	**USPHP-403**	Cosmology and Quantum Mechanics	2
IV	**USPHP-4P**	Practical course-4 (Group A,B,C and Demo)	3
		Total	9

USPH301: Mathematical Methods, Mechanics and Properties of Matter

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basic mathematical concepts and applications of them in physical situations
2. Understand the concepts of mechanics, acoustics and the properties of matter and be able to perform calculations using them.
3. Demonstrate quantitative problem solving skills in all the topics covered.

UNIT-I i) Waves and Oscillations- i) Linear S.H.M., composition of two collinear S.H.M., superposition of two mutually perpendicular S.H.Ms, Lissajous's figures

SPP: 2.4.3 and 2.4.4

ii) Compound pendulum: Expression for period, maximum and minimum time periods, Centres of suspension and oscillations, Reversible compound pendulum, Kater's reversible pendulum. Advantages of a compound pendulum over a simple pendulum.

HP: (pages 279 to 284)

ii) Fourier series and applications.

Introduction, Fourier cosine and sine series, change of intervals, Complex form of Fourier series, Generalized Fourier series. (Note: - Good number of examples of all types is expected to be covered.)

CH: 7.1, 7.11, 7.12, 7.13, 7.14

UNIT-II Partial Differential equations and its applications.

Introduction, Formation of partial differential equation by eliminating arbitrary constants, by eliminating arbitrary functions, Modeling of vibrating stretched string or membrane one dimensional wave equation D'Alembert's solution to be obtained. By analogy of wave equation, obtain Schrodinger time dependent and time independent equation in one dimension, Modeling of two dimensional heat flow equation, Laplace's equation in two dimensions, Solutions by method of separation of variables, Use of Fourier series.

HKD: 9.3, 9.15, 9.16, 9.17, 9.18, 9.19, 9.20

UNIT-III Mechanics, Acoustics And Properties of Matter

i) Dynamics of system of particle and concept of rigid bodies, CM coordinates, Motion of a centre of mass and linear momentum, angular momentum and torque, angular momentumof a system of CM. Conservation of angular momentum.

BSJ: 6.1, 6.2, 6.4, 6.5, 6.6, 6.7, 6.11, 6.12

ii) Acoustics of Buildings

Reverberation, Sabine's formula (without derivation) Absorption coefficient, Acoustics of Buildings, factors affecting Acoustics of Buildings, Sound distribution in an auditorium.

Ref.:MS:5.9, 5.10, 5.12, 5.13, 5.14, 5.15.

iii) Bending of beams: bending moment, Basic assumptions for theory of bending, cantilever, beam supported at its ends and loaded in the middle, I-section girders, determination of Y by bending, Determination of elastic constants by Searle's method.

BSJ: 10.16, 10.17, 10.18, 10.19, 10.20, 10.22, 10.23, 10.26.

Note: - Good number of problems on all types is expected to be solved in each unit.

References:

SPP : Fundamentals of vibration and waves – S P Puri (Tata McGraw Hill)

HP : Mechanics – H. S. Hans and S. P. Puri, Tata McGraw Hill (2nd Ed.)

CH: Introduction to Mathematical Physics by Charlie Harper

HKD: Advanced Engineering Mathematics by H K Das

MS: Properties of matter and acoustics, S Chand Publications

BSJ: Mechanics and Electrodynamics Rev Edn. 2005 by Brijlal and Subramanayan and Jeevan Seshan.

Additional reference: KRS: Mechanics by Symon.

USPH-302: ELECTRICITY AND MAGNETISM

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basic mathematical physics concepts and applications of them in physical situations
2. Understand the basic laws of electrostatics and magneto statics and applications of them and be able to perform calculations using them.
3. Demonstrate quantitative problem solving skills in all the topics covered.

UNIT I. i) Mathematical Background

Review of vector algebra and calculus. Product rules, Second derivative,

ii) Integral Calculus: Line, Surface and Volume Integrals, The Fundamental Theorem for Gradients (statement of theorem without proof; do problems), The Fundamental Theorem for Curls (statement of theorem without proof; do problems) The Fundamental Theorem for Divergences (statement of theorem without proof; do problems)

iii) Curvilinear Coordinates: Cylindrical Coordinates, Spherical Coordinates

DJG: 1.2.6 to 1.2.7, 1.3.1 to 1.3.4, 1.4.1 to 1.4.2, Problems 1.3 to 1.35

UNIT II. Electrostatics and Magnetostatics

The Electric Field: Introduction, Coulomb's Law, The Electric Field, Continuous Charge Distribution, Electric Potential, Introduction to Potential, Comments on Potential, The Potential of a Localized Charge Distribution

Work and Energy in Electrostatics: The Work Done to Move a charge, The Energy of a Point Charge Distribution

Magnetostatics: Magnetic Fields

The Biot Savart Law: Steady Currents,The Magnetic Field of a Steady Current Helmholtz coil and solenoid.

DJG: 2.1.1 to 2.1.4, 2.3.1, 2.3.2, 2.3.4, 2.4.1, 2.4.2, 5.1.1, 5.2.1, 5.2.2
BS: 16.10, 16.11

UNIT III: Motion of Charged Particles in Uniform electric and Magnetic Fields: Kinetic Energy of a Charged Particle in an Electric Field, Motion of a Charged Particle in a Constant Electric Field, Cathode Ray Oscilloscope, Charged Particle in an Alternating Electric Field, Force on a Charge in a Magnetic Field, Charged Particle in a Uniform and Constant Magnetic Field, The Cyclotron, Motion of Charged Particles in Combined Electric and Magnetic Fields, Velocity Selector

HP: 13.1, 13.2, 13.2.1, 13.3, 13.4, 13.5, 13.5.1, 13.6, 13.6.1

References:

DJG: Introduction to Electrodynamics 3rd Edn by D. Griffith

BS: Mechanics and Electrodynamics Rev Edn. 2005, by Brijlal and Subramanayan and Jeevan Seshan.

HP: Hans and Puri, Mechanics, TMH, 2nd Edition

USPH303: Thermodynamics

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basic concepts of thermodynamics and its applications in physical situations.
2. Understand and learn low temperature physics
3. Demonstrate quantitative problem solving skills in all the topics covered.

UNIT-I

Conversion of heat into work, Heat engine, Carnot's cycle: its efficiency, Refrigerator

Steam engine, Rankine cycle

ABG : 7.1, 7.2, 7.3,7.3.1, 11.2, 11.3,

Second law of thermodynamics, Statements, Equivalence of Kelvin and Plank statement, Carnot's theorem, Reversible and irreversible process, Absolute scale of temperature.

ABG : 7.5, 7.5.1, 7.6, 7.7, 7.8

Otto engine, Efficiency of Otto cycle, Diesel cycle, Efficiency of Diesel cycle, Otto and diesel comparison,

Refrigerator and air-conditioning, General Principle of Refrigerator, Theorem of refrigerator.

ABG : 11.4,11.4.1, 11.5,11.5.1 11.6, 11.7, 11.8, 11.8.1

UNIT-II

Clausius theorem, Entropy, Entropy of cyclic process, Reversible process; Entropy change, Carnot cycle, Reversible heat transfer, Principal of increase in entropy, Generalized form of first and second law, Entropy Change of an ideal gas, Entropy of steam, Entropy and unavailable energy, Entropy and disorder, Absolute entropy.

ABG :-7.9, 7.10, 7.11, 7.12, 7.12.1, 7.12.2, 7.13, 7.14, 7.14.1, 7.14.3, 7.15, 7.16, 7.17

Third law of thermodynamics, Nernst heat theorem, Consequences of the third law, Maxwell's thermodynamic relations, Clausius – Claperyron equation,

ABG : 10.12,10.12.1, 10.12.2, 8.3, 8.3.2

UNIT III

Low temp physics: Different method of liquefaction of gases, method of freezing, Cooling by evaporation, cooling by adiabatic expansion**.**

BS : 7.1, 7.2, 7.3, 7.4

Joule – Thomson effect, Theory of the experiment, JT effect of van der Waals gas, Regenerative cooling, Liquefaction of air, Liquefaction of hydrogen, Liquefaction of helium, Properties and uses of liquid Helium, Feature of He II, He -III Cryostat,

ABG: 10.2, 10.2.1, 10.2.2, 10.3, 10.4, 10.5, 10.6, 10.6.1, 10.7, 10.10

References:

ABG: Thermal Physics, AB Gupta and H. Roy, Book and Allied (P) Ltd, Reprint 2008, 2009.

BS: Heat Thermodynamics and Statistical Physics, Brijlal, N.Subramanyam, P.S. Hemne, S. Chand, edition 2007.

Additional References:

1. Basic Thermodynamics : Evelyn Guha (Narosa Publications)
2. Thermal Physics : Philip M. Morse (W.A. Benjamin Inc. New York)
3. Heat & Thermodynamics : Robert and Miller (ELBS)
4. A treatise of Heat : Saha and Srivastava.

USPHP3P: Revised Practical course

Instructions: i) All the measurements and readings should be written with proper units in SI system only

ii) After completing all the required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination.

iii) While evaluating practical, weightage should be given to circuit/ray diagram, observations, tabular representation, experimental skill and procedure, graph, calculation and result.

iv) Skill of doing the experiment and understanding physics concepts should be more important than the accuracy of final result.

Leaning Outcome:

On successful completion of this course students will be able to:

i) To demonstrate their practical skills more effectively.
ii) To understand and practice the skills while doing physics practical.
iii) To understand the use of apparatus and their use without fear.
iv) To correlate their physics theory concepts through practical.
v) Understand the concepts of errors and their estimation.

Group A

1 Surface tension by Jaeger's Method.
2 Bar pendulum: determination of g (Graph Lvs T and L vs LT^2)
3 Y by bending.
4 Searle's experiment: determination of Y and η.
5 Determination of thermal conductivity of bad conductor by Lee's Method.
6 Young's modulus by Koenig's method.
7 Helmholtz resonator- determination of unknown frequency.
8 Moment of Inertia of compound pendulum by method of coincidence.

Group B

9 Verification of Stefan's law (electrical method)
10 Determination of absolute capacitance using BG
11 High resistance by mirror galvanometer

12 Series Capacitance Bridge.
13 LCR parallel resonance.
14 e/m by Thomson's method
15 Temperature coefficient of resistance of conducting material,
16 Measurement of resistance of galvanometer-G by shunting.

Group C

17 Bridge rectifier: Ripple, Load regulation. (with C/ pi filter)
18 Figure of merit of a mirror galvanometer.
19 C1/C2 by de- Sauty's method.
20 Passive low pass filter.
21 Passive high pass filter.
22 High resistance by leakage using BG.
23 Charging and discharging of capacitor.
24 Lissajous figures using CRO.

D) Skill experiments:

1. Wiring of a simple circuit using bread board
2. Use of oscilloscope
3. Travelling microscope (radius of capillary)
4. Spectrometer: mean μ of yellow doublet of mercury source.
5. Component testing, colour code of resistors, capacitors etc.
6. Drawing of graph on semi logarithmic / logarithmic scale.

E) Exemption of two experiments from section A and/or B and/or C may be given if student carry out any one of the following activity.

1. Students should collect the information of at least five Physicistswith their work or any three events on physics. Report that in journal.
2. Students should carry out mini-project up to the satisfaction of professor In-charge of practical.
3. Study tour. Students participated in study tour must submit a study tour report.

For practical examination the learner will be examined in **three experiments** (one from each group). Each experiment will be of two hour duration. Minimum **3** from each group and in all minimum **12** experiments and all the skill experiments are required to be completed compulsorily. Students are required to report all these experiments in the journal. Evaluation in viva-voce will be based on regular experiments and skill experiments

A learner will be allowed to appear for the semester end practical examination only if the candidate submits a certified journal of Physics or a certificate that the learner has completed the practical course of Physics **Semester III** as per the minimum requirements.

REFERENCES

1. Advanced course in Practical Physics D. Chattopadhya, PC. Rakshit & B. Saha. (6^{th} Edition) Book & Allied Pvt. Ltd.
2. BSc Practical Physics – Harnam Singh S. Chand & Co. Ltd. – 2001
3. A Text book of advanced Practical Physics – Samir Kumar Ghosh, New Central Book Agency – (3^{rd} edition)
4. B Sc. Practical Physics – CL Arora (1^{st}Edition) – 2001 S. Chand & Co. Ltd.
5. Practical Physics – CL Squires – (3^{rd} Edition) Cambridge University Press.
6. University Practical Physics – D C Tayal. Himalaya Publication.
7. Advanced Practical Physics – Worsnop& Flint.

USPH401: Optics

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the diffraction and polarization processes and applications of them in physical situations.
2. Understand the applications of interference in design and working of interferometers.
3. Understand the resolving power of different optical instruments.
4. Demonstrate quantitative problem solving skills in all the topics covered.

UNIT I: (15 Lectures)

Diffraction:

Fresnel's diffraction: Introduction, Huygen's-Fresnel's theory, Fresnel's assumptions, Distinctionbetween interference and diffraction, Fresnel and Fraunhoffer types of diffraction, diffraction due tosingle edge, position of maximum and minimum intensity, intensity at a point inside a geometricalshadow, diffraction due to a narrow slit, diffraction due to narrow wire.

Fraunhoffer diffraction: introduction, Fraunhoffer diffraction at a single slit, intensity distribution indiffraction pattern due to single slit, Frounhoffer diffraction due to double slit, distinction betweensingle slit and double slit diffraction patterns, plane diffraction grating, theory of plane transmissiongrating, width of principal maxima, prism and grating spectra.

SBA: 17.1, 17.2, 17.3, 17.6, 17.7, 17.10, 17.10.1, 17.10.2, 17.11, 17.12, 18.1, 18.2, 18.2.1, 18.4, 18.4.2, 18.7, 18.7.1, 18.7.2, 18.7.8(i to vi)

Unit II: (15 lectures)

Michelson Interferometer: principle, construction, working, circular fringes, localized fringes, Visibility of fringes. Applications of Michelson interferometer, a) measurement of wavelength b) Determination of the difference in wavelengths of two waves c) Thickness of thin transparent sheet.d) Standardization of meter.

Fabry-Perot interferometer and etalon: Formation of fringes, determination of wavelength, Measurement of difference in wavelength.

SBA: 15.7, 15.7.1 to 15.7.7, 15.8, 15.8.1 o 15.8.3, 15.8.5, 15.12, 15.12. to 15.12.3

Resolving Power: introduction, Raleigh's criterion, resolving power of optical instruments, criterionfor resolution according to Lord Rayleigh's;Resolving power of telescope, resolving power of aprism, resolving power of a plane transmission grating.

SBA:19.1, 19.2, 19.5, 19.6, 19.7, 19.11, 19.12.

UNIT III: **(15 Lectures)**

Polarization: Introduction, The wire grid polarizer and a Polaroid, polarization by reflection, polarization by double refraction, Malus' law, Superposition of two disturbances, the mathematical analysis, the phenomenon of double refraction, quarter wave plates and half wave plates.

AG: 19.1, 19.2.1, 19.2.2, 19.2.3, 19.3, 19.4, 19.4.1, 19.5, 19.6.

[Note: A good number of numerical examples are expected to be covered during the prescribed lectures].

REFRENCES

1. SBA.: A text book of Optics – Subramanyam, Brij Lal, Avadhanulu – S. Chand & Co. Multicoloured Ed. 2007.
2. AG. : Optics – Ajoy Ghatak (3rd Ed) Mc. Graw Hill Co.

USPH402: Electronics

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basics of transistor biasing, operational amplifiers, their applications.
2. Understand the basic concepts of oscillators and be able to perform calculations using them.
3. Understand the working of digital circuits.
4. Use IC 555 timer for various timing applications.
3. Demonstrate quantitative problem solving skills in all the topics covered.

UNIT I (15 Lectures)

1. Transistor Biasing: Essentials of transistor biasing circuit, stability factor, methods of transistor biasing, Emitter bias, Voltage divider bias method.

MM: 9.5, 9.6, 9.7, 9.9, 9.10, 9.12

2. Uni- Junction Transistor: Symbol, construction, I-V characteristics, equivalent circuit

AM: 28.5

3. General amplifier characteristics:

Concept of amplification, amplifier notations, current gain, Voltage gain, power gain, input resistance, output resistance, general theory of feedback, reasons for negative feedback, loop gain.

AM: 7.1 to 7.7, 17.1, 17.2, 17.3.

Practical circuit of transistor amplifier, phase reversal, frequency response, Decibel gain and Band width.

MM: 10.4, 10.5, 11.3

UNIT II **(15 Lectures)**

1. Oscillators: Introduction, effect of positive feedback. Requirements for oscillations, phase shift oscillator, Colpitt's oscillator, Use of UJT as a relaxation oscillator

AM: 18.0 to 18.3, 18.6, 28.5

2. Operational Amplifiers: Introduction, Differential and Common-Mode Operation,Op-Amp Basics, Virtual Ground , Practical Op-Amp Circuits : Inverting amplifier, Non inverting amplifier, Unity Follower, summing amplifier, integrator, differentiator, Frequency Parameters : Gain bandwidth and Slew rate

BN: 14.1 to 14.4 and 14.6 (7^{th} Edition)

BN : 13.1 to 13.4 and 13.6 (8^{th} Ed.)

UNIT III **(15 Lectures)**

1. Number system: Decimal, binary, hexadecimal number system and their mutual conversions.

ML: 5.2 to 5.5, 5.7

2. Binary addition, binary subtraction, unsigned Binary numbers, Sign-magnitude Numbers, 2's compliment representation and 2's compliment arithmetic: addition and subtraction.

ML: 6.1 to 6.6

3. Flip-flops and counters: R-S flip flops, Clocked R-S , D Flip flop, edge triggered J K flip flop, Master slave flip flop, Asynchronous counters: 3 bit ripple up counter and 3 bit ripple down counter

ML: 8.1, 8.2,8.5, 8.8 , 10.1

4. 555 Timer : Block diagram , Monostable and Astable Operation

MB: 23.7, 23.8, 23.9

[Note: A good number of numerical examples are expected to be covered during the prescribed lectures].

References:

1. MM : Principles of Electronics – V. K. Mehta and Rohit Mehta. (S. Chand – Multicoloured illustrative edition)
2. AM : Electronic devices and circuits – An introduction Allan Mottershead (PHI Pvt. Ltd. – EEE – Reprint – 2013)
3. BN : Electronic Devices And Circuit Theory: Robert Boylestad and Louis Nashelsky (7^{th}/8th Edition Prentice Hall)
4. ML : Digital Principles and Applications: Donald Leach, A Malvino , Goutam Saha (13^{th} Edition) (McGraw Hill Publication)
5. MB : Electronic Principles : A. P. Malvino and D.J. Bates (7th Ed.) – (TMH).

Additional references:

UNIT – I: Electronics Fundamental and applications (8^{th} Ed.) D. Chattopadhyay & P. C. Rakshit (New Age International)

Unit-II and UNIT–III : A textbook of electronics – Santanu Chattopadhyay New Central Book Agency. 2006 Ed.

Basic Electronics – Ravish Aradhya H V, Mc Graw Hill Education 2013 Ed.

USPH 403 Cosmology and Quantum Mechanics

Learning Outcomes:

On successful completion of this course students will be able to:

1. Understand the basic terms like Cosmology, galaxy, quasars.
2. Understand the postulates of quantum mechanics and to understand need of quantum mechanics.
3. Demonstrate quantitative problem solving skills in all the topics covered.

UNIT I:

Cosmology : Units in cosmology : length, mass, time scale , Magnitude,(solve problems) structural hierarchy (large scale structure of the universe) Hubble's law and expansion of the universe (problems)

JVN E - 1.1 , 1.2, 1.3

Types of galaxy, Radio Sources, Quasars, Radiation background

JVNI - 1.3, 1.4 , 1.5 ,1.6 , 1.9

Quantum mechanics : (Review : failure of classical mechanics to explain black body radiation and how quantum theory was successful , De-Broglie waves) Photo electric effect , waves of what ? Describing a wave, phase velocity and group velocity, Applying the uncertainty principle (problems on all the topics), Applications of quantum mechanics

AB - 2.3, 3.2, 3.3, 3.4, 3.9 Concepts of modern physics (6^{th} Edition) – Arthur Beiser

UNIT II:

Postulates of Quantum mechanics, Quantum mechanics, Wave equation, Schrodinger's equation –time dependent form, Linearity and superposition, Expectation values, Operators, Schrodinger's equation –steady state form Worked out examples and problems

SPS : 4.9

AB - 5.1 to 5.7

UNIT III:

Free states , The free particle , potential step, The rectangular potential barrier, The tunnel effect, The emission of alpha particle for a radioactive element, Square well potential , free states, bound states , particle in a box, Particle in a rectangular three dimensional box, Worked out examples and problems

SPS - 5.1 to 5.6 , 6.1 to 6.3

[Note: A good number of numerical examples are expected to be covered during the prescribed lectures].

References :

JVNE: Elements of Cosmology – by Jayant V Narlikar 1996 University press

JVNI: Introduction to Cosmology(3^{rd} edition 2002) – Jayant Narlikar Cambridge University Press

AB: Concepts of modern physics - Arthur Beiser (6^{th} Editionn) Tata Mc Graw Hill

SPS: Quantum Mechanics : SP Singh , M.K Bagade , Kamal Singh Chand 2004 Edition

Additional references:

Astrophysics for Physicists- Chapter 9 - (Cambridge university press): Arnab Rai Chaudhary

Quantum Physics (2^{nd} edition) Wiley student edition, Eisberg and Resnick

Modern Physics : A B Gupta

Solid state Physics by S O Pillai for Unit 3.

USPHP4P: Revised Practical course

Instructions: i) All the measurements and readings should be written with proper units in SI system only

ii) After completing all the required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination.

iii) While evaluating practical, weightage should be given to circuit/ray diagram, observations, tabular representation, experimental skill and procedure, graph, calculation and result.

iv) Skill of doing the experiment and understanding physics concepts should be more important than the accuracy of final result.

Leaning Outcome:

On successful completion of this course students will be able to:

i) To demonstrate their practical skills.
ii) To understand and practice the skills while doing physics practical.
iii) To understand the use of apparatus and their use without fear.
iv) To correlate their physics theory concepts through practical.
v) Understand the concepts of errors and their estimation.

List of experiments:

Group A

1. Optical lever: determination of μ
2. Determination of Couchy's constants.
3. Cylindrical obstacle: determination of λ
4. Fresnel's bi-prism: determination of λ
5. Resolving power of telescope.
6. R.P. of grating
7. Brewster's law: determination of μ
8. Single slit diffraction

Group B

9. Opamp: Inverting amplifier with different gains
10. Opamp: Noninverting amplifier with different gains and voltage follower
11. Opamp: Integrator
12. Opamp: Differentiator.
13. Passive band pass filter.
14. UJT characteristics
15. UJT relaxation oscillator
16. Colpitt's oscillator.

Group C

17. CE amplifier: determination of bandwidth
18. CE amplifier: variation of gain with load
19. Square wave oscillator using gates.
20. Half adder and full adder (7486, 7408)
21. Study of MS-JK flip flop and divide by 2 and 4 counter.
22. 555 timer as Astable multivibrator
23. 555 timer as Monostable multivibrator
24. Use of 555 as timer in seconds and minutes

Demonstration experiments:

1. Laser experiments: straight edge, single slit, ruler grating
2. Optical fibre: transmission of signal
3. Concept of beats
4. Coupled oscillations and resonance
5. Error analysis of a given experiment
6. Wave form generator using Op-amp
7. PC simulations: graph, curve fitting etc.
8. Straight edge Fresnel diffraction
9. Double refraction
10. First order active filter.
11. Hysteresis expt.

E) Exemption of two experiments from section A and/or B and/or C may be given if student

carry out any one of the following activity.

1. Students should collect the information of at least five Physicists with their work or write a report on any major physics events and report that in journal.
2. Students should carry out mini-project up to the satisfaction of professor In-charge of practical.
3. Study tour; Students participated in study tour must submit a study tour report.

REFRENCES

1. Advanced course in Practical Physics D. Chattopadhya, PC. Rakshit & B. Saha. (6^{th} Edition) Book & Allied Pvt. Ltd.
2. BSc Practical Physics – Harnam Singh S. Chand & Co. Ltd. – 2001
3. A Text book of advanced Practical Physics – Samir Kumar Ghosh, New Central Book Agency – (3^{rd} edition)
4. B Sc. Practical Physics – CL Arora (1^{st} Edition) – 2001 S. Chand & Co. Ltd.
5. Practical Physics – CL Squires – (3^{rd} Edition) Cambridge University Press.
6. University Practical Physics – D C Tayal. Himalaya Publication.
7. Advanced Practical Physics – Worsnop & Flint.

For practical examination the learner will be examined in **three experiments** (one from each group). Each experiment will be of two **hour** duration. **Minimum 3** from each group and in all minimum **12** experiments and minimum of 4 demonstration experiments are required to be completed and reported in journal compulsorily. The learner be evaluated at the time of viva voce on the basis of regular experiments and the demonstration experiments.

A learner will be allowed to appear for the semester end practical examination only if the candidate submits a certified journal of Physics or a certificate that the learner has completed the practical course of Physics **Semester IV** as per the minimum requirements.

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AC 11-02-2017

Item No. 4.222

UNIVERSITY OF MUMBAI

Essential Elements of the Syllabus

Title : Syllabus for the B.Sc. Course in Physics (from academic year 2017-18) for Semester III & IV

Course Code : **USPH**

Preamble :

This is a revised part of the undergraduate programme (Six Semesters) in Physics, to be taught in Semester III & IV from the academic year 2017-18 onwards.

Developing Curriculum that is progressive and purposeful to create positive improvement in the education system is the logic behind this revision.

Out of the three courses in each Semester, **two** courses are devoted to core Physics, catering to Mechanics, Thermodynamics, Optics , Electrodynamics, Quantum Mechanics, Mathematical Physics and Digital and Analog Electronics. These have been tailored to fit in with the existing FYBSc syllabus (Sem I and Sem II) in terms of continuity and to ensure delivery of quality content to the learner.

The science of Physics has diversified immensely in recent times and numerous new fields in Physics, such as Biophysics, Geo-Physics, Radio-Physics, Physics of metals and materials, etc. have come into existence. The fundamentals and the generality of many principles of Physics are common to all these specialized diverse fields. Most problems in applied areas have been discussed

intensely in academic conferences and journals, but have not found their place in curricula or in text books.

The **third** course in each semester offers interdisciplinary application- oriented topics . It will be offered as a **choice** to all learners across various combinations. This course will seek to foster a spirit of multidisciplinary approach in learning.

The 'practical' component in the applied course will be seen as a combination of laboratory sessions , a visit to a Research Institute/Industry, mini project, an assignment on a relevant topic etc.

For the various units, experts will guide as '**Resource Persons**' and their laboratories/ departments could serve as **Resource Centers**. Faculty members/Teachers can avail of their expertise to train themselves in the delivery of these courses whenever required.

Objective :

Upon completion of the course, students should have acquired the following knowledge and skills:

1. a thorough quantitative and conceptual understanding of the core areas of physics, including mechanics, , thermodynamics, quantum mechanics, electronics at a level compatible with graduate programs in physics at peer institutions.
2. the ability to analyze and interpret quantitative results, both in the core areas of physics and interdisciplinary areas.
3. the ability to use contemporary experimental apparatus and analysis tools to acquire, analyze and interpret scientific data.
4. the ability to apply the principles of physics to solve new and unfamiliar problems.
5. the ability to communicate scientific results effectively in presentations or posters.

Eligibility : Passed semester 1 and Semester II **;** as per rules of passing

Question paper pattern : Paper of 100marks ; 3 hours duration.

(pattern as per guidelines)

Revised Syllabus in Physics (Theory and Practical)

as per Choice based Credit and Grading system

Second year B.Sc. 2017-2018

The revised syllabus in Physics as per credit based system (with choice) of the Second Year B.Sc course will be implemented from the academic year 2017-2018.

Objectives:

- To develop analytical abilities towards real world problems
- To familiarize with current and recent scientific and technological developments
- To enrich knowledge through problem solving hands on activities, study visits, projects etc.

Semester	Paper	Title	Credits
III	USPH301	Mechanics and thermodynamics	2
III	USPH302	Vector calculus ,Analog Electronics	2
III	USPH303	Applied Physics -I	2
III	USPHP3	Practical course -3 (Group A,B,C and Skill)	3
		Total	**9**
IV	USPH401	Optics and Digital Electronics	2
IV	USPH402	Quantum Mechanics	2
IV	USPH403	Applied Physics-II	2
IV	USPHP4	Practical course -4 (Group A,B,C and Demo)	3
		Total	**9**

Proposed syllabus of SYBSc (2017-18)

USPH301 : Mechanics and thermodynamics

Learning Outcomes :

On successful completion of this course, students will be able to :

i) Understand the concepts of mechanics & properties of matter & to apply them to problems.

ii) Comprehend the basic concepts of thermodynamics & its applications in physical situation.

iii) Learn about situations in low temperature.

iv) Demonstrate tentative problem solving skills in all above areas.

UNIT – I **15 Lectures**

I Compound pendulum :
Expression for period, maximum and minimum time period, centres of suspension and oscillations , reversible compound pendulum. Kater's reversible pendulum , compound pendulum and simple pendulum- a relative study.

Ii Center of Mass , .Motion of the Center of Mass , Linear momentum of a Particle Linear momentum of a System of Particles , Linear momentum wrt CM coordinate (i.e shift of origin from Lab to CM), Conservation of Linear Momentum , Some Applications of the Momentum Principle , System of Variable Mass
Torque Acting on a Particle , Angular Momentum of a Particle , Angular Momentum of System of Particles , Total angular momentum wrt CM coordinate. Conservation of Angular Momentum

iii Oscillations **,** The Simple Harmonic Oscillator , Relation between Simple Harmonic Motion and Uniform Circular Motion , Two Body Oscillations, Damped Harmonic Motion , Forced Oscillations and Resonance.

UNIT –II **15 Lectures**

(Review of zeroth and first law of thermodynamics)

I Conversion of heat into work, heat engine, Carnot's cycle: its efficiency.

Ii Second law of thermodynamics, Statements, Equivalence of Kelvin and Plank statement, Carnot's theorem, Reversible and irreversible process, Absolute scale of temperature.

iii Clausius theorem, Entropy, Entropy of a cyclic process, Reversible process, Entropy change, Reversible heat transfer, Principle of increase in entropy, generalized form of first and second law, entropy change of an ideal gas, entropy of steam, entropy and unavailable energy, entropy and disorder, absolute entropy.

UNIT –III **15 Lectures**

i Third law of thermodynamics, Nernst heat theorem, Consequences of the third law, Maxwell's thermodynamic relations, Clausius – Clapeyron equation, Thermal Expansion.

ii Steam engine, Rankine cycle, Otto engine, Efficiency of Otto cycle, Diesel cycle, Efficiency of Diesel cycle, Otto and diesel comparison

iii Low temp Physics: Different methods of liquefaction of gases, methods of freezing, Cooling by evaporation, cooling by adiabatic expansion
Joule - Thompson effect, JT effect of Van der Waal's gas, Liquefaction of helium, properties and uses of liquid Helium

References:

Resnick and Halliday : Physics – I

Mechanics – H. S. Hans and S. P. Puri, Tata McGraw Hill (2_{nd} ED.)

Thermal Physics, AB Gupta and H. Roy, Book and Allied (P) Ltd, Reprint 2008, 2009.

Heat thermodynamics and Statistical Physics, Brijlal, N.Subramanyam, P. S. Hemne, S. Chand, edition 2007.

Additional reference:

1. KRS: Mechanics by K.R Symon.
2. Classical Dynamics of particles and systems by Thornton and Marian, (CENGAGE Learning)
3. Basic Thermodynamics : Evelyn Guha (Narosa Publications)
4. Classical mechanics by Kleppener , Kollenkov
5. A treatise on heat : Meghanad Saha and BN Srivastava , 1969, India Press.
6. Mechanics and Electrodynamics Rev Edn. 2005 by Brijlal and Subramanyan and Jeevan Seshan.

USPH302 : Vector calculus, Analog Electronics

Learning Outcomes:

On successful completion of this course students will be able to :

1) Understand the basic concepts of mathematical physics and their applications in physical situations.

2) Understand the basic laws of electrodynamics and be able to perform calculations using them.

3) Understand the basics of transistor biasing, operational amplifiers, their applications

4) Understand the basic concepts of oscillators and be able to perform calculations using them.

5) Demonstrate quantitative problem solving skill in all the topics covered.

Unit I: Vector Calculus: 15 Lectures

1. Line, Surface and Volume Integrals, The Fundamental Theorem of Calculus, The Fundamental Theorem of Gradient, The Fundamental Theorem of Divergence , The Fundamental Theorem of Curl (Statement and Geometrical interpretation is included, Proof of these theorems are omitted). Problems based on these theorems are required to be done.

2. Curvilinear Coordinates: Cylindrical Coordinates, Spherical Coordinates

Unit II: Analog Electronics **15 Lectures**

1.Transistor Biasing, Inherent Variations of Transistor Parameters, Stabilisation, Essentials of a Transistor Biasing Circuit, Stability Factor, Methods of Transistor Biasing, Base Resistor Method, Emitter Bias Circuit, Circuit analysis of Emitter Bias, Biasing with Collector Feedback Resistor, Voltage Divider Bias Method, Stability factor for Potential Divider Bias.

2.General amplifier characteristics: Concept of amplification, amplifier notations, current gain, Voltage gain, power gain, input resistance, output resistance, general theory of feedback, reasons for negative feedback, loop gain.

3.Practical circuit of transistor amplifier, phase reversal, frequency response, Decibel gain and Band width.

Unit III: Analog Electronics **15 Lectures**

1. Oscillators: Introduction, effect of positive feedback. Requirements for oscillations, phase shift oscillator, Wien Bridge Oscillator, Colpitt's oscillator, Hartley oscillator

2. Operational Amplifiers: Introduction, Schematic symbol of OPAMP, Output voltage from OPAMP, AC analysis, Bandwidth of an OPAMP, Slew rate, Frequency Response of an OPAMP, OPAMP with Negative feedback, Inverting Amplifier, Non-Inverting Amplifier, Voltage Follower, Summing Amplifier, Applications of Summing amplifier, OPAMP Integrator and Differentiator, Critical frequency of Integrator, Comparator

References:

Introduction to Electrodynamics 3rd Ed by D.J. Griffith

Principles of Electronics – V. K. Mehta and Rohit Mehta. (S. Chand – Multicoloured illustrative edition)

Electronic devices and circuits – An introduction Allan Mottershead (PHI Pvt. Ltd.– EEE – Reprint – 2013)

USPH303 : Applied Physics - I

This paper consists of three modules (units) designed in a way so as to offer interdisciplinary & application oriented learning.

Learning Outcomes :

On completion of this, it is expected that

i) Students will be exposed to contextual real life situations.

ii) Students will appreciate the role of Physics in 'interdisciplinary areas related to materials, Bio Physics, Acoustics etc.

iii) The learner will understand the scope of the subject in Industry & Research.

iv) Experimental learning opportunities will faster creative thinking & a spirit of inquiry.

Unit 1 : Acoustics , Lasers and fibre optics 15 Lectures

1)Acoustics of Buildings: Reverberation, Sabine's formula (without derivation) Absorption coefficient, Acoustics of Buildings, factors affecting Acoustics of Buildings, Sound distribution in an auditorium.

2)Laser : Introduction, transition between Atomic energy states (without derivation), Principle of Laser, Properties of Laser, Helium–Neon Laser, Application of Laser, Holography

3) Fibre Optics : Light propagation through Fibres, Fibre Geometry, Internal reflection, Numerical Aperture, Step-Index and Graded-Index Fibres, Applications of Fibres.

References:

Modern Physics Concept and Applications – Sanjeev Puri, Narosa Publication.

Properties of matter and Acoustics – R Murugeshan and K. Shivaprasath, S Chand & Co.Ltd. (2005-Ed)

Unit II : Biophysics **15 Lectures**

Introduction, definition, History & scope of biophysics, biological fluids, physico-chemical properties, viscosity, surface tension, pH, osmosis, osmotic pressure. Diffusion, Ficks' laws of diffusion, dialysis, Cell is unit of life, fundamental understanding prokaryotic and eukaryotic cell structure and function, eukaryotic cell membrane, Fundamentals of transport process through biological membrane, membrane channels. electrical properties of cell, Action potential, propagation of action potential, methods of measurement of action potential, Nernst equation, Golman equation, The Hodgkin-Huxely model of action potential, voltage clamp technique, Patch clamp technique, cell impedance and capacitance .

References:

1. Cellular and Molecular Biology: Concept and Experiment by Gerald Karp
2. The Cell: A Molecular Approach by Geoffery Cooper
3. Introductory Biophysics: Perspective on living state by James Claycomb
4. Medical Physiology by Guyton
5. Molecular Biology of Cell by Bruce Albert
6. Text Book of Biophysics by R N Roy

Unit III : Materials – properties and applications **15 Lectures**

<u>Introduction to Materials</u>

Classification of Materials based on structures (Crystalline and Amorphous, single crystal, polycrystalline and nanomaterials) and Functionality (Conducting, insulating, superconducting, reflecting, transmitting etc)
Types of Materials: Metals and alloys, Ceramics, Polymers and Composites, Thin Films, Nanomaterials; Some Physical and Chemical methods of materials synthesis (5L)

<u>Properties of materials</u>

Electrical Properties: Review of energy band diagram for materials - conductors, semiconductors and insulators, Electrical conductivity in metals, semiconductors and insulators (dielectrics), effect of temperature on conductivity

Optical Properties: Reflection, refraction, absorption and transmission of electromagnetic radiation in solids.
Magnetic Properties: Origin of magnetism in solids (basic idea), Types of magnetic order (paramagnetism, diamagnetism, antiferro magnetism, ferromagnetism, ferrimagnetism), magnetic hysteresis (6L)

Applications
Optical materials: LEDs, OLEDs, LCDs, Flat Panel Displays, optical fibers
Dielectric materials: Piezoelectric, ferroelectric and pyroelectric materials
Magnetic Materials: Soft magnets (Transformer steels), Hard magnets for permanent magnets, Magnetic Recording and Storage (4L)

References:

1. Electronic Properties of Materials, Rolf E Hummel
2. Materials Science and Engineering: A First Course by V. Raghavan

USPHP3: Practical course -3

Instructions:

i) All the measurements and readings should be written with proper units in SI system only.
ii) After completing all the required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination.
iii) While evaluating practical, weight age should be given to circuit/ray diagram, observations, tabular representation, experimental skills and procedure, graph, calculation and result.
iv) Skill of doing the experiment and understanding physics concepts should be more important than the accuracy of final result.

Learning outcomes :

On successful completion of this course students will be able to :

i) Understand & practice the skills while performing experiments.
ii) Understand the use of apparatus and their use without fear & hesitation.
iii) Correlate the physics theory concepts to practical application.
iv) Understand the concept of errors and their estimation.

Note: Exemption of two experiments from section A and / or B and / or C may be given if student carries out any one of the following activity.

1) Collect the information of at least five Physicists with their work or any three events on physics, report that in journal.
2) Execute a mini project to the satisfaction of teacher in-charge of practical.
3) Participate in a study tour or visit & submit a study tour report.

For practical examinations, the learner will be examined in three experiments (one from each group) .
Each experiment will be of three hours' duration .
A Minimum 3 from each group and in all minimum 12 experiments must be reported in journal.
All the skill experiments are required to be completed compulsorily. Students are required to report all these experiments in the journal. Evaluation in viva voce will be based on regular experiments and skill experiments.

A learner will be allowed to appear for the semester and practical examination only if he submits a certified journal of Physics or a certificate that the learner has completed the practical course of Physics Semester III as per the minimum requirements.

Group A

1 Y by bending.
2 Kater’s pendulum
3 Searle’s experiment: determination of Y and □.
4 Flat spiral spring (Y)
5 Flat spiral spring (n)
6 Young’s modulus by Koenig’s method.
7 Determination of thermal conductivity of bad conductor by Lee’s Method.
8 Helmholtz resonator- determination of unknown frequency.

9 Moment of Inertia of compound pendulum by method of coincidence.
8. Verification of Stefan's law (electrical method)
9. Temperature coefficient of resistance of conducting material,
10. e/m by Thomson's method
11. Charging and discharging of capacitor.
12. LCR parallel resonance.
13. Figure of merit of a mirror galvanometer.
14. Determination of absolute capacitance using BG
15. Measurement of resistance of galvanometer (G by shunting)

Group B

1. Passive low pass filter
2. Passive high pass filters.
3. Passive band pass filter.
4. Opamp: Inverting amplifier with different gains
5. Opamp: Non-inverting amplifier with different gains and voltage follower
6. Opamp: Integrator and Differentiator
7. CE amplifier: determination of bandwidth
8. CE amplifier: variation of gain with load
9. Lissajous figures using CRO.
10. Phase shift oscillator
11. Wien bridge oscillator
12. UJT characteristics
13. UJT relaxation oscillator
14. Colpitt's oscillator
15. Hartley oscillator

Group C

1. Laser experiments: straight edge, single slit, ruler grating
2. Optical fibre: transmission of signal
3. Concept of beats
4. Coupled oscillations and resonance
5. Standardization of pH meter & acid-base titration.
6. Determination of Isoelectric point of Amino Acids/protein.
7. Understanding uv visible spectra of protein/Nucleic Acids.
8. Surface tension of Biological fluid.
9. Microscopic examination of Red blood Cells & White blood Cells.
10. Synthesis of materials - mini project - thin film/nano materials/bulk powders using different routes etc.
11. Visit to research institutes (equivalent to three practical sessions).

12. Assignment & literature survey (equivalent to 2 practical sessions).

Skill experiments

1. Soldering technique
2. Wiring of a simple circuit using bread board
3. Use of DMM
4. Use of oscilloscope
5. Travelling microscope (radius of capillary)
6. Spectrometer: mean μ of yellow doublet of mercury source.
7. Spectrometer: optical leveling and Shuster's method
8. Component testing, colour code of resistors, capacitors etc.
9. Drawing of graph on semi logarithmic / logarithmic scale.
10. Radius of ball bearings (single pan balance)

References:

1) Advanced course in Practical Physics D. Chattopadhya, PC Rakshit & B Saha. (6^{th} Edition) Book and Allied Pvt.Ltd.
2) B.Sc Practical Physics – Harnam Singh S.Chand & Co. Ld. 2001
3) A test book of advanced practical PHYSICS _ SAMIR Kumar Ghosh, New Central Book Agency (3^{rd} edition)
4) B.Sc. Practical Physics – CL Arora (1^{st} Edition) -2001 S.Chand and Co Ltd.
5) Practical Physics CL Squires (3^{rd} Edition) Cambridge University
6) University Practical Physics – DC Tayal. Himalaya Publication
7) Advanced Practical Physics – Worsnop &Flint.

USPH401 : Optics and Digital Electronics

Learning Outcomes:

On successful completion of this course students will be able to :

1) Understand the diffraction and polarization processes and applications of them in physical situations.
2) Understand the applications of interference in design and working of interferometers.
3) Understand the resolving power of different optical instruments.\
4) Understand the working of digital circuits
5) Use IC 555 time for various timing applications.
6) Demonstrate quantitative problem solving skills in all the topics covered.

UNIT I: (15 Lectures)

Background knowledge (devote one lecture at commencement):

i. Introduction, Huygens's - Fresnel theory, Distinction between interference and diffraction, Fresnel and Fraunhoffer types of diffraction.
ii. Introduction of Polarization, Natural light is unpolarized, Unpolarized and Polarized light
iii. Brewster's law , Polaroid sheets
iv. Prism and grating spectra , Cornu's spiral, Fresnel's integrals.

Diffraction:

Fresnel's Diffraction: Fresnel's assumptions, Rectilinear propagation (Half period zones) of light, Diffraction pattern due to straight edge, Positions of maxima and minima in intensity, Intensity at a point inside the geometrical shadow(straight edge), Diffraction due to a narrow slit, Diffraction due to a narrow wire

Fraunhoffer Diffraction : Introduction, Fraunhoffer diffraction at a single slit, Intensity distribution in diffraction pattern due to a single slit, Fraunhoffer diffraction at a double slit, Distinction between single slit and double slit diffraction pattern and missing orders, Plane diffraction Grating, Theory of plane transmission grating, Width of principal maxima .

Unit II **(15 Lectures)**

Polarization: Types of polarization, Plane polarized light, Circularly polarized light, Elliptically polarized light, Partially polarized light, Production of Plane polarized light, Polarization by reflection from dielectric surface, Polarization by refraction –pile of plates, Polarization by scattering, Polarization by selective Absorption, Polarization by double refraction, Polarizer and Analyzer, Malus' Law, Anisotropic crystal, Calcite crystal, Optic Axis, Double refraction in calcite crystal, Huygens' explanation of double refraction, Ordinary and Extra ordinary rays, Positive and Negative crystals, Superposition of waves linearly polarized at right angles, Superposition of e-Ray and o-Ray, Retarders, Quarter wave plate, Half wave plate, Production of linearly polarized light,Production of elliptically polarized light, Production of circularly polarized light, Analysis of polarized light, Applications of polarized light.

Unit – III

Digital Electronics: **(15 Lectures)**

Background knowledge (devote one lecture at commencement):

i. Binary number system , Arithmetic building blocks , Types of registers

Digital IC signal levels, Binary to Decimal ,Decimal to binary , Hexadecimal number, Hexadecimal to decimal Conversion, Decimal to hexadecimal conversion, Hexadecimal to binary conversion, Binary to hexadecimal conversion, Binary addition, Unsigned binary numbers, Sign magnitude numbers , 1's complement , 2's complement , Converting to and from 2's complement representation , 2's complement arithmetic, The adder-subtractor (ignore IC specific diagrams)

RS Flip-Flops (only NOR gate latch, NAND gate latch) , Gated Flip-Flops, Edge-Triggered RS Flip-Flop, Edge- Triggered D Flip-Flop, Edge-Triggered J-K Flip-Flop, JK Master- Slave Flip-Flops, Bounce elimination switch

Types of registers : SISO , SIPO, PISO , PIPO [in this chapter the teacher should make all IC specific diagrams into general diagrams ie. Ignore pin numbers and IC numbers]

Asynchronous counter -3 bit (ignore IC specific diagrams), Synchronous counter only mod 8, Decade Counters Mod5 and Mod10

A Text Book Of Optics By: Dr.N.Subrahmanyam, Brijlal, Dr M.N. Avadhaanulu (S.Chand, 25th Revised edition2012 Reprint 2013)

AJOY GHATAK: OPTICS (5thEdition)

LMS – Digital Principles and Aplications By Leach, Malvino, Saha 6th edn.

TF – Digital Fundamentals by Thomas L Floyd 10th edn. (Additional Reading)

RPJ – Modern Digital Electronics by R P Jain 4th edn. (Additional Reading)

USPH402: QUANTUM PHYSICS

Learning Outcomes :

On successful completion of this course students will be able to :

1) Understand the postulates of quantum mechanics and to understand its importance in explaining significant phenomena in Physics.

2) Demonstrate quantitative problem solving skills in all the topics covered.

Background Reading (Review):

Origin of Quantum Mechanics:
1) Review of Black body radiation, b) Review of photoelectric effects.
2) Matter waves-De Broglie hypothesis. Davisson and Germer experiment.
3. Wave particle duality
5. Concept of wave packet, phase velocity, group velocity and relation between them
6. Heisenberg's uncertainty principle with thought experiment, different forms of uncertainty.

Unit –I: The Schrodinger wave equation: 15 Lectures

1. Concept of wave function, Born interpretation of wave function.
2. Concepts of operator in quantum mechanics examples – position, momentum and energy operators.
3. Eigenvalue equations, expectation values of operators.
4. Schrodinger equation.

5. Postulates of Quantum Mechanics.
6. Analogy between Wave equation and Schrodinger equation.
7. Time dependent and time independent (Steady State) Schrodinger equation, Stationary State
8. Superposition principle.
9. Probability current density, Equation of continuity and its physical significance.

Unit-II: Applications of Schrodinger steady state equation- 15 Lectures

1. Free particle.
2. Particle in infinitely deep potential well (one - dimension).
3. Particle in finitely deep potential well (one - dimension).
4. Step potential.
5. Particle in three dimension rigid box, degeneracy of energy state.

Unit-III: Applications of Schrodinger steady state equation –II 15 Lectures

1. Potential barrier (Finite height and width) penetration and tunneling effect (derivation of approximate transmission probability)
2. Theory of alpha particle decay from radioactive nucleus.
3. Harmonic oscillator (one-dimension), correspondence principle.

[Note: A good number of numerical examples are expected to be covered during the prescribed lectures].

Reference Books:

1. Concepts of Modern Physics – A. Beiser (6th Ed.) Tata McGraw Hill.
2. Quantum Mechanics – S P Singh, M K Bagade, Kamal Singh, - S. Chand : 2004 Ed.
3. Quantum Mechanics of Atoms, Molecules, Solids, Nuclei and particles. - By R. Eisberg and R. Resnik Published by Wiley.
5. Introduction to Quantum Mechanics. - By D. Griffiths Published by Prentice Hall.
6. Quantum Mechanics. - By Ghatak and Lokanathan Published by Mc. Millan.
7. Quantum Mechanics. - By L. I. Schiff.
8. Quantum Mechanics. - By Powell and Crasemann, Addison-Wesley Pub. Co.

USPH403 : Applied Physics II

Learning Outcomes :

On successful completion of this course, students will be able to :

i) Understand the concepts of mechanics & properties of matter & to apply them to problems.

ii) Comprehend the basic concepts of thermodynamics & its applications in physical situation.

iii) Learn about situations in low temperature.

iv) Demonstrate tentative problem solving skills in all above areas.

Unit 1 : Introduction to Geophysics 15 Lectures

CHAPTER 1 : GEOLOGY AND GEOPHYSICS

1.1 Introduction to Geophysics its branches and relationship with other sciences.

1.2 Earth and solar system: Meteorites and other extra-terrestrial materials.

1.3 Age of Earth and various methods of determination. Planetary evolution of the Earth and its internal structure: Elastic waves and variation of physical and chemical properties in the interior of Earth.

1.4 Major tectonic features of the ocean oceanic and continental crust.

1.5 Continental drift – geological and geophysical evidence: mechanisms, objections and present status.

1.6 Gravity and magnetic anomalies at Mid-ocean ridges: deep sea trenches, continental shield areas and mountain chains.

1.7 Geomagnetism, elements of Earth's magnetism: Internal, external fields and their causes, Palaeomagnetism, Polar wandering paths and reversals, Seafloor spreading and Plate tectonics.

1.8 Seismic belts of the Earth: Seismicity and plate movements.

1.9 Geodynamics of the Indian plate.

1.10 Utility of the different geophysical techniques (discussed above) in exploration for academic as well as for harnessing resources. Geophysical potential fields: Principles of Gravity and Magnetic methods.

1.11 Instrumentation, field procedures used in geophysical studies.

1.12 Case studies

1.13 Problems.

Suggested Textbooks and References

1. *Geomagnetism: Solid Earth and Upper Atmosphere Perspectives.* Nathani Basavaiah, Springer (2011).
2. *Introduction to Applied Geophysics: Exploring the Shallow Subsurface.* H.R. Burger, A.F. Sheehan and C.H. Jones. W.W. Norton, New York (2006).
3. *Earth Science.* E.J. Tarbuck, F.K. Lutgens and D. Tasa, Prentice & Hall (2005).
4. *Mantle Plumes and Their Record in Earth History.* K.C. Condie, Cambridge University Press, Cambridge, UK (2001)
5. *The Magnetic Field of the Earth: Paleomagnetism, the Core, and the Deep Mantle.* R.T. Merrill, M.W. McElhinny and P.L. McFadden, International Geophysical Series 63, Academic Press (1996).
6. *Applied Geophysics (Paperback).* W.M. Telford, L.P. Geldart and R.E. Sheriff, Cambridge University Press, Cambridge (1990).

CHAPTER 2 : GEO-ENVIRONMENTAL SCIENCES

2.1 Environmental Magnetic Analysis relating to magnetic minerals and environmental systems, soil magnetism, mineral magnetic studies of lake and marine sediments and magnetic monitoring of air-, land- and water-pollution.

2.2 Geo-Environmental Studies relating to mining, urban, industrial, coastal and desert management, palaeoclimate, palaeoenvironment, medical geology, climate change and studies related to their impact on ecosystem.

2.3 Natural Hazard Investigations including scientific studies related to natural hazards such as earthquakes, landslides, floods and tsunamis.

2.4 Impact Assessment of Anthropogenic Activities such as heavy metal pollution in Mumbai aquatic system with industries and thermal power plants, urbanization, disposal of industrial and radio-active waste, excessive withdrawal of ground water and use of fertilizers.

Problems.

Suggested Textbooks and References

1. *Energy and Environment, 3rd Edition.* Robert A. Ristinen and Jack P. Kraushaar, John Wiley and Sons, Inc. (2015).
2. *Geomagnetism: Solid Earth and Upper Atmosphere Perspectives.* Nathani Basavaiah, Springer (2011).
3. *Textbook of Environmental Chemistry.* Balaram Pani, I.K. International Publishing House (2007).

4. *A Textbook of Environmental Studies, 1/e*. D.K. Asthana and Meera Asthana, S. Chand and Co. Publishing (2006).
5. *Environment: Problems and Solutions, 2/e*. D.K. Asthana and Meera Asthana, S. Chand and Co. Publishing (2006).
6. *Environmental magnetism.* R. Thompson and F. Oldfield F, Allen & Unwin (1986).

Unit II : Microprocessors (15 Lectures)

8085 Microprocessor and Basic Assembly Language Programming *(15 lectures)*

Introduction, Historical Perspective, Organization of a Microprocessor Based system, how does
the Microprocessor works, Machine Language, Assembly Language, High Level Languages,
Writing and executing an Assembly Language Program.

8085 Bus Organization, 8085 Programming Model, The 8085 Microprocessor, Pin connection
diagram and function of each pin, A detailed look at 8085 Microprocessor.

Basic definitions: Instruction, Opcode, operand. Instruction word Size, instruction Format, data format **,**Addressing Modes, The 8085 Instruction Set(Classification) Data transfer Operations, Arithmetic Operations, Logical Operations Branch Operations ,
Introduction to Advanced I nstructions Flowchart

Main References:

1. G: Microprocessor Architecture, programming and Applications with the 8085 by Ramesh Gaonkar, 5th Edition, Prentice Hall of India.
Additional references:
1) Microprocessor and Applications by Vibhute and Borole, Technova Publications, Pune.
2) Microprocessor, Principles & Applications by Gilmore (2nd Ed) TMH

Unit III : **15 Lectures**

A)Radiation Physics

1**: Basics of Radiation Science** 3L

Electromagnetic Spectrum, Introduction to radioactivity, Sources of radiation: Alpha, beta and gamma radiation, high energy electron radiation and X-rays, Radiation units, Sources of radiation: natural and man-made, Radiation protection

2: **Radiation Detectors and Beam Calibration** 4L

Types of radiation detectors, Ionization detectors, scintillation detectors, particle detectors, TLD, thin film detectors, Radiation field analyzer, Basic principles of beam profile measurement

Recommended Books:

1. Course in DRP by Dept of Atomic Energy

B) Radio communication :

1: Basics of Communication 3L

Block diagram of communication system, types of communication system: simplex, duplex, analog and digital communication,

Electromagnetic spectrum, base band and broad band communication. Noise

concept and types, signal to noise ratio, noise figure, noise temperature.

2: Amplitude Modulation 2 L

Need of modulation, concept of modulation, AM waveform, mathematical expression of AM, concept of sideband, demodulation principles. AM Receiver: TRF and super-heterodyne receiver,

3: Frequency Modulation 2 L

FM modulation: definition, mathematical representation, frequency spectrum, bandwidth and modulation index.

4.Concept of ASK, PSK, FSK, PAM, PWM, PPM, PCM. 1 L

Recommended Books:

1. Communication Electronics: Principles and applications by Louis E Frenzel 3rd edition TMH Publications.

2. Electronics Communication Systems by Kennedy

3. Telecommunication Switching Systems and Network by Vishwanathan and Thiagarajan, PHI publication.

4. Electronics Communication Systems by Denis Roddy and John Coolen, PHI publication.

USPHP4: Practical course -4

Instructions:

i. All the measurements and readings should be written with proper units in SI system only.

ii. After completing all the Required number of experiments in the semester and recording them in journal, student will have to get their journal certified and produce the certified journal at the time of practical examination.

iii. While evaluating practical, weight age should be given to circuit/ray diagram, observations, tabular representation, experimental skills and procedure, graph, calculation and result.

iv. Skill of doing the experiment and understanding physics concepts should be more important than the accuracy of final result.

Learning Outcomes :

On successful completion of this course students will be able to :

i) Understand & practise the skills while performing experiments.
ii) Understand the use of apparatus and their use without fear & hesitation.
iii) Correlate their physics theory concepts to practical application.
iv) Understand the concept of errors and their estimation.

For practical examination the learner will be examined in the experiments (one from each group) . Each experiment will be of three hour duration;
Minimum 3 from each group and in all minimum 12 experiments and all the demonstration experiments are required to be completed compulsorily.
Students are required to report all these experiments in the journal. Evaluation in viva voce will be based on regular experiments and skill experiments.

A learner will be allowed to appear for the semester and practical examination only if he submits a certified journal of Physics or a certificate that the learner has completed the practical course of Physics Semester III as per the minimum requirements.

Group A

1. Optical lever: determination of μ
2. Cylindrical obstacle: determination of λ
3. Single slit diffraction
4. Fresnel's bi-prism: determination of λ
5. Determination of Couchy's constants.
6. R.P. of telescope.
7. R.P. of grating
8. R. P. of prism
9. Brewster's law: determination of μ
10. Double refraction
11. Polarimeter
12. Laser beam profile
13. Determination of wavelength of laser using grating
14. Determination of R.I. of liquid by laser
15. μ by total internal reflection

Group B

1. Square wave oscillator using gates.
2. Half adder and full adder (7486, 7408)
3. Study of MS-JK flip flop
4. Study of Latch (74LS373)
5. Study of 3:8 Decoder (74LS138)
6. Study of 8:3 Priority Encoder (74LS148)
7. Counters mod 2,5 and 10
8. Shift registers
9. Transistorized Astable multivibrator
10. Transistorized Monostable multivibrator
11. Transistorized Bistable multivibrator
12. Op-Amp as Astable multivibrator
13. IC 555 timer as Astable multivibrator
14. IC 555 timer as Monostable multivibrator
15. IC 555 timer as a Ramp generator

Group C

1. Study of 8085 microprocessor kit and commands.
2. 8 -bit addition, subtraction, multiplication
3. Two digit Decimal addition, subtraction.
4. Memory block transfer from one location to another.
5. Find largest/smallest number in given block.
6. Find number of positive/negative, odd/even elements in given block.
7. Arrange given number in ascending/descending order
   (**Note**: Use 8085 kit or any 8085 simulator to perform practicals)
8. Use of initial magnetization curve to find flux in core
9. Project on a topic (equivalent to three practical sessions)
10. Visit to research institutes (equivalent to three practical sessions)
11. Assignment & literature survey (equivalent to 2 practical sessions).
12. Visit to Hospital with medical diagnostic equipment.
13. Plotting and analysis of detector data (from University /research institutions)
14. Design, Build and test Amplitude Modulator and/or Frequency Modulator
15. Time Division Multiplexing circuit.
16 Frequency Shift Keying(FSK) using IC 555 or XR 2206
17. Demonstration of PAM, PPM and PWM.

Demonstration experiments

1. Error analysis of a given experiment
2. Wave form generator using Op-amp
3. PC simulations: graph, curve fitting etc.
4. Straight edge Fresnel diffraction
5. First order active filter.
6. DAD instruction.

References:

1. Advanced course in Practical Physics D. Chattopadhya, PC Rakshit & B Saha. (6^{th} Edition) Book and Allied Pvt.Ltd.
2. B.Sc PRACTICAL Physics – Harnam Singh S.Chand & Co. Ld. 2001
3. A test book of advanced practical PHYSICS _ SAMIR Kumar Ghosh, New Central Book Agency (3^{rd} edition)
4. B.Sc. Practical Physics – CL Arora (1^{st} Edition) -2001 S.Chand and Co Ltd.
5. Practical Physics CL Squires (3^{rd} Edition) Cambridge University
6. University Practical Physics – DC Tayal. Himalaya Publication
7. Advanced Practical Physics – Worsnop &Flint.

University of Mumbai

No. UG/ 27 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty is invited to this office Circular No. UG/299 of 2017-18, dated 7th November, 2017 relating to the revised syllabus as per (CBCS) of S.Y.B.A. Social Psychology Development Psychology and General Applied Component Option A Health Psychology, B Psychology of Adjustment, C Stress Management (Part I) (Sem. III) and (Part II) (Sem.IV).

They are hereby informed that the recommendations made by the Board of Studies in Psychology at its meeting held on 26th March, 2019 have been accepted by the Academic Council at its meeting held on 15th April, 2019 **vide** item No. 4.13 and that in accordance therewith, the revised syllabus as per the (CBCS) for the S.Y.B.A.(Sem.III & IV) Paper II Social Psychology, Paper III Development Psychology, Applied Components (a) Health Psychology, (b) Psychology of Adjustment, (c) Stress Management has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032
1st June, 2019

(Dr. Ajay Deshmukh)
REGISTRAR

To

The Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C./4.13/15/04/2019

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No. UG/ 27 -A of 2019 MUMBAI-400 032 1st June, 2019

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities,
2) The Chairman, Board of Studies in Psychology,
3) The Director, Board of Examinations and Evaluation,
4) The Professor-cum-Director, Institute of Distance and Open Learning (IDOL),
5) The Director, Board of Students Development,
6) The Co-ordinator, University Computerization Centre,

(Dr. Ajay Deshmukh)
REGISTRAR

Choice Based Credit System (CBCS)
S.Y.B.A. Psychology Syllabi to be implemented from 2019-2020
Social Psychology - Paper II: Part I and Part II

Code	Sem.	Course Title	Credits	Marks
UAPSY 301	3	Social Psychology: Part I	3	100
UAPSY 401	4	Social Psychology: Part II	3	100

Objectives: -
1. To help students in building knowledge of the basic concepts and modern trends in Social Psychology.
2. To foster interest in Social Psychology as a field of study and research among students.
3. To make the students aware of the applications of the various concepts in Social Psychology in the Indian context.

Semester III Social Psychology: Part I (3 lectures per week)

Unit 1: Social Psychology: The Science of the Social Side of Life
a) Social Psychology: What it is and is not
b) Social psychology: Advances at the boundaries
c) How social psychologists answer the questions they ask: Research as the route to increased knowledge
d) The role of theory in social psychology
e) The quest for knowledge and the rights of individuals: Seeking an appropriate balance

Unit 2: Social Perception: Seeking to Understand Others
a) Nonverbal communication: An unspoken language
b) Attribution: Understanding the causes of behavior
c) Impression formation and management: Combining information about others
d) What research tells us about the role of nonverbal cues in job interviews?
e) What research tells us about why some people conclude they are superior to others?

Unit 3: Attitudes: Evaluating and responding to the social world
a) Attitude formation: How attitudes develop
b) When and why do attitudes influence behavior?
c) How do attitudes guide behavior?
d) The science of persuasion: How attitudes are changed
e) Resisting persuasion attempts
f) Cognitive dissonance: What it is and how do we manage it?
g) What research tells us about culture and attitude processes?

Unit 4:Liking, Love and Other close relationships.
a) Internal sources of liking others: The role of needs and emotions
b) External sources of attraction: The effects of proximity, familiarity and physical beauty
c) Sources of liking based on social interaction
d) Close relationships: Foundations of social life
e) What research tells us about dramatic differences in appearance between partners: Is love really blind?
f) What research tells us about two factors that may destroy love—jealousy and infidelity

Semester IV Social Psychology: Part II (3 lectures per week)

Unit 1: Causes, and Cures of Stereotyping, Prejudice and Discrimination
a) How members of different groups perceive inequality
b) The nature and origins of stereotyping

c) Prejudice: Feelings toward social groups
d) Discrimination: Prejudice in action
e) Why prejudice is not inevitable: Techniques for countering its effects
f) What research tells us about the role of existential threat in prejudice

Unit 2: Social Influence: Changing Others' Behavior

a) Conformity: How groups – and norms – influence our behavior.
b) Compliance: To ask – sometimes – is to receive
c) Obedience to authority: Would you harm someone if ordered to do so?
d) Unintentional social Influence: How others change our behaviors even when they are not trying to do so
e) What research tells us about how much we really conform?
f) What research tells us about using scarcity to gain compliance?

Unit 3: Aggression: Its Nature, Causes and Control

a) Perspectives on aggression: In search of the roots of violence
b) Causes of human aggression: Social, cultural, personal and situational
c) Aggression in the classroom and workplace
d) The prevention and control of violence: some useful techniques
e) What research tells us about the role of emotions in aggression?
f) What research tells us about workplace aggression?

Unit 4: Prosocial Behavior: Helping Others

a) Why people help: Motives for prosocial behaviour
b) Responding to an emergency: Will bystanders help
c) Factors that increase or decrease the tendency to help
d) Crowdfunding: A new type of prosocial behaviour
e) Final thoughts: Are prosocial behaviour and aggression opposites?
f) What research tells us about paying it forward: Helping others because we have been helped
g) What research tells us about how people react to being helped

Book for Study:

Branscombe, N. R. &Baron, R. A., Adapted by PreetiKapur (2017). *Social Psychology*. (14th Ed.). New Delhi: Pearson Education; Indian reprint 2017

Books for Reference-

Aronson, E., Wilson, T. D., Akert, R. M.,&Sommers ,S.A. adapted by Veena Tucker (2016). *Social Psychology*. (9th Ed), New Jersey: Pearson Education Prentice Hall.Indian subcontinent adaptation .Pearson India Education Pvt.Ltd.

Crisp ,R.J.,&Turner,R.N.(2014).*Essential Social Psychology*. Sage Publication.South Asia adaptation (2017).

Mercer, J. & Clayton, D. (2014). *Social Psychology*. New Delhi: Dorling Kindersley India pvt ltd. 8)

Myers, D. G., Sahajpal, P., &Behera, P. (2017). *Social psychology* (10th ed.). McGraw Hill Education.

Taylor, S. E., Sears, D. O., &Peplau, L. A. (2017). *Social psychology* (10th ed.). Pearson Education.

S.Y.B.A. Developmental Psychology: A Focus on Adolescent and Adult Development Paper III Part I and Part II

Code	Sem.	Course Title	Credits	Marks
UAPSY 302	3	Developmental Psychology A Focus on Adolescent and Adult Development: Part I	3	100
UAPSY 402	4	Developmental Psychology A Focus on Adolescent and Adult Development: Part II	3	100

Objectives: -

1. To help students in building knowledge and understanding of the basic concepts, principles, perspectives and modern trends in Developmental Psychology
2. To foster interest in Developmental Psychology as a field of study and research among students.
3. To make the students aware of the implications and applications of the various concepts, principles and theories of Developmental Psychology in daily life in the Indian context

Semester III Developmental Psychology: A Focus on Adolescent and Adult Development Part I
(3 lectures per week)

Unit 1. An Introduction to Lifespan Development and Adolescence Physical & Cognitive development

1A Lifespan Development

a) An orientation to lifespan development
b) Defining life span development
c) Scope of the field (areas, age and individual differences)
d) Basic influences in development (history, age, sociocultural, life events)

1B Adolescence Physical & Cognitive development

e) Physical maturation
f) Cognitive development and schooling
g) Threats to adolescence well being

Unit 2. Social and Personality Development in Adolescence

a) Identity: Asking 'Who am I'
b) Relationships: Family and friends
c) Dating, sexual behaviour and teenage pregnancy

Unit 3. Physical and Cognitive Development in Early Adulthood

a) Physical Development
b) Cognitive development
c) College: Pursuing Higher Education

Unit 4. Social and Personality Development in Early Adulthood

a) Forging Relationships: Intimacy, Liking and Loving during Early Adulthood
b) The Course of Relationships
c) Work: Choosing & Embarking on a Career

Semester IV Developmental Psychology: A Focus on Adolescent and Adult Development Part II
(3 lectures per week)

Unit 1. Physical and Cognitive Development in Middle Adulthood

a) Physical development
b) Health
c) Cognitive development

Unit 2. Social and Personality Development in Middle Adulthood

a) Personality Development
b) Relationships: Family in Middle Age
c) Work& Leisure

Unit 3. Physical and Cognitive Development in Late Adulthood

a) Physical development in Late Adulthood
b) Health and wellness in Late Adulthood
c) Cognitive development in Late Adulthood

Unit 4. Social and Personality Development in Late Adulthood

a) Personality Development and successful aging
b) The daily life of Late Adulthood
c) Relationships: Old & new

Book for study

Feldman, R. S. & Babu, N. (2018). Development across the Life Span. (8th Ed). India: Pearson India Education services Pvt.Ltd

References

Cook, J. L., & Cook, G. (2009). Child Development: Principles and Perspectives. Boston: Pearson Education

Crandell, T. L., Crandell, C. H., &Zanden, J. W. V. (2009). Human Development. (9th Ed). New York: McGraw Hill co. Inc.

Feldman, R. S., &Babu, N. (2011). Discovering the Life Span. Indian subcontinent adaptation, New Delhi: Dorling Kindersley India pvt ltd.

Papalia, D. E., Olds, S. W., & Feldman, R. (2012). Human Development. (12th Ed). McGraw Hill, international Edition

Papalia, D. E., Olds, S. W., & Feldman, R. (2012). Human Development. (12th Ed). McGraw Hill, international Edition

Santrock, J. (2017). Life-span development (13th ed.). Indian Edition. McGraw-Hill Higher Education.

Singh, A. (Ed.) (2015). Foundations of human development: A life span approach. Orient Longman.

S.Y.B.A. Applied Component (Option A) Health Psychology - Part I and Part II

Code	Sem.	Course Title	Credits	Marks
UAHP3A1	3	Health Psychology: Part I	2	100
UAHP4A1	4	Health Psychology: Part II	2	100

Objectives: -

1. To help students in building knowledge of the basic concepts and modern trends in Health Psychology.
2. To foster interest in Health Psychology as a field of study and research among students.
3. To make the students aware of the practical applications of the various concepts in Health Psychology in the Indian context.

Semester III Health Psychology: Part I (4 lectures per week)

Unit 1. What Is Health Psychology and Health Behaviors

1A. Introduction to the field of Health Psychology

a) Definition of health psychology
b) The mind-body relationship
c) The rise of the biopsychosocial method
d) The need for health psychology
e) The role of epidemiology in Health Psychology
f) What is health psychology training for?

1B. Health Behaviors

g) An introduction to health behaviours
h) Health promotion: An overview
i) Changing health habits
j) Cognitive-behavioural approaches to health behaviour change
k) The transtheoretical model of behaviour change
l) Changing health behaviors through social engineering
m) Venues for health-habit modification

Unit 2. Health-Promoting Behaviors

2AHealth-Promoting Behaviors

a) Exercise, its determinants, & interventions
b) Accident prevention
c) Vaccination and screening
d) Developing a healthy diet
e) Sleep
f) Rest, Renewal and savouring

2B. Health-compromising Behaviors

g) Characteristics of health-compromising behaviours
h) Alcoholism & Problem Drinking
i) Smoking

Unit 3: Stress

a) What is stress?
b) Origins of the study of stress
c) The physiology of stress
d) What makes events stressful?
e) How has stress been studied?
f) Sources of chronic stress

Unit 4. Coping, Resilience & Social Support

a) Coping with stress and resilience
b) Coping and external resources
c) Coping outcomes
d) Coping interventions
e) Social support

Semester IV - Health Psychology Part II (4 lectures per week)

Unit 1. Management of Chronic Health Disorders & Placebo Effect

1A Management of Chronic Health Disorders

a) Quality of life
b) Emotional responses to health disorders
c) Personal issues in chronic health disorders
d) Coping with chronic health disorders
e) Co-management of chronic health disorders
f) Psychological interventions and chronic health disorders

1B Complementary and Alternative medicine,& placebo effect

g) Complementary andalternative medicine
h) The placebo effect

Unit 2.Psychological Issues in Advancing and Terminal Illness

a) Death across the life span
b) Psychological issues in advancing illness
c) Are there stages in adjustment to dying?
d) Psychological issues and the terminally ill
e) Alternatives to hospital care for the terminally ill
f) Problems of survivors

Unit 3. Heart Disease, Hypertension, Stroke and Type II Diabetes

a) Coronary heart disease
b) Hypertension
c) Stroke
d) Type II Diabetes

Unit 4.Psychoneuroimmunology and Immune – Related Disorders

a) Psychoneuroimmunology
b) HIV infection and AIDS
c) Cancer
d) Arthritis
e) Type I Diabetes
f) Future trends in the field of Health Psychology

Book for Study -

Taylor, Shelley E. (2018). Health Psychology (10th Ed). McGraw Hill Higher Education. Indian Edition

Books for reference

DiMatteo, M. R., & Martin, L. R. (2017). Health psychology(1st ed.). Pearson Education.

Ogden, J. (2017). Health psychology: A textbook (4th ed.).McGraw Hill Education.

S.Y.B.A. Applied Component (Option B) Psychology of Adjustment - Part I and Part II

Code	Sem.	Course Title	Credits	Marks
UAPA3A1	3	Psychology of Adjustment: Part I	2	100
UAPA4A1	4	Psychology of Adjustment: Part II	2	100

Objectives: -

1. To help students in building knowledge of the basic concepts and modern trends in Psychology of Adjustment

2. To foster interest in Psychology of Adjustment as a field of study and research among students.
3. To make the students aware of the practical applications of the various concepts in Psychology of Adjustment in the Indian context

Semester III - Psychology of Adjustment: Part I (4 lectures per week)

Unit 1. Self-direction in a changing world and seeking selfhood

a) Social change, the challenge of self-direction, themes of personal growth
b) What is self-concept; the components of self-concept, core characteristics of self-concept, the Self-concept and personal growth

Unit 2. Towards better health

a) Body image; Health and the mind–body relationship
b) Coping with illness; Promoting wellness

Unit 3. Taking charge and Managing motives and emotions

a) Personal control, decision making, decisions and personal growth
b) Understanding motivation; Understanding emotions

Unit 4. Sexuality, Love and commitment

a) Sexuality and shared partnerships, sexual responsiveness, sexual orientation, practical issues
b) Love is a many splendored (and defined) thing, finding love, marriage and other committed relationships, adjusting to intimate relationships, divorce and its consequences

Semester IV - Psychology of Adjustment: Part II (4 lectures per week)

Unit 1. Stress

a) Understanding stress; reactions to stress
b) Managing stress

Unit 2. Understanding mental disorders

a) Psychological disorders; Anxiety disorders
b) Mood disorders; Other disorders

Unit 3. Therapy and Treatment

a) Psychotherapy: what it is and who uses it
b) Insight therapies; Cognitive and behavioral therapies
c) Other approaches to treatment; How well does therapy work

Unit 4. : Death, Dying, and Grief

a) Death and Dying
b) Life and Death in Perspective
c) Bereavement and Grief

Book for Study

Kirsh, S.J., Duffy, K.G., & Atwater, E. (2014). Psychology for Living – Adjustment, Growth, and Behaviour Today. (11th ed.). New Jersey: Pearson

Books for reference

1. Abascal, J. R., Brucato, D., Brucato, L., & Chauhan, D. (2001). *Stress Mastery: The Art of Coping Gracefully*. Indian subcontinent adaptation 2012, New Delhi: Dorling Kindersley India pvt ltd
2. Bam, B. P. (2008). *Winning Habits: Techniques for Excellence in Sports*. New Delhi:Pearson Power, Dorling Kindersley India pvt ltd

3. Baumgardner, S. &Crothers, M. (2009).*Positive Psychology*. Pearson Education
4. Brannon, L. & Feist J. (2007). *Introduction to Health Psychology*. Thomson Wadworth. New Delhi: Indian edition
5. Duffy, K.G., & Atwater, E. (2005). Psychology for Living – Adjustment, Growth, and Behaviour Today. (8th ed.). New Delhi: Pearson, Indian reprint 2008
6. Greenberg, J. S. (2008). Comprehensive Stress Management. (10th ed). McGraw Hill publications
7. Hariharan, M., &Rath, R. (2008). Coping with Life Stress: The Indian Experience. New Delhi: Sage publications India pvt ltd
8. Schafer, W. (2002). Stress Management. (4th ed). New Delhi: Wadsworth Cengage Learning India pvt ltd; first Indian reprint 2008
9. Snyder, C.R., & Lopez, S.J. (2007). Positive Psychology – The scientific and practical explorations of human strengths. New Delhi: Sage publications India pvt ltd, South Asia edition
10. Taylor S. E. (2003). Health Psychology (5th ed). McGraw Hill Higher Education. International Edition.
11. Weiten, W. & Lloyd, M.A. (2006). Psychology Applied to Modern Life - Adjustment in the 21st century. (8th ed.) Cengage Learning India
12. Wilson, E. (2007). Stress Proof Your Life: 52 Brilliant Ideas for Taking Control. New Delhi: Pearson Power

S.Y.B.A. Applied Component Option C - Stress Management - Part I and Part II

Code	Sem.	Course Title	Credits	Marks
UASM3A1	3	Stress Management: Part I	2	100
UASM4A1	4	Stress Management: Part II	2	100

Objectives: -
1. To impart knowledge and understanding of the basic concepts and modern trends in Stress Management
2. To foster interest in Stress Management as a field of study and research
3. To make the students aware of the practical applications of the various concepts in Stress Management in daily life, in the Indian context

Semester III Stress Management Part I (4 lectures per week)

Unit 1. Stress and Stress Psychophysiology

a) The pioneers, stress theory, the stressor, stress reactivity, a definition of stress,stress management goals
B) Stress psychophysiology: the brain, endocrine system, autonomic nervous system, cardiovascular system, gastrointestinal system, muscles and skin, symptoms and stress

Unit 2. Stress and Illness/Disease, and Intervention

a) Hot reactors, psychosomatic disease, stress and the immunological system, stress and serum cholesterol, specific conditions, post-traumatic stress disorder, stress and other conditions
b) Intervention – coping with a stressor, a model of stress, setting up roadblocks, comprehensive stress management, eustress and the model, taking control and making a commitment

Unit 3. Intrapersonal and Interpersonal Life-Situation Interventions

a) Intrapersonal Interventions: – Eliminating unnecessary stressors, nutrition and stress, noise and stress, life events and stress, hassles and chronic stress, success analysis

b) Interpersonal Interventions – asserting oneself, conflict resolution, communication, emotional intelligence, technostress, time management, social support networking

Unit 4.Perception Interventions

a) Selective awareness, stop to smell the roses, perspective and selective awareness, an attitude of gratitude, humour and stress

b) Type A behaviour pattern, self-esteem, locus of control, anxiety management, resiliency, hardiness

Semester IV. Stress Management: Part II (4 lectures per week)

Unit 1. Relaxation Techniques

a) Meditation

b) Autogenic training, imagery and progressive relaxation

c) Biofeedback and other relaxation techniques

Unit 2. Exercise and Strategies for decreasing stressful behaviors

a) Physiological arousal interventions: Exercise and health, the healthy way to exercise, principles of exercise, assessing cardio-respiratory fitness, starting an exercise program, choosing an exercise program, exercise and the elderly, exercise – keep it going

b) Strategies for decreasing stressful behaviors - Health and lifestyle behaviors, health-behavior assessment, selected lifestyle behaviors, barriers to action, locus of control, various methods for decreasing stressful behaviors, application of behavior change techniques, behavior change theories and stress

Unit 3. Occupational Stress

a) What is Occupational Stress, occupational stress cycle, why is occupational stress of concern, gender and occupational stress, disease and occupational stress

b) Occupational stressors, the workaholic, burnout, women and work outside the home, working in the home, interventions, managing occupational stress

Unit4. Family Stress

a) The family, marriage, cohabitation, divorce, single-parent families, gay and lesbian families

b) Family stressors, a model of family stress, interventions

Book for Study

Greenberg, J. S. (2013). *Comprehensive Stress Management.* (13th ed). New York: McGraw Hill publications

Books for Reference

1) Abascal, J. R., Brucato, D., Brucato, L., & Chauhan, D. (2001). Stress Mastery: The Art of Coping Gracefully. Indian subcontinent adaptation 2012, New Delhi: Dorling Kindersley India pvt ltd

2) Bam, B. P. (2008). Winning Habits: Techniques for Excellence in Sports. New Delhi:Pearson Power, Dorling Kindersley India pvt ltd

3) Hariharan, M., &Rath, R. (2008). Coping with Life Stress: The Indian Experience. New Delhi: Sage publications India pvt ltd

4) Rice, P.L. (1999). Stress and Health. (3rd ed). Brooks/Cole publishing co.

5) Schafer, W. (2002). Stress Management. (4th ed). New Delhi: Wadsworth Cengage Learning India pvt ltd; first Indian reprint 2008

7) Wilson, E. (2007). Stress Proof Your Life: 52 Brilliant Ideas for Taking Control. New Delhi: Pearson Power

Question Paper Pattern for all the subjects

Pattern of Question Paper for Semester End Assessment implemented from 2019-2020

Duration of examination = **3 hours** Total Marks = **100 (per semester)**

Instructions: 1. All 5 questions carry **20** marks and are compulsory.
2. There will be internal choice in each Question.

Q1. Attempt any two questions (unit 1) 20 marks

A

B

C

Q2. Attempt any two questions (unit 2) 20 marks

A

B

C

Q3. Attempt any two questions (unit 3) 20 marks

A

B

C

Q4. Attempt any two questions (unit 4) 20 marks

A

B

C

Q5. Attempt any two questions (unit 1, 2, 3, 4 one from each unit) 20 marks

A

B

C

D

PREAMBLE:

The syllabus has been revised in view to understand recent trends in the subject of economics .The Board of Studies in Economics has revised the syllabi of papers at the TYBA which will be made effective from the Academic Year 2018-19. In this revision, some of the existing optional papers have been replaced by new papers. A broad overview of the structure, followed by the syllabi of individual papers, is given below.

DURATION:

- The course shall be a full time course.
- The duration of B.A. course shall be of Three years /Six Semesters.

  FYBA: SEMESTER – I & II (One paper each semester)

  SYBA: SEMESTER – III & IV (Two papers each semester)

  TYBA: SEMESTER – V & VI (Six papers each semester)

PATTERN:

The T.Y.B. A. [Entire Economics] Course shall have 12 papers. Every semester shall have six papers, each carrying 100 marks. However students can opt combination of any two subjects (Economics and any other subject). Every semester shall have three papers of each subject, carrying 100 marks.

SCHEME OF EXAMINATION:

- **Duration** – **Three Hours** for each paper.
- There shall be five questions each of 20 marks.
- All questions shall be compulsory with internal choice within the questions.
- Questions may be subdivided into sub-questions a, b, c and the allocation of marks shall depend on the weightage given to the topic.

Questions	Modules	Marks
Qu.1	Unit I	20
Qu.2	Unit II	20
Qu.3	Unit III	20
Qu.4	Unit IV	20

Qu.5	4 sub-questions from Unit I, II, III & IV	20

COURSE STRUCTURE (APPLICABLE FROM ACADEMIC YEAR 2018 – 2019)

TYBA (SEMESTER – V)

COURSE CODE		REVISED PAPER	CREDIT	MARKS
GROUP-I		**COMPULSORY PAPERS**		
ECOMIC501	**VII**	**MICROECONOMICS III**	**4**	**100**
ECODEV502	**VIII**	**ECONOMICS OF DEVELOPMENT**	**4**	**100**
GROUP-II		**ELECTIVE PAPERS**		
ECOFEA503	**IX**	**FINANCIAL ECONOMICS**	**3**	**100**
OR				
ECOEHIB503	**IX**	**ECONOMIC HISTORY OF INDIA:1857-1947**	**3**	**100**
OR				
ECOILEC503	**IX**	**INDUSTRIAL AND LABOUR ECONOMICS**	**3**	**100**
ECOMSEAA504	**X**	**MATHEMATICAL AND STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS**	**4**	**100**
OR				
ECOMMEB504	**X**	**MATHEMATICAL METHODS IN ECONOMICS**	**4**	**100**
OR				
ECOREMC504	**X**	**RESEARCH METHODOLOGY**	**4**	**100**
OR				
ECOEACD504	**X**	**ECONOMICS OF AGRICULTURE AND COOPERATION**	**4**	**100**
ECOITEA505	**XI**	**INTRODUCTION TO ECONOMETRICS**	**4**	**100**

OR				
ECOENVEB505	**XI**	**ENVIRONMNTAL ECONOMICS**	**4**	**100**
ECOPROA506	**XII**	**PROJECT**	**3**	**100**

TYBA (SEMESTER –VI)

COURSE CODE		REVISED PAPER	CREDIT	MARKS
GROUP-I		**COMPULSORY PAPERS**		
ECOMAE601	**XIII**	**MACROECONOMICS III**	**4**	**100**
ECOINE602	**XIV**	**INERNATIONAL ECONOMICS**	**4**	**100**
GROUP-II		**ELECTIVE PAPERS**		
ECOIFSA603	**XV**	**INDIAN FINANCIAL SYSTEM**	**3**	**100**
OR				
ECOIETB603	**XV**	**INDIAN ECONOMIC THOUGHT**	**3**	**100**
OR				
ECOILEC603	**XV**	**INDUSTRIAL AND LABOUR ECONOMICS**	**3**	**100**
ECOMSEA604	**XVI**	**MATHEMATICAL AND STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS**	**4**	**100**
OR				
ECOAEB604	**XVI**	**APPLIED ECONOMETRICS**	**4**	**100**
OR				
ECOREMC604	**XVI**	**RESEARCH METHODOLOY**	**4**	**100**
OR				
ECOEACD604	**XVI**	**ECONOMICS OF AGRICULTURE AND COOPERATION**	**4**	**100**
ECOITEA605	**XVII**	**INTRODUCTION TO ECONOMETRICS**	**4**	**100**

OR				
ECOPUEB605	**XVII**	**DEVELOPMENT THEORY AND EXPERINENCE**	**4**	**100**
OR				
ECOPEG605	**XVII**	**POLITICAL ECONOMY OF GLOBALIZATION**	**4**	**100**
ECOPROA606	**XVIII**	**PROJECT**	**3**	**100**

MICROECONOMICS III: PAPER VII

Preamble:

The course is designed to provide sound training in microeconomic theory. Since students have already studied the perfect competition, the focus of this course is on the study of imperfect completion and general equilibrium and welfare economics.

SEMESTER –V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - I	**COMPULSORY PAPERS**		
ECOMIC501	**MICROECONOMICS III: PAPER VII**	**4**	**100**

Module I: Monopoly – sources of monopoly - Profit maximising monopoly – calculation of price, output and profit for a monopoly – price discrimination: First and third degree-public policy towards monopoly.

Module II: Basics of Game theory – Prisoner's dilemma – dominant strategy equilibrium – Battle of sexes game – Nash equilibrium – Extensive form games – game tree - Solving finite extensive form game.

Module III: Oligopoly – the Cournot model – the Bertrand model - the Edgeworth model – the Chamberlin model – the Kinked demand curve model – Collusion and Cartels – Price Leadership.

Module IV: General Equilibrium and Welfare Economics – Interdependence in the Economy – General Equilibrium and its Existence -The Pareto Optimality Condition of Social Welfare,

Marginal Conditions for Pareto Optimal Resource Allocation, Perfect Competition and Pareto Optimality - Kaldor- Hicks Compensation Criterion - Arrow's Impossibility Theorem.

References:

1. Koutsoyannis, Modern Microeconomics, Macmillan Press Ltd., London.
2. Mankiw, N. Gregory, Principles of Microeconomics, 7th edition, Cengage Learning, 2015
3. Mansfield, Edwin; Micro-economics: Theory & Applications, 5th edition, W.W. Norton & Company, New York, 1985.
4. Sen Anindya (2007), Microeconomics: Theory and Applications, Second edition Oxford University Press, New Delhi, 2007.
5. Salvatore, D.; Microeconomics : Theory and Applications , New Delhi Oxford, New Delhi, Oxford University Press 2006.
6. R.Gibbons (1992) : A Primer in Game Theory, Harvester Wheatsheaf.

MACROECONOMICS III: PAPER XIII

Preamble:

This course introduces the students to formal modelling of a macroeconomic theory with analytical tools. It discusses goods market with fixed exchange rate, the money market, uncovered interest rate parity and the benefits and costs of fixed and flexible exchange rate

SEMESTER –VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - I	COMPULSORY PAPERS		
ECOMAE601	MACROECONOMICS III: PAPER XIII	4	100

Module 1: The Goods Market in the Open Economy

Trade Balance and its implications for GDP calculations; Export and Import Functions; The Real Exchange Rate and why it matters; Why equilibrium GDP is consistent with a trade imbalance; Fiscal and Exchange Rate Policy with a Fixed Exchange Rate

Module 2: Money/Financial Markets and Mundell-Fleming

The LM equation for the open economy; Uncovered Interest Parity and its implications for exchange rate determination; The combined IS/LM/UIP model; Fiscal and Monetary Policy under Fixed and Flexible Exchange Rates; The Mundell-Fleming trilemma

Module 3: Exchange Rate Regimes & Exchange Rate Crises

The choice of regime, Fixed or Flexible; The spectrum of arrangements from Hard Peg at one end to Fully Floating at the other; Why the Balance of Payments must always balance under Floating Exchange Rates but need not balance under a Fixed or Managed Exchange Rate regime; The operational aspects of fixing; How a fix might come apart; Exchange Rate crises; The relation between Exchange Rate crises and other kinds of crises (banking crises, financial crises, etc.)

Module 4: International Monetary History, 1900-present

The Gold Standard; The Inter-War Period and the Great Depression; The key issues debated at Bretton Woods and the system that emerged as a result of those debates; 1971 and the collapse of the Bretton Woods system; Fixing in Europe via ERM, and the Dollar Standard elsewhere; The Maastricht Treaty and preparations for the Euro; The Global Financial Crisis and its consequences for the Euro; The Euro Crisis; Chinese ambitions in the present day

References:

1. Blanchard, Oliver; Macroeconomics (4th edition, 9th impression), Pearson education, New Delhi, India.
2. Dornbusch R S, Fischer and R Startz; Macroeconomics, 8e Tata Mc Grow Hill, New Delhi 2004.
3. Froyen, R. T.; Macroeconomics : Theory and Policy, Pearson Education Asia, Delhi 2001.
4. Mankiw, Gregory; Macroeconomics, 6e, Worth Publishers, New York, 2003.
5. Salvatore, D.; International Economics, Printice Hall, New York, 1997 .
6. Robert Feenstra & Alan Taylor, *International Macroeconomics*, 2nd ed.
7. Yannis Varoufakis, *The Global Minotaur*

ECONOMICS OF DEVELOPMENT: PAPER VIII

SEMESTER –V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - I	**COMPULSORY PAPERS**		
ECODEV502	**ECONOMICS OF DEVELOPMENT: PAPER VIII**	**4**	**100**

Module 1: Concepts of Economic Growth and Development

Meaning of Growth and Development, Distinction between growth & development, Concept of human development, HDI, GDI, Sustainable development, Green GDP, Three core values of development, Capabilities & functioning

Module 2: Structural Issues in Development Process

Big push theory, Theory of human capital, Role of Education, health & nutrition in economic development, Schumpeter's theory of development, dual economy models of growth, Solows growth model

Module 3: Inequality, Poverty and Development

Measures of poverty and inequality, Kuznets inverted U-hypothesis, Policy options for poverty alleviation, Inclusive growth, Rural credit institutions.

Module 4: Technology and Economic Development

Role of Infrastructure in economic development, Role of technology in economic development, types of technical progress, Intermediate/ Appropriate technology, Green technology,

References:

1 Todaro, Michael P. and Stephen C. Smith. Economic Development, 8e. Delhi: Pearson Education, 2003.

2. Thirlwall, A.P. Growth and Development 8e. New York: Palgrave MacMillan, 2005.

3. Meier, Gerald M. and James E. Rauch. Leading Issues in Economic Development, 8e. New Delhi: Oxford Univ. Press, 2006.

INTERNATIONAL ECONOMICS: PAPER XIV

Preamble

This course develops a systematic exposition of models that try to explain the composition, direction, and consequences of international trade, and the determinants and effects of trade policy. It then builds on the models of open economy macroeconomics developed in courses 08 and 12, focusing on national policies as well as international monetary systems. It concludes with an analytical account of the causes and consequences of the rapid expansion of international financial flows in recent years. Although the course is based on abstract theoretical models, students will also be exposed to real-world examples and case studies.

SEMESTER –VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - I	COMPULSORY PAPERS		
ECOINE602	INTERNATIONAL ECONOMICS: PAPER XIV	4	100

Module 1: Introduction

What is international economics about? An overview of world trade.

Module 2: Old Theories of International Trade

The Ricardian, specific factors, neoclassical trade theory and Heckscher-Ohlin models, Stolper-Samuelson theorem.

Module 3: New trade theories of International Trade

Monopolistic competition and trade-firm heterogeneity, FDI and the global supply chain

Module 4: Trade Policy

Instruments of trade policy; Why countries cooperate and GATT, GATS, Regional Trade Agreements-controversies in trade policy (labor standards, IPR and environment)

References:

1. Paul Krugman, Maurice Obstfeld, and Marc Melitz, *International Economics: Theory and Policy*, Addison-Wesley (Pearson Education Indian Edition), 9th edition, 2012.

2. Dominick Salvatore, *International Economics: Trade and Finance*, John Wiley International Student Edition, 10th edition, 2011.

3 Gordon Hanson, 'The Rise of Middle Kingdoms: Emerging Economies in Global Trade", *Journal of Economic Perspectives*, Spring 2012.

4 Melitz M. and Trefler D., "Gains from Trade When Firms Matter", *Journal of Economic Perspectives*, Spring 2012.

FINANCIAL ECONOMICS: PAPER IX

Preamble:

The course introduces students to the economics of Finance. It aims at imparting knowledge about the basic models of investment and portfolio analysis, including the CAPM. The valuation of assets, derivatives & options is to be studied in addition to patterns of corporate financing.

SEMESTER – V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOFEA503	FINANCIAL ECONOMICS: PAPER IX	3	100

Module1: Investment & portfolio Analysis

Basic theory of interest, discounting & present value; internal rate of return, evaluation criteria , fixed income securities; bonds prices & yields. Structure of interest rate, yield curves, spot & forward rates. Portfolio of assets, random asset returns, Mean variance portfolio analysis, The Markowitz Model & two fund theorem.

Module 2: CAPM

The capital Market line, the CAP Model, the beta of an asset & of a portfolio, security market line, CAPM model in investment & pricing formula.

Module 3: Options & Derivatives

Meaning & types of derivatives: forward contracts, futures - forward & future prices, stock index futures, interest rate futures, future for hedging. Options & Swaps and their types- Option market: call & put options, option trading strategies- spreads, straddles, strips & straps, strangles, the principle of arbitrage. Participants of derivatives market- hedgers, speculators, arbitrageurs.

Module 4: Corporate Finance

Patterns of corporate financing: stock, debt, preferences, convertibles. Capital structure & the cost of capital, corporate debt & dividend policy, the Modigliani –Miller theorem.

Readings:

1. David Luenberger (1997); Investment Science, Oxford University Press.
2. Hull John C. (2005); Options, Futures and other derivatives, Pearson Education 6th Edition.
3. Thomas Copeland, J. Fred Weston and Kuldeep Shastri (2003); Financial Theory and Corporate Policy, Prentice Hall 4th Edition.
4. Richard Brealey and Stewart Myers (2002); Principles of Corporate Finance, McGraw Hill 7th Edition.
5. Stephen Ross and Bradford Jordan (2005); Fundamentals of Corporate Finance, McGraw Hill 7th Edition.
6. William Sharpe, Gordon Alexander and J. Bailey (2003); Investment, Prenice Hall of India 6th Edition.

INDIAN FINANCIAL SYSTEM: PAPER XV

Preamble: The basic purpose of this paper is to acquaint students with various components of the Indian financial system, its working and the trends and turns that have taken place over the years especially since financial sector reforms.

SEMESTER – VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOIFSA603	INDIAN FINACIAL SYSTEM : PAPER:XV	3	100

Module I: Indian Financial System: Structure, Trends and Turns (10 lectures)

Meaning and components of the Financial System - Financial System and Economic Development - Indicators of Financial Development: FR, FIR, NIR and IR. – Overview of financial sector reforms since 1990s – Trends and turns in Indian financial sector: 1950-2017.

Module II: Banking in India since 1990s (10 lectures)

Developments in Commercial banking sector since 1990s – Management of Non-Performing Assets (NPAs); Capital Adequacy Norms - Basel Accord III.- Monetary policy of the RBI –Changes in RBI monetary policy since1990s - Transmission Channels of Monetary policy.

Module III: Money and Capital Markets in India (10 lectures)

Money Market: Components of organized money market – Reforms in the money market - Features of Indian Money Market.

Capital Market: Structure of the Indian Capital Market – Recent Developments in the Capital Market – Role of SEBI - Interlink between Money Market and Capital Market - Overview of Debt Market in India.

Module IV: Non-Banking sector of the Financial System (10 lectures)

Non-Bank Finance Companies (NBFCs) in India and their progress - Developments in India's Insurance sector – Progress of Mutual Funds industry in India - Credit Rating Agencies in India.

References:

1. Pathak, Bharati (2008): The Indian Financial System –Markets, Institutions, and Services, (2nd Edition), Pearson Education, New Delhi.
2. Bhole, L. M. (2008): Financial Institutions and Markets, Growth and Innovation, Tata McGraw-Hill, New Delhi.
3. Khan, M.Y. (2007): Financial Services, Tata McGraw Hill, New Delhi.
4. Reserve Bank of India (various issues) Report on Currency and Finance, RBI, Mumbai.
5. Rakesh Mohan & Partha Ray (2017), Indian Financial Sector: Structure, Trends & Turns; IMF Working Paper (WP/17/7). (https://www.imf.org > Issues > 2017/01/20).

ECONOMIC HISTORY OF INDIA: 1857-1947: PAPER IX

Preamble:

This course analyses key aspects of Indian economic development during the second half of British colonial rule. It investigates the place of the Indian economy in the wider colonial context, and the mechanisms that linked economic development in India to the colonial rule.

SEMESTER – V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOEHIB503	**ECONOMIC HISTORY OF INDIA: 1857-1947 : PAPER IX**	**3**	**100**

Module1: Growth and Structural Change 1857-1947

Measuring Change-Explaining Change-Globalisation and patterns of trade-Saving and Investment-Public Finance -Balance of Payments

Module 2: Agriculture and the Commons

Trends in Production and Income-Resources, Regional dimensions of agriculture- land, labour and credit markets- forests and forest-dependent peoples-village commons and pastures-land use patterns

Module 3: Industry

Long term patterns of small scale industrialisation and its interpretation- handloom, weaving and other industries- labour and capital in traditional small scale industry- modern small scale industry- statistical outline of large scale industry- stages of industrialisation and major industries- labour, finance, entrepreneurship and management in large scale industry

Module 4: Infrastructure, Fiscal and Monetary systems:

Impetus- Irrigation- Railways- Roads and Internal Waterways- Ports- Post and Telegraph- Power- Legal- systems Economic policy and policy making-Trade policy- Fiscal systems- Monetary system- prices.

References:

1. Tirthankar Roy, *The Economic History of India 1857-1947*, Oxford University Press, 3rd edition,2011.
2. S.Sivasubramonian, *National Income of India in the Twentieth Century*, Oxford University Press,2000
3. Sumit Guha (ed.), *Growth, Stagnation or Decline?*, Delhi , Oxford University Press,1993
4. A.K. Banerji, *India's Balance of Payments*, Bombay: Asia Publishing House,1962.

5. George Blyn, *Agricultural Trends in India, 1891-1947: Output, Availability and Productivity*, Philadelphia: University of Pennsylvania press, 1966
6. M.Gadgil and R. Guha, *The Fissured Land: An Ecological History of India*, Delhi: Oxford University Press, 1992.
7. Alice Thorner, The Secular Trend in the Indian Economy,1881-1951,*Economic Weekly*, vol.14,1962.
8. Dharma Kumar, "The Fiscal System" in *The Cambridge Economic History of India* , Dharma Kumar (ed.),vol. 2,pp.905-46, Cambridge, 1983.
9. M.J.K.Thavaraj, 'Capital Formation in the Public Sector in India: A Historical Study, 1898-1938', in *Papers on National Income and Allied Topics*, V.K.R.V.Rao(ed.), Delhi: Allied Publishers,1962.

INDUSTRIAL AND LABOUR ECONOMICS: PAPER IX

Preamble:

There has been a paradigm shift in the structure of the Indian industrial sector and the policies governing it ever since the new era of globalisation and liberalisation has ushered in. This paper intends to equip the students with the knowledge about the fundamentals of Industrial Economics and also the latest policies relating to the Indian industry.

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOILEC503	**INDUSTIRAL AND LABOUR ECONOMICS: PAPER IX**	**3**	**100**

Module 1: Introduction

Meaning and Scope of Industrial Economics, Industrial Profile : Private sector - Performance and Problems; Cooperatives - features, types, merits and demerits; Public Sector - Role, Performance and Problems, Diversification and Industrial Combinations - Motives for Mergers and Acquisitions

Module 2: Industrial Location and Problem of Regional Imbalance

Determinants of Industrial Location, Theories of Industrial Location - Weber's and Sargent Florence's Theories, Dispersion of Industries and the Problem of Regional Imbalance

Module 3: Industrial Productivity and Industrial Sickness

Concept and Measurement of Industrial Productivity, Factors Affecting Industrial Productivity, Industrial Sickness - Causes, Effects and Remedial Measures, Rationalisation - Concept, Aspects and Impact

Module 4: Industrial Development in India

New Industrial Policy, 1991; Disinvestment Policy; Micro, Small and Medium Enterprises Development Act, 2006; National Manufacturing Policy, 2011, Recent Trends in India's Industrial Growth, Role of MNCs in the Indian Economy - Merits and Demerits, Issues in Industrial Proliferation and Environment Preservation; Pollution Control Policies

References:

- Agrawal A.N. (2011), Indian Economy, New Age International Publishers, New Delhi
- Barthwal R.R. (2007), Industrial Economics, New Age International Publishers, New Delhi
- Cherunilam, F. (1994), Industrial Economics: Indian Perspective, Himalaya Publishing House, Mumbai
- Datt R. and Sundaram K.P.M. (2009), Indian Economy, S.Chand & Co., New Delhi
- Desai S.S.M. and Bhalerao N (2008), Industrial Economy of India, Himalaya Publishing House, Mumbai
- Ekbote Vidya and Ekbote Vilas (1999), Industrial Economics, Anmol Publication, Pune
- Kuchhal S.C. (1980), Industrial Economy of India, Chaitanya Publishing House, Allahabad
- Mishra S.K. and Puri V.K.(2008), Indian Economy, Himalaya Publishing House, Mumbai

Ranjana Seth, Industrial Economics (2010), Ane Books Pvt. Ltd., New Delhi

- Reasons Behind Mergers
- National Manufacturing Policy, 2011 - Department Of Industrial ...

 The Micro, Small and Medium Enterprises Development Act, 2006 .

 Micro, Small and Medium Enterprises (MSMEs) in India: An Appraisal

 Industrial Growth and the Environment - of Planning Commission

PREVENTION AND CONTROL OF POLLUTION - Ministry of ...

 Sinha V.C., Sinha P. and Sinha V. (2001), Industrial Economics, Lokbharati Publication, 15 - A, Mahatma Gandhi Marg, Elahabad

 Raykhelkar A.R. and Damji B.H. (2011), Industrial Economics, Vidya Books Publication, Aurangabad, Maharashtra

INDIAN ECONOMIC THOUGHT: PAPER XV

Preamble:

The history of Indian economic thought provides rich insights into both economic issues and the workings of the Indian mind. It will give the student an introduction to major Indian thinkers and their ideas on Indian economic policy.

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOIETB603	INDIAN ECONOMIC THOUGHT: PAPER XV	3	100

Module 1: The Modernists

Naoroji:-Drain theory, criticism and long run relevance, Ranade's views on railway investment and the methodology of Indian economics, Gokhale:-Gokhale and the economics of education, the rupee ratio debate , Dr. Ambedkar's contribution to the rupee debate

Module 2: Agriculture, Poverty and Famines

Why famines occur, famine policy, criticism of famine policy, Ranade's views on Poverty and Industrialisation, agrarian policy, contribution of Dr. Ambedkar

Module 3: Economic Policy after Independence

Nehruvian economics –Mahalonobis model and planning, industrial stagnation, industry and trade, agriculture and the wage goods model , reappraisal of Nehru's economics

Module 4: Economic Thought in Contemporary India

Measurement of poverty, liberalisation, privatisation and globalisation, Human development and Amartya Sen's contribution, Jagadish Bhagawati's contribution.

References:

1. Jadhav Narendra (2015) : AMBEDKAR : An Economist Extraordinaire , Konark Publishers, New Delhi
2. Dasgupta A.K.(1993) : A History of Indian Economic Thought , Routledge.
3. Balkrishnan P. (2007) : The Recovery of India: Economic Growth in the Nehru Era, Economic and Political Weekly, Vol. 42, No. 45/46 (Nov. 10 - 23, 2007), pp. 52-66
4. A.Sen : Development as capabilities Expansion, http://morgana.unimore.it/Picchio_Antonella/Sviluppo%20umano/svilupp%20umano/Sen%20development.pdf
5. A.Pangariya: Why Growth Matters: How India's Growth Acceleration has Reduced Poverty, http://www.cde.org.za/wp-content/uploads/2013/09/Prof%20Arvind%20Panagariya_Why%20growth%20matters_%20How%20Indias%20growth%20acceleration%20has%20reduced%20poverty.pdf
6. Deaton Angus(2013) : What is Going on in India, https://scholar.princeton.edu/sites/default/files/deaton/files/deaton_book_review_sen_dreze_etc_lancet_2013_0.pdf
7. A. Pangariya (2013): Indian Economy: Retrospect and Prospect, http://www.pc.gov.au/news-media/lectures/arvind-panagariya/snape-2013-panagariya.pdf

INDUSTRIAL AND LABOUR ECONOMICS: PAPER XV

Preamble:

Issues pertaining to the labour market, wage policy, trade unions and amicable solutions to industrial disputes have become vital for developing countries, especially for India, where the bulk of the labour force is employed in the unorganised sector, and the organized sector is witnessing a phenomenon of 'jobless' growth. This paper intends to provide knowledge of the same and also discusses the importance of labour welfare and social security measures for the growing labour force in India.

SEMESTER – VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOILEC603	INDUSTIRAL AND LABOUR ECONOMICS: PAPER XV	3	100

Module I – Introduction – Indian Labour Market

- Characteristics of the Indian Labour Market
- Child Labour and Female Labour – Problems and Measures
- Globalisation and Indian Labour Market
- Labour Market Reforms – Exit Policy and Need for Safety Nets
- Second National Commission on Labour

Module II – Trade Unionism

- Definition and Functions of Trade Unions
- Historical Evolution of Trade Unions in India and Their Present Status
- Problems of Trade Unions in India
- Role of Outside Leadership

Module III – Industrial Relations

- Causes of Industrial Disputes and Their Settlement Mechanism
- Collective Bargaining – Concept, Features, Importance and Pre-requisites for Successful Collective Bargaining
- Collective Bargaining in India
- Workers' Participation in Management – Concept, Objectives and Forms of Workers' Participation in India

Module IV – Labour Welfare and Social Security

- Concept, Theories and Principles of Labour Welfare
- Agencies for Labour Welfare
- Role of the Labour Welfare Officer
- Social Security – Concept; Social Assistance and Social Insurance
- Social Security Measures in India
- International Labour Organisation and Its Impact on Indian Labour Legislations

References:

- Agrawal A.N. (2011), Indian Economy, New Age International Publishers, New Delhi
- Datt R. and Sundaram K.P.M. (2009), Indian Economy, S.Chand & Co., New Delhi
- Mamoria C.B. and Mamoria S. (2002), Dynamics of Industrial Relations, Himalaya Publishing House, Mumbai
- Mishra S.K. and Puri V.K.(2008), Indian Economy, Himalaya Publishing House, Mumbai
- Monappa A, (2006), Industrial Relations, Tata McGraw Hill Publishing Company Ltd., New Delhi
- Punekar S.D., Deodhar S.B. and Sankaran Saraswathi (2004), 'Labour Welfare, Trade Unionism and Industrial Relations', 2004
- Ratna Sen, Industrial Relations in India - Shifting Paradigms (2005), Macmillan, New Delhi
- Singh J.K. (1998), Labour Economics – Principles, Problems and Practices, Deep andDeep Publications Pvt. Ltd., New Delhi
- Sinha P.R.N., Sinha I.B. and Shekar S.P. (2006), Industrial Relations, Trade Unions and Labour Legislation, Pearson Education, New Delhi
- Sarma A.M. (2002), Industrial Relations, Himalaya Publishing House, Mumbai

MATHEMATICAL AND STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS: PAPER X

Preamble

A plethora of data has emerged at an exponential rate and it is the description, interpretation and understanding of these data and drawing of accurate conclusions that is imperative for a student of Economics. The aim of this paper is to provide students with the mathematical and statistical skills and understanding needed for 'knowing why' and 'when' to apply these techniques.

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOMSEAA504	**MATHEMATICAL AND STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS: PAPER X**	**4**	**100**

Module 1: (Lectures 13)

A: Microeconomic applications of equations and graphs

- Linear and non-linear relationships in economic analysis
- Market demand and supply models, taxes, elasticity

B: Derivatives and their applications in various areas of economic analysis

- Derivatives
- Higher order derivatives
- Increasing and decreasing functions; Necessary and sufficient conditions for maxima and minima
- Optimisation of economic functions

Module 2: Linear Algebra (Lectures 10)

- Matrices and basic operations on matrices
- Rank of a matrix
- Inverse of a matrix
- Cramer's rule
- Input-Output Analysis and policy implications
- Linear Programming Problem: Formulation and graphical solution

Module 3: (Lectures 12)

A: Descriptive Statistics and graphing techniques for presenting data

- Concept of primary and secondary data along with tabulation and graphs

- Measures of central tendency (only arithmetic-mean, median, and mode).
- Absolute and relative measures of dispersion (range, quartile deviation, mean deviation and standard deviation) with simple applications.
- Measures of skewness and kurtosis.
- Lorenz Curve

B: Commercial Statistics

- Brokerage, Commission and Insurance

Module 4: Elementary Probability Theory (Lectures 10)

- Sample space and events
- Mutually exclusive, exhaustive and complimentary events
- Conditional probability
- Binomial probability distribution
- Nature and Properties of the Normal Probability Distribution; Standard Scores and the Normal Curve; The Standard Normal Curve: Finding Areas when the Score is Known, Finding Scores when the Area is Known

References:

1. Dowling Edward T: Introduction to Mathematical Economics, Schaum Outline Series in Economics, Tata McGraw -Hill, New Delhi, 2004.
2. Dowling Edward T: Theory and Problems of Mathematical Methods for Business and Economics, McGraw –Hill, 1993.
3. Gupta S.P.: Statistical Methods, S. Chand, New Delhi.
4. Lerner Joel J and P.Zima: Theory and Problems of Business Mathematics, McGraw Hill, New York, 1986.
5. Pfitzner Barry C.: Mathematical Fundamentals of Microeconomics, Biztantra, New Delhi, 2003.
6. Sancheti D.C. and V.K. Kapoor: Statistics-Theory, Methods and Applications, S. Chand, New Delhi
7. V. K. Kapoor and S. C. Gupta: Fundamentals of Mathematical Statistics, Sultan Chand &Sons, New Delhi.

8. Wisniewski Mik: Mathematics for Economics-An integrated approach, Palgrave Macmillan, 2013.

MATHEMATICAL AND STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS:

PAPER XVI

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOMSEA604	MATHEMATICAL AND STATISTICAL TECHNIQUES FOR ECONOMIC ANALYSIS: PAPER XVI	4	100

Module1: Techniques and applications of partial derivatives (Lectures 13)

- Functions of several variables and partial derivatives
- Second order partial derivatives
- Optimisation of multivariable functions
- Constrained optimisation with Lagrange multiplier and its economic interpretation.
- Marginal productivity, Income and price elasticities of demand
- Homogeneous production functions and returns to scale
- Cobb-Douglas production function

Module 2: Integral Calculus (Lectures 12)

- Integration and Definite integral; area under the curve
- Economic applications
- Present value of cash flows (present value of a sum to be received in future and present value of a stream of future income)
- Consumer's and Producer's Surplus
- Learning curve

Module 3: Correlation and Regression (Lectures 10)

- The meaning and significance of Correlation; Scatter plot of Bivariate Distributions; Correlation and Causation

- Karl Pearson's coefficient of correlation
- Spearman's rank correlation coefficient
- Simple regression analysis- Method of Least Squares and Regression Lines
- Regression Coefficients
- Relationship between correlation coefficients and regression coefficients.

Module 4: Index Numbers and Time Series (Lectures 10)

- Simple and composite index numbers
- Construction, uses and problems of index numbers
- Laspeyre's, Paasche's and Fisher's Index numbers
- Cost of living index numbers-real income – wholesale price index number
- Splicing of index numbers
- Components of time series
- Estimation and forecasting of trend by the Least Squares Method

References:

1. Dowling Edward T: Introduction to Mathematical Economics, Schaum's Outline Series in Economics, Tata McGraw Hill, New Delhi, 2004
2. Lerner Joel J and P. Zima: Theory and Problems of Business Mathematics, McGraw Hill, New York, 1986.
3. Dowling Edward T: Theory and Problems of Mathematical methods for Business and Economics, McGraw –Hill, 1993
4. Gupta S.P.: Statistical Methods, S. Chand, New Delhi.
5. Sancheti D. C. and V. K. Kapoor: Statistics-Theory, Methods and Applications, S. Chand, 4New Delhi

MATHEMATICAL METHODS IN ECONOMICS: PAPER X

Preamble:

The objective of this paper is to transmit the body of basic mathematics that enables the study of economic theory at the undergraduate level, specifically the courses on microeconomic theory,

macroeconomic theory, statistics and econometrics set out in this syllabus. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. The level of sophistication at which the material is to be taught is indicated by the contents of the prescribed textbook.

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOMMEB504	**MATHEMATICAL METHODS IN ECONOMICS: PAPER X**	**4**	**100**

Module 1: Functions of one real variable

Graphs; elementary types of functions: quadratic, polynomial, power, exponential, logarithmic; sequences and series: convergence, algebraic properties and applications; continuous functions: characterizations, properties with respect to various operations and applications; differentiable functions: characterizations, properties with respect to various operations and applications; second and higher order derivatives: properties and applications.

Module 2: Single-variable optimization

Geometric properties of functions: convex functions, their characterizations and applications; local and global optima: geometric characterizations, characterizations using calculus and applications.

Module 3: Integration of functions

Areas under curves; indefinite integrals; the definite integral.

Module 4: Difference equations

First order difference equations.

References:

1. K. Sydsaeter and P. Hammond, *Mathematics for Economic Analysis*, Pearson Educational Asia, Delhi, 2002.

APPLIED ECONOMETRICS: PAPER XVI

Preamble:

The aim of this course is to provide a foundation in applied econometric analysis and develop skills required for empirical research in economics. Topics include specification and selection of regression models, dynamic econometric models, advanced methods in regression analysis and panel data models. Since the emphasis is on application of methods, this course requires understanding of econometric software and computing skills.

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOAEB604	APPLIED ECONOMETRICS: PAPER XVI	4	100

Module 1: Violations of Assumptions in the Linear Regression model

Heteroscedasticity, implications, testing and remedy, autocorrelation, implications, testing and remedy, multicollinearity

Module 2: Regression Diagnostics and Specification

Misspecification; functional forms; model selection, endogeneity and instrumental variables

Module 3: Advanced Topics in Regression Analysis

Dynamic Econometric Models: distributed lag models; autoregressive models; simultaneous equation models.

Module 4: Introduction to R

Running a regression in R, diagnostic tests in R, plotting graphs in R, writing a function in R

Readings:

1. Jeffrey M. Wooldridge, Econometrics, Cengage Learning, India Edition, 2009.
2. Dimitrios Asteriou and Stephen Hall, Applied Econometrics: A Modern Approach, Palgrave Macmillan, 2007.
3. Damodar Gujarati, Econometrics by Example, Palgrave Macmillan, 2011.
4. Kleiber C and Zeilis A (2008) : Applied Econometrics with R, Springer, UseR1

RESEARCH METHODOLOGY: PAPER X

Preamble

The central focus of this course is an introductory study of the concepts, principles and methods of economic research. The course focuses on the logic of social science research and on practical problems of applying quantitative and qualitative methods in the process of formulating research questions. The primary goal is to strengthen student's critical thinking and reasoning skills at planning economic research and to enable them to communicate research results competently.

The study equips the students with the basic understanding of the research methodology and provides an insight into the application of modern analytical tools and techniques for the purpose of economic decision making. The course will provide students an opportunity to learn how to collect and analyze primary and secondary data. Methods covered include interview design and technique, case study method and also a study of secondary data sources. Computer Applications to research analysis and tools commonly used in research are introduced to sharpen the analytical and presentation skills of the learner.

The course is to be taught in two parts in the fifth and sixth semester of final year B.A. degree course in Economics. The entire course is to be conducted from an interdisciplinary perspective. The first part covers the structure of research and theory construction, types of research as well as the main issues of data gathering and data quality and learning of basic statistical tools. The second part provides an overview of the main methodological problems of quantitative and qualitative analysis, an introduction to hypothesis formulation, testing of hypotheses and illustrates the usage of different approaches and application of computers in recent empirical social research.

The course work of this paper will be taught in each semester. There are four units in each semester and each unit will be taught in 10 contact hours. The contact hours allotted to individual unit are notional and are adjustable to the total contact hours. In addition, a learner is expected to undertake practice on quantitative techniques and carry out computer practical exercise to grasp the nuance of fundamental statistical analysis using computers. The contact tools like discussion, group work, seminar, use of web resources and library resources are to be extensively used for teaching this paper. Hands on experience on web search, Practical sessions in the computer laboratory and Library sessions and are inbuilt requisites of this course.

The course in each Semester is categorized into three components;

(a) Conceptual clarity on Research Methodology with 40 marks weightage

(b) Numerical problems on Quantitative Techniques with 20 marks' weightage and

(c) Conduct of a case study, framing of schedule and questionnaire and field visit report as a project and/or Computer Application and Practical on Quantitative Techniques with 40 marks' weightage (for internal assessment.) Also an introduction to presentation tool is to be imparted with Training on Creating presentation, Customizing presentation and showing presentation as integral part of internal assessment.

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOREMC504	**RESEARCH METHODOLOGY: PAPER X**	**4**	**100**

Module 1: Introduction to Concept of Research (10 lectures)

- Nature, Scope & Purpose of social research
- Basic assumptions of research
- Significance of social sciences research
- Objectivity in social sciences research
- Types of research: pure & applied research; formulative or exploratory research; descriptive research, historical research, experimental research, survey research
- Ethical issues relating to research
- Major Difficulties in the Area of economic research

Module 2: Elements of Research Methodology (15 lectures)

I. Steps in Research process:

- Identification, selection and formulation of research problem – sources of research problem – criteria of a good research problem
- Review of literature
- Formulation of hypothesis
- Preparing Research Design: Definition, Concepts, and types– exploratory, descriptive and diagnostic, experimental and Analytical research designs
- Collecting and analysing the data
- Interpretation and report writing

II. Use of web search in research process- introduction to Internet and WWW, Using search engine like Google, Yahoo etc. Use of advanced search techniques

Module 3: Sources of Data for Research (15 lectures)

I. Types of data sources: Primary and Secondary, choice between primary and secondary data

- Primary data-Meaning and Collection methods

i. Observational method

ii. Interview technique

iii. Design of Schedule and Questionnaire

iv. Survey method and Field Visits

v. Case Study as a method

- Major Sources of Secondary data: Meaning, advantages, Relevance, limitations and cautions of secondary data.

II. Sampling Technique: Census and sample survey- Essentials of a good Sampling - Advantages and limitations of sampling, Methods of sampling:

i. random sampling : simple or unrestricted random sampling- mixed or stratified random sampling, systematic or quasi random sampling – multistage or cluster random sampling - sequential random sampling

ii. non random sampling : judgement or purposive sampling–convenience sampling accidental sampling – quota sampling

Sampling and Non-sampling errors - Sample size – selecting an appropriate sampling technique

Module 4: Processing and Analysis of Data (10 lectures)

- Classification, Tabulation and Graphical presentation of socio-economic data
- An introduction to Statistical Analytical Tools – Measures of Central Tendency – Measures of Variation: absolute and relative measures – Quartile deviation, standard deviation, coefficient of variation- Skewness: meaning and Measurement (Karl Pearson's and Bowley's methods)
- Preliminaries of Computer Applications in Data organization & Data Processing Introduction to spreadsheet application, features and functions, Using formulas and functions, Data storing, Features for Statistical data analysis, Graphical representation of data, Generating charts/ graph and other features.

SEMESTER – VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOREMC604	**RESEARCH METHODOLOGY: PAPER XVI**	**4**	**100**

Module 1: Statistical applications in research (15 lectures)

- Methods of studying Correlation- measurement of simple correlation: graphic method: scatter diagram - coefficient of correlation - Karl Pearson and rank correlation interpretation of $r = \pm 1$
- Linear Regression analysis: meaning, regression lines, regression coefficients, regression equations, relationship between correlation and regression
- Analysis of Time Series – components –trend analysis- moving averages (3, 4 and 5 yearly)- method of least square

Module 2: Index numbers (15 lectures)

Meaning – classification – problems encountered while constructing index numbers- uses and limitation of index numbers

Methods of constructing index numbers:

- Simple index: i) aggregate method ii) simple average of relatives method
- Weighted index: Laspeyer's, Paache's and Fisher's index – weighted average of relatives method
- Chain based index – concepts of Base shifting, splicing, and deflating
- Consumer price index: meaning, need and construction – methods: aggregate expenditure method and family budget method

Module 3: Hypothesis formulation and Hypothesis Testing (10 lectures)

- Definition and functions of hypothesis –Criteria of workable hypothesis – forms and sources of hypothesis
- Concepts in Testing of Hypothesis: Universe / Population, parameter and statistic, Null and Alternative Hypotheses, Levels of Significance, critical region, Type I and type II errors - Point and Interval Estimates

Module 4: Research Report Writing (10 lectures)

Types of Research Report: Technical, Popular, Interim, Summary, Article

- Format of a Research Report
- Principles of writing the Research Report: Organization and Style - Contents-Styles of reporting- Steps in drafting Reports- Editing the final draft-Evaluating the final draft - Organization of the Research Report: Preliminaries, Contents of Report, Structuring the Report: Chapter format- Pagination- Identification- Using quotations- Presenting footnotes – abbreviations- Presentation of tables and figures- Referencing- Documentation-Use and format of appendices- Indexing - Bibliography, Appendices

References:

1. Gopal, M.H (1970) An Introduction to Research Procedures in Social Sciences, Bombay, Asia Publishing House.
2. Goode J.Willium & Hatt K. Paul, Methods of social Research, New York, McGraw –Hill.
3. Kothari, C.R (2004) Research Methodology: An Introduction, Delhi, New Age
4. Krishnaswami, O.R &, M.Ranganatham (2011) Methodology of Research in Social Sciences, Himalaya Publishing House, Mumbai. .(Unit 1,2, 3,4)
5. Kumar, Renjith (2009) Research Methodology: A Step by Step Guide for Research, Delhi, Pearson Education
6. P.Saravanavel ((1987) Research Methodology, Kitab Mahal, Allahabad .(Unit 1,2, 3,4)
7. Gupta S P tatistical Methods Sultan Chand and Sons, New Delhi. .(Unit 3,4,)
8. Gupta S.C, Fundamentals of Statistics, Himalaya Publication House, Bombay. (Unit 4,)9. Rajaram V. (1996), Fundamentals of computers, Prentice Hall of India, New Delhi

ECONOMICS OF AGRICULTURE AND COOPERATION: PAPER X

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOEACD504	**ECONOMICS OF AGRICULTURE AND COOPERATION: PAPER X**	**4**	**100**

Module 1: Agricultural Productivity (12 lectures)

Role of agriculture in economic development - Cropping Pattern Agricultural Productivity, Causes of Low Productivity in Agriculture - Measures taken to improve the Agricultural Productivity in India - Water Management and agricultural development - Agricultural labour: Problems and suggestions.

Module 2: Agricultural Credit (12 lectures)

Institutional and Non-Institutional Sources of Credit - Co-operative Credit and Agriculture, Rural Indebtedness - Commercial Banks and Regional Rural Banks, micro finance - NABARD - Role and Performance.

Module 3: Agricultural Marketing (12 lectures)

Types of Marketing - Corporate, Commodity and Global Problems and Measures of Agricultural Marketing - WTO and Indian Agriculture. Problems of Agricultural Marketing and its measures.

Module 4: Agricultural Price and Policy (12 lectures)

New Agricultural Policy – 2007 - Food Security in India - Price Policy of CACP Evaluation, Agricultural Crisis and Farmers' Suicide. Agro-Tourism and its policy

References:

1. Carl Eicher and Lawrence wit (1964), Agriculture in Economic Development McGraw Hill Book Company, New York
2. Bilgram, S.A.R,(1966), Agricultural Economics, Himalaya Publication House, Delhi.
3. Ghatak S. and K. Ingerscent, (1964), Agriculture and Economic Development, Select Books, New Delhi
4. Raj K.N. (1988) Essays in Commercialization of Indian Agriculture, Oxford University Press, New Delhi
5. Thamarajalaxmi R. (1994), Intersectoral Relationship in Developing Economy, Academic Foundation, Delhi
6. Papola T.S. (1982), Rural Industrilization in India, Himalaya Publication House, Delhi.
7. Sadhu A.N. & Singh Amarjit (1966):" Fundamentals of Agricultural Economics, Himalaya Publication House, Delhi.

8. Soni R.N.(1955), Leading Issues in Agricultural Economics, Arihant Press, Jalandhar
9. Wanmali S. and C. Ramasamy (Ed.)(1995), Developing Rural Infrastructure, McMillan, New Delhi
10. Govt. of India, (1976), Report of National Commission on Agriculture, New Delhi
11. Memoria C. B. (), Agricultural Problems of India
12. Lekhi R.K. (), Agricultural Problems in India
13. Datt and Sundaram (2012), Indian Economy, S.Chand & Company, New Delhi
14. Mishra & Puri, (2012), Indian Economy, Himalaya Publishing House, New Delhi
15. Vaidhanathan, A. (1995), Indian Economy: Crisis, Response and Prospects, Orient Longmans, New Delhi.
16. John W. Penson, Oral Capps, C.Parr Rosson, (1999), Introduction to Agricultural Economics, Prentice Hall, New Jersey.
17. Agrawal A.N. & Kundan K.L. Agricultural Problems of India, Vikas Publication House, New Delhi
18. Khusro A.M. (1968) Leading issues in Agricultural Development, Allied Publishers, Bombay.

ECONOMICS OF AGRICULTURE AND COOPERATION: PAPER XVI

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	**ELECTIVE PAPERS**		
ECOEACD604	**ECONOMICS OF AGRICULTURE AND COOPERATION: PAPER XVI**	**4**	**100**

Module 1: Co-operation (12 lectures)

Meaning, features of Co-operation - Principles of Co-operation (Manchester-1995) – Role of Co-operation in Economic development - Globalization and Co-operation-Importance and Benefits of Co-operation.

Module 2: Co-operative Finance in India (12 lectures)

Co-Operative Finance: Need, Structure, Progress and Problems - National Co-operative Development Corporation (N.C.D.C.) -. Farmers service societies and urban Co-operative banks.

Module 3: Agricultural Co-operatives (12 lectures)

Role and Types of Agro-Industries - Problems and Measures of Agro-Industries – Sugar and Dairy Co-operatives - Food and Fruits Processing Industry - Co-Operative Farming.

Module 4: Co-operative Organizations in India (12 lectures)

Consumer Co-operatives - Co-Operative Marketing - Housing Co-operative societies - Labour Co-operative societies - Agricultural Marketing societies-Leadership in Cooperative development.

References:

1. R. D. Bedi ( ) Theory, History and Practice of Co-Operation, Loyal Book Depot, Meerut (U.P.)
2. Mathur B. S, ( ) Co-Operation in India, Sahitya Bhavan, Agra
3. John Matthai, ( ) Agricultural Co-Operation in India , Reliance Publishing House, New Delhi
4. Krishnaswami,( ) Fundamentals of Co-Operation, S. Chand and Company Ltd, New Delhi
5. Hajela T.N, ( ) principles, problem and practice of Co-operation, Agarwal publication.
6. Government of Maharashtra - Co-operative movement at a Glance (latest annual report).

INTRODUCTION TO ECONOMETRICS: PAPER XI

Preamble:

The objective of this course is to impart a basic understanding of econometrics. The student will be able to appreciate the theoretical basis of the subject. At the same time, it will enhance the student's ability to apply the theoretical techniques to the problems of the real world. Topics like forecasting have been introduced to impart this practical orientation.

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOITEA505	INTRODUCTION TO ECONOMETRICS: PAPER XI	4	100

Module 1: Idea of a random variable (10 Lectures)

- Concept of a random variable: Discrete and continuous
- Expected values of a random variable
- Variance of a random variable
- Discrete random variables: Bernoulli, Binomial, Poisson
- Continuous random variables: The normal distribution

Module 2: Jointly distributed Random variables (10 Lectures)

- Joint and marginal distributions for bivariate random variables
- Conditional probability
- Conditional mean and variance
- Covariance
- Correlation and Partial correlation
- Central limit theorem (without proof)

Module 3: Statistical Inference (12 Lectures)

- Point and interval estimation
- The Z distribution
- The Null and Alternate hypotheses and significance testing for mean using Z distribution when population variance is known
- The chi-square distribution and testing for sample variance with known population variance
- The F distribution and comparing sample variances
- The t distribution and hypothesis tests when population variance in unknown.

Module 4: Regression Analysis (13 Lectures)

- Two variable regression model
- The concept of the PRF
- Classical assumptions of regression
- Derivation of the OLS estimators and their variance
- Properties of OLS estimators under classical assumptions, Gauss-Markov Theorem (without proof)

• Tests of Hypothesis, confidence intervals for OLS estimators

• Measures of goodness of fit: R square and its limitations, adjusted R square and its Limitations.

INTRODUCTION TO ECONOMETRICS: PAPER XVII

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOITEA605	INTRODUCTION TO ECONOMETRICS: PAPER XVII	4	100

Module 1: Econometric Model Specification (10 Lectures)

• Identification: Structural and reduced form

• Omitted Variables Bias

• Errors in measurement

• Endogeneity and Bias

Module 2: Failure of Classical Assumptions (10 Lectures)

• Multi-collinearity and its implications

• Auto-correlation: Consequences and Durbin-Watson test

• Heteroskedasticity: Consequences and the Goldfeld -Quandt test

Module 3: Forecasting (13 Lectures)

• Forecasting with a)moving averages b) linear trend c) exponential trend- CAGR

• Forecasting with linear regression

• Classical time series decomposition

• Measures of forecast performance: Mean Square Error and Root Mean Square Error

• Limitations of econometric forecasts

Module 4: Linear Programming (12 Lectures)

• Linear programming

• Dual of a linear programming problem

- Simplex method
- Transportation

References:

1. Gujarati Damodar, Basic Econometrics.
2. Hatekar Neeraj (2009), Econometrics: The First Principles A Friendly Introduction.
3. Kapoor V. k. (2011), Operations Research Problems & Solutions, Sultan Chand & sons.
4. Lipschutz (Schaum Series), Theory and Problems of Statistics.

ENVIRONMENTAL ECONOMICS: PAPER XI

Preamble:

This course focusses on economic causes of environmental problems. In particular, economic principles are applied to environmental questions and their management. Economic implications of environmental policy are addressed as well as valuation of environmental improvements.

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOENVEB505	ENVIRONMENTAL ECONOMICS: PAPER XI	4	100

Module 1: Introduction to Environmental Economics

What is environmental economics, review of microeconomics and welfare economics, Pareto optimality and market failure in the presence of externalities; property rights and Coase theorem

Module 2: The design and implementation of Environmental Policy

Overview-Criteria for evaluating environmental policies; Standards, Pigovian taxes and effluent fees, tradable permits, choice between taxes and quotas, implementation of environmental policy

Module 3: Measuring benefits of environmental improvements

Economic value of Environment- Use and Non-use values-Measurement method:-market based and non-market based methods, contingent valuation, travel cost method, hedonic price method, risk assessment and perceptions

Module 4: Environmental problems

The global environment- Trans-boundary environmental problems, economics of climate change, International environmental Agreements - , sustainable development: Concepts and measures

References:

1. Barry C. Fields (1997) : Environmental Economics : An Introduction, McGraw Hill International Edition
2. Charles Kolstad (2000): Environmental Economics, Oxford University Press, New York.

DEVELOPMENT THEORY AND EXPERIENCE: PAPER XVII

Preamble:

This is the second paper of economic development sequence. The course begins with demographic concepts and their evolution during the process of development. Then it focuses on the theory migration and discusses the link between migration and development. The structure of markets and contracts is linked to the particular problems of enforcement experienced in poor countries. The course ends with the issues related to environment and development.

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOPUEB605	DEVELOPMENT THEORY AND EXPERIENCE: PAPER XVII	4	100

Module I: Demography and Development

Demographic concepts; birth and death rates, age structure, fertility and mortality; demographic transitions during the process of development; gender bias in preferences and outcomes and evidence on unequal treatment within households; connections between income, mortality, fertility choices and human capital accumulation.

Module II: Structural Transformation

The Lewis model –Clark-Fisher model of structural change , Urbanization: Trends and Projections with reference to India, Urbanization and Development, Causes of urbanization, Urban informal sector, Policies for the urban informal sector, Migration and development, Economic theory of rural-urban migration: Harris-Todaro migration model

Module III: Land, Labor and Credit Markets

Role of Agriculture in Economic Development, Market Failure and Agriculture, The distribution of land ownership; Land reform and its effects on productivity; contractual relationships between tenants and landlords; Land Acquisition; Nutrition and Labor Productivity; Rural Credit Market; Microfinance; Inter-linkages between Rural Factor Markets.

Module IV: The Environment and Development

The core of environmental problems-Rural poverty and environmental destruction-industrialization and environmental pollution-Economic models of environmental issues: privately owned resources, common property resources, public goods and bads: regional environmental degradation and the free rider problem, limitations of pubic good framework.

References:

1. Debraj Ray, *Development Economics*, Oxford University Press, 2009.
2. Partha Dasgupta, *Economics: A Very Short Introduction*, Oxford University Press, 2007.
3. Abhijit Banerjee, Roland Benabou and Dilip Mookerjee, *Understanding Poverty*, Oxford University Press, 2006.
4. Kaushik Basu, 2012, editor, *The New Oxford Companion to Economics in India*, Oxford University Press.
5. Amartya Sen, *Development as Freedom*, Oxford University Press, 2000.

6. Daron Acemoglu and James Robinson, *Economic Origins of Dictatorship and Democracy*, Cambridge University Press, 2006.

7. Robert Putnam, *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press, 1994.

8. Michael Todaro and Stephen Smith : Economic Development,11th edition, Pearson

POLITICAL ECONOMY OF GLOBALISATION: PAPER XVII

Preamble:

This course explores changes in the organisation of production, labour market institutions and corporate structure. It goes on to study the consequences of globalization, especially of financial flows, for the role of the state, economic performance, gender issues, environment, human welfare and development.

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOPEG605	POLITICAL ECONOMY OF GLOBALISATION: PAPER XVII	4	100

Module 1: Changing Dynamics of Capitalist Production, Organisational Form and Labour Process

Perspective on political economy with a historical overview: capitalist development in the pre-second world war period, the 'golden age' and later, Fordist and post-fordist production; changing dynamics of organisation of production, markets and labour process; the changing nature of job security and labour rights.

Module 2: The State in the Era of Globalisation: Welfare, Development and Autonomy

Globalisation and the limits of the welfare state, development and state autonomy.

Module 3: The Changing Role of Finance

The changing role of finance in capital accumulation and corporate structure; finance and globalisation - financialisation, financial liberalisation and financial crisis.

Module 4: The Social Dimensions

Globalisation and uneven development – growth, inequality and exclusion, Gender in work, accumulation and globalisation; issues in environment and sustainability; alternatives ahead.

References:

1. Michel Beaud, *A History of Capitalism, 1500-2000*, trans. by Tom Dickman and Anny Lefebvre, New York: Monthly Review Press, 2001.
2. Ash Amin (ed.), *Post-Fordism: A Reader*, Blackwell, 1994.
3. Fran Tonkiss, *Contemporary Economic Sociology: Globalisation, Production, Inequality*, Chapter 4 (Fordism and After), Routledge India 2008 reprint, 2006.
4. S. Hymer, 1975, "The Multinational Corporation and the Law of Uneven Development", in H. Radice (ed.) *International Firms and Modern Imperialism*, Penguin Books.
5. G. Gereffi, J. Humphrey and T. Sturgeon, 2005, "The Governance of Global Value Chains", *Review of International Political Economy*, Volume 12, pp. 78–104.
6. Narasimha Reddy, 2003, "Economic Globalisation, Past and Present – The Challenges to Labour" in Jomo K.S. & Khoo Khay Jin (ed.) *Globalization and Its Discontents, Revisited*, Sephis -Tulika Books.
7. David Harvey, *A Brief History of Neoliberalism*, Oxford University Press, 2005.
8. Andrew Glyn, 2006, "Challenges to Capital", in *Capitalism Unleashed: Finance, Globalization and Welfare*, Oxford: Oxford University Press, (Ch. One, pp. 1-24).
9. G Dumenil and D Levy, *The Crisis of Neoliberalism*, Harvard University Press, 2011.
10. K.S. Jomo (ed.), *The Long Twentieth Century: The Great Divergence: Hegemony, Uneven Development and Global Inequality*, Oxford University Press, 2006.
11. Gary Dymsky, 2005, "Financial Globalization, Social Exclusion and Financial Crisis",
12. International Review of Applied Economics, Vol. 19, pp. 439–457.
13. E. Stockhammer, 2010, "Financialization and the Global Economy", in G. Epstein and
14. M.H. Wolfson (ed.) The Political Economy of Financial Crises, Oxford University Press. [Also in Working Paper Series, No. 240, Political Economy Research Institute, University of Massachusetts Amherst]
15. J.P. Smith and M.P. Ward, 1989, "Women in the Labour Market and in the Family",

16. Journal of Economic Perspectives, Volume 3, pp. 9-23.
17. Marilyn Power, 2004, “Social Provisioning as a Starting Point for Feminist Economics”,
18. Feminist Economics, Volume 10, pp. 3-19.
19. John Bellamy Foster, Ecology against Capitalism, Monthly Review Press, 2002.

PROJECT: PAPER XII

SEMESTER V

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOPROA506	PROJECT: PAPER XII	3	100

PROJECT: PAPER XVIII

SEMESTER VI

COURSE CODE	PAPER TITLE	CREDITS	MARKS
GROUP - II	ELECTIVE PAPERS		
ECOPROA606	PROJECT: PAPER XVIII	3	100

University of Mumbai

No. UG/ 69 of 2019-20

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges, Directors of the recognized Institutions in Science & Technology Faculty is invited to the syllabus uploaded by Academic Authority Unit which was accepted by the Academic Council at its meeting held on 27th February, 2013 vide item No. 4.48 relating to the revised syllabus as per (CBSGS) for B.Sc. in Biochemistry (6 Units) Sem. V & VI w. e. f. the academic year 2013-14.

They are hereby informed that the recommendations made by the Board of Studies in Biochemistry at its meeting held on 17th May, 2019 have been accepted by the Academic Council at its meeting held on 26th July, 2019 vide item No.4.1 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.Sc. - Biochemistry 6 Units (USBCH) has been brought into force with effect from the academic year 2019-20, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Ajay Deshmukh)
REGISTRAR

MUMBAI – 400 032
14th August, 2019

To

The Principals of the affiliated Colleges, and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.1/26/07/2019

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No. UG/69 -A of 2019-20 MUMBAI-400 032 14th August, 2019.

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Bio-chemistry,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-ordinator, University Computerization Centre.

(Dr. Ajay Deshmukh)
REGISTRAR

Cover Page

AC 26/7/19
Item No. 4.1

UNIVERSITY OF MUMBAI

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	BIOCHEMISTRY- 6 UNITS
2	Eligibility for Admission	SECOND YEAR B.Sc-BIOCHEMISTRY
3	Passing Marks	40/ 100
4	Ordinances / Regulations (if any)	O.2145
5	No. of Years / Semesters	TWO SEMESTERS
6	Level	U.G.
7	Pattern	Semester
8	Status	Revised
9	To be implemented from Academic Year	From Academic Year : 2019-20

Date: May 2016 Signature :

Name of BOS Chairperson / Dean : Dr. Nupur Mehrotra

Recd.
for Rly Deshmukh

UNIVERSITY OF MUMBAI

Syllabus for the T.Y.B.Sc.
Program: B.Sc.
Course: Biochemistry - 6 units, USBCH

(Choice Based Credit System with effect from the academic year 2019–2020)

T.Y.B.Sc. –BIOCHEMISTRY-(6 Units) Syllabus

Choice Based and Credit System
To be implemented from the Academic year 2019-2020

SEMESTER V
Theory

Course	UNIT	TOPICS	Credits	L / Week
USBCH501	**Metabolism & Analytical Techniques-I**		2.5	
	I	Role of minerals and vitamins in metabolism		1
	II	Bioenergetics & Oxidative Phosphorylation		1
	III	Carbohydrate metabolism		1
	IV	Chromatography		1
USBCH 502	**Environmental Science**		2.5	
	I	Air		1
	II	Water & Water treatment		1
	III	Soil & Noise		1
	IV	Energy, Industrial Pollutants and Environmental Monitoring		1
USBCH 503	**Genetics & Recombinant DNA Technology**		2.5	
	I	DNA Replication & Repair		1
	II	Transcription & Translation		1
	III	Recombinant DNA Technology I		1
	IV	RDT Recombinant DNA Technology		1
USBCH 504	**Immunology and Pathophysiology- I**		2.5	
	I	Human immune system		1
	II	Antigen- Antibody interactions		1
	III	Pathophysiology of metabolic and other disorders		1
	IV	Cancer		1

Practicals

USBCHP05	Practicals of Course USBCH 501 + Course USBCH 502	**3**	**8**
USBCHP06	Practicals of Course USBCH 503 + Course USBCH 504	**3**	**8**

T.Y.B.Sc. –BIOCHEMISTRY-(6 Units) Syllabus

Choice Based and Credit System
To be implemented from the Academic year 2019-2020

SEMESTER VI
Theory

Course	UNIT	TOPICS	Credits	L / Week
USBCH601	**Metabolism & Analytical Techniques-II**		2.5	
	I	Lipid metabolism		**1**
	II	Amino acid and protein metabolism & Hormone action and Signal transduction		**1**
	III	Centrifugation and Spectrophotometry		**1**
	IV	Electrophoresis		**1**
USBCH 602	**Nutrition & Pharmacology**		2.5	
	I	Nutrition		**1**
	II	Diet Management		**1**
	III	Pharmacology		**1**
	IV	Mechanism of Drug Action and Therapeutic drugs		**1**
USBCH 603	**Biostatistics &Bioinformatics**		2.5	
	I	Biostatistics and descriptive statistics		**1**
	II	Bioinformatics		**1**
	III	Hypothesis testing		**1**
	IV	Hypothesis testing		**1**
USBCH 604	Immunology and Pathophysiology-II		2.5	
	I	Antigen- Antibody interactions & Complement system		**1**
	II	Major histocompatibility complex &Transplant immunology		**1**
	III	Pathophysiology of viral diseases		**1**
	IV	Endocrine Diseases & Ageing		**1**

Practicals

USBCHP07	Practicals of Course USBCH 601 + Course USBCH 602	**3**	**8**
USBCHP08	Practicals of Course USBCH 603 + Course USBCH 604	**3**	**8**

SEMESTER V

T.Y.B.Sc. – BIOCHEMISTRY
USBCH501
METABOLISM & ANALYTICAL TECHNIQUES - I

Learning objective:

- The course will be to understand the concepts of metabolism and the role of vitamins and minerals as coenzymes and cofactor in metabolic pathways.
- This paper aims to acquaint the learner with the maintenance of life processes of biomolecule carbohydrates -reactions / pathways involved in oxidation and synthesis.
- This paper also aims to acquaint the learner with oxidative phosphorylation and photophosphorylation and fixation of carbon dioxide, photorespiration and bioluminescence.
- The learner should also comprehend the principle, working and applications of analytical technique of chromatography which serves as an important tool in separation and deciphering the structure and function of biomolecules.

Learning outcome

At the end of the course the learner should

- understand simple concepts related to metabolism, metabolic roles played by vitamins and minerals, appreciate the correlation between energy molecules, reducing equivalents and pathways
- comprehend the catabolism and anabolism of carbohydrates and the disorders associated with these biomolecules.
- have learnt the principle, working and applications of chromatography technique and be able to appreciate the contribution of this technique to the study of various biomolecules.

Unit No.	Topic No.	Topics	No. of L
I	**1.0**	**Role of vitamins and minerals in metabolism**	**15**
	1.1 1.1.1 1.2 1.2.1	**Minerals as cofactors:** Iron, Calcium, Magnesium, Zinc, Selenium, Molybdenum. **Vitamins as Coenzymes**: Water soluble vitamins –Thiamin, Riboflavin, Niacin, Pyridoxine, Biotin, Lipoic acid: Chemistry of the Vitamin and its coenzyme form [structure not to be done, only group involved in its activity] and one biochemical role; Fat soluble vitamins A, D, E, K:	

	1.2.2	Vitamin A – Chemistry, Wald's Visual cycle and role of Rhodopsin (with structure), Transducin, cGMP in vision; Vitamin D – role in Ca absorption and mobilization; Vit E and Vit K– physiological role (Vitamins D, E, K no structures)	
II	**2.0**	**Bioenergetics & Oxidative Phosphorylation**	**15**
	2.1	**Bioenergetics:** Concept of free energy; Respiratory electron transport chain – Carriers [basic chemistry, redox potentials, orientation on the membrane, sequence}; Q cycle in Complex III; Inhibitors of electron transport – Antimycin A , Amytal, Rotenone, CN, Azide, CO; Barbital Malate-Aspartate shuttle and Glycerol phosphate shuttle	
	2.2.	**Oxidative phosphorylation** –Chemiosmotic hypothesis, Proton motive force; Structure of ATP synthase, Uncoupler- of ETC and Oxidative phosphorylation [DNP]	
	2.3	**Photosynthesis** – Light and dark reactions, Z scheme and electron carriers, photophosphorylation [linear and cyclic]; Calvin cycle – schematic with enzymes; Photorespiration	
	2.4	Bioluminescence. Phenomenon and its biological significance. Applications of Bioluminescence	
III	**3.0**	**Carbohydrate metabolism**	**15**
	3.1.	Catabolism – Cellular location, sequence of reactions, labelling of carbon atoms, and energetics of: Glycolysis (aerobic and anaerobic); Oxidation of pyruvate, Krebs cycle; Glyoxylate pathway; Glycogenolysis – [schematic – no structures, but with enzymes and coenzymes]	
	3.2	Anabolism – HMP shunt (Cellular location, sequence of reactions, multifunctional nature); Gluconeogenesis, Glycogenesis – [schematic – no structures, but with enzymes and coenzymes]	
	3.3	Disorders of carbohydrate metabolism: • Galactosemia, Fructosemia, • Lactose intolerance	
IV	**4.0**	**Chromatography**	**15**
	4.1 4.1.1 4.2. 4.3	**Chromatography** Principle, Theoretical plates, Technique and Applications of the following kinds of chromatography : Partition chromatography (Paper), Adsorption Chromatography (TLC and column); Ion exchange chromatography and Gel filtration Principle and applications of GLC, HPLC, HPTLC, Affinity chromatography, Numerical problems based on above concept	

T.Y.B.Sc. – BIOCHEMISTRY
USBCH502
ENVIRONMENTAL SCIENCE

Learning objective:

- To familiarize the learners with our environment
- To create awareness about the effect of human activities on the environment and impact of pollution on living organisms.
- To teach the learner to harness alternate ecofriendly sources of energy.
- To acquaint the learner with the tools and techniques employed for environmental monitoring.

Learning outcome:

At the end of the course the learner should be

- aware of our environment
- sensitized to the challenging environmental issues and problems.
- motivated to address the environmental problems and to work towards finding solutions to these problems.

Unit No.	Topic No.	Topics	No. of L
I	**1.0**	**Air**	**15**
	1.1 1.1.1 1.1.2 1.1.3	Atmosphere Composition and structure of atmosphere Particles, ions and radicals in the atmosphere Chemical and photochemical reactions in the atmosphere [reactions of oxygen, ozone, sulphur dioxide, nitrogen oxide and organic compounds]	
	1.2.1	Air Pollutants – CO, Oxides of Nitrogen, SO_2, hydrocarbons and photochemical smog, Greenhouse gases, suspended particulate matter [sources and effect of] , depletion of ozone	
II	**2.0**	**Water & Water treatment**	**15**
	2.1 2.1.1	Water Hydrosphere- characteristics and the water cycle	
	2.2 2.2.1 2.2.2	Water Pollution Organic pollutants [pesticides, insecticides, detergents, oil spills, toxic organic chemicals] Inorganic pollutants [heavy metals – Hg, Pb, As, Cd] Thermal pollution of water	
	2.3 2.3.1 2.3.2	Water treatment: Criteria for water purity, Water purification [preliminary, primary, secondary, tertiary- chlorination, ion exchange]	

III		**Soil & Noise**	**15**
	3.1 3.1.1 3.1.2 3.1.3	Soil Composition of soil, Nitrogen cycle Types of soil pollution – acidification, agrochemical pollution, salinization, and contamination by metalliferous wastes	
	3.2 3.2.1 3.2.2	Noise and its measurement Classification of Noise Causes and consequences of Noise pollution	
IV	**4.0**	**Energy, Industrial Pollutants and Environmental Monitoring**	**15**
	4.1 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5	Energy Conventional Sources: Coal, Coke, Natural gas (CNG), Petroleum products (Petrol, Diesel, Kerosene, Oils, Naphtha) Non-Conventional Sources: Solar, Geothermal, Tidal, Hydroelectric power, Nuclear energy, Biofuels, Natural gas (Synthetic Natural Gas)	
	4.2 4.2.1 4.2.2 4.2.3 4.2.4	Industrial pollutants (Sources and remedial measures) Polymers and Plastics Asbestos Poly Chlorinated Biphenyls Mining – Acid mine drainage	
	4.3 4.3.1 4.3.2	Environmental monitoring Approaches used to monitor the environment-air, water and soil. [Principles and Significance only. Protocols for each factor – not required] Remote Sensing	

T.Y.B.Sc. – BIOCHEMISTRY (6 units)
USBCH503
GENETICS & RECOMBINANT DNA TECHNOLOGY

Learning Objectives:

The main objective of the course will be to understand the concepts genetics, in terms of DNA replication i.e. perpetuation of life, mutation, the changes in the DNA, its implications and the inbuilt repair systems in the cell to prevent the heritable changes.

The learner will also be acquainted with the application based branch, Recombinant DNA Technology with a detailed insight into the various tools and techniques.

Learning outcome

At the end of the course the learner should

- be able to appreciate the experiments carried out by various scientists to prove DNA as the genetic material, understand the mechanism of DNA replication and comprehend how DNA damage can lead to detrimental effects and how DNA repair systems in the cells try to prevent mutations before being inherited.
- understand the mechanisms of DNA transcription and translation in prokaryotes
- understand the basic tools required and know the techniques of recombinant DNA technology, their applications and the use of the technology for the benefit of society.

Unit No.	No.	Topics	No. of L
I	**1.0**	**DNA Replication & Repair**	**15**
	1.1 1.2 1.3	**Replication of DNA (in prokaryotes) -** Models of DNA replication: Semi-conservative, Dispersive & Conservative; Modes of DNA replication: Theta & rolling circle; Enzymes (pol I, II and III) and accessory proteins; Mechanism of semi-conservative replication; **Mutations:** Point and Gross- Structural (Deletion, Duplication, Inversion, Translocation, insertion); Numerical (Euploidy, Aneuploidy) **DNA repair**: Direct, Photoreactivation O6 - methyl guanine DNA methyl transferase, Excision repair, Mismatch repair, Recombination repair, SOS-error prone repair	

II	**2.0**	**Transcription & Translation**	**15**
	2.1	**Transcription** - in prokaryotes, prokaryotic RNA polymerase and promoter; mechanism of RNA transcription: Initiation, elongation and termination; processing of tRNA, rRNA, mRNA (prokaryotes and eukaryotes)- concept of split genes, reverse transcription. Role of Inhibitor- Rifampicin, Actinomycin D	
	2.2	**Translation (protein biosynthesis) in prokaryotes** – Genetic code, mechanism of translation: Activation of amino acids, chain initiation, elongation & termination: Post translational modifications of proteins Inhibitors and mode of action: Puromycin, Chloramphenicol, cycloheximide, tetracycline	
III	**3.0**	**Recombinant DNA Technology I**	**15**
	3.1 3.2 3.3	Introduction to RDT Tools for RDT (a) Enzymes- Restriction endonucleases, ligases, terminal transferases, reverse transcriptase: (b) Cloning and Expression Vectors- Plasmid, pBR 322, PUC-19, Bacteriophage – Lambda phage; Cosmid; Artificial Chromosomes (BAC and YAC); Shuttle vectors; (c) Probes- DNA probes Applications of RDT- Agriculture (Bt Cotton); Medicine (Insulin); GM food	
IV	**4.0**	**Recombinant DNA Technology II**	**15**
	4.1 4.2 4.3 4.4	Isolation of gene: Gene library and c-DNA library; Southern blot; Chimeric DNA Gene Transfer: Transformation, Transfection, Electroporation, Microinjection, Liposome, Microprojectile (in brief) Selection and screening- Antibiotic and colony hybridization DNA Amplification by PCR (Steps, Types, Applications) DNA fingerprinting, DNA sequencing (any one method)	

T.Y.B.Sc. – BIOCHEMISTRY (6 units)
USBCH504
IMMUNOLOGY & PATHOPHYSIOLOGY -I

Learning Objectives:

- Reveal to the learner the understanding of basic immune cells, organs and their characteristics, antigen antibody reactions along with the types of immune responses.
- Guide the learner to develop the skills necessary for the critical analysis of contemporary literature on topics related to diseases and health problems associated with metabolic disorders of the macromolecules including; Carbohydrates, Lipids, proteins and hormones.
- Help the learner understand the basic objective of studying cancer biology to translate basic findings into diagnostics, treatments and ultimate cures.

Learning outcome:

At the end of the course the learner should

- understand the overall organization of the immune system, appreciate the structure and function of antibodies, relationship between innate and adaptive systems and humoral and cell mediated immunity.
- learn the normal and abnormal metabolic pathways of bio-molecules (carbohydrates, proteins, lipids) and diseases related.
- be able to discuss pathophysiology and etiology of different diseases and in born errors.
- understand basic aspects of cancer biology and familiarize with elementary facets of carcinogenesis and types of cancer along with therapy to treat the cancer.

Unit No.	Topic No.	Topics	No. of L
I	**1.0**	**Human immune system**	**15**
	1.1 1.1.1 1.1.2 1.1.3 1.1.4	Types of Immunity Innate immunity – Anatomical barriers, physiological barriers, Characteristics of Inflammation, phagocytosis [no mechanism] Adaptive immunity – Active & Passive Humoral & Cell mediated immunity	
	1.2 1.2.1 1.2.2	Organs of the immune system: Primary lymphoid organs: Thymus, Bone marrow Secondary lymphoid organs: Lymphatic system, Lymph nodes, Spleen, MALT.	
	1.3 1.3.1 1.3.2	Cells of the immune system: Lymphocytes – B cells and T cells, Natural killer cells – Mononuclear phagocytes, Granulocytes, Antigen presenting cells. Clonal selection & immunologic memory.	

	1.3.3	Cytokines: biological functions of IL1, tumor necrosis factor-alpha, interferon –alpha, IL2, interferon-gamma.	
II	**2.0**	**Antigen- Antibody interactions**	**15**
	2.1	Antigens: Antigenicity, immunogenicity, epitope, factors determining immunogenicity, Haptens. Antibodies: Fine structure of immunoglobulin, Antibody-mediated functions, Antibody classes, Monoclonal antibodies (concept, production and applications)	
	2.2	Antibody diversity*:* Multigene organization of immunoglobulin genes – Lambda, kappa & heavy chain Light chain DNA – VJ rearrangements Heavy chain DNA - VDJ rearrangements	
III	**3.0**	**Pathophysiology of metabolic and other disorders**	**15**
	3.1 3.1.1 3.1.2 3.1.3 3.1.4	Metabolic disorder Inborn error: With respect to Etiology and Clinical manifestations Carbohydrate Metabolism: Glycogen storage disease Type I & III. Amino acid Metabolism: Albinism, Phenylketonuria, Maple syrup urine disease, Alkaptonuria Lipid Metabolism: Tay Sach's disease, Niemann–Pick diseases, Fabry's disease	
	3.2 3.2.1 3.2.2 3.2.3 3.2.4 3.2.5	Blood related diseases*:* Iron deficiency anemia. Sickle cell anemia. Thalassemia. Pernicious anemia Hemophilia A and B	
	3.3 3.3.1	Cardio Vascular System and related diseases*:* Hypertension, Arteriosclerosis and Atherosclerosis	
IV	**4.0**	**Cancer**	**15**
	4.1 4.2 4.3 4.4 4.5 4.6 4.7	Biology of Cancer. Physiology of Cancer cells. Causes of cancer Carcinogens: Types (Physical, Chemical and Biological, Environmental Factor); AMES test Oncogenes and activation of oncogenes Genetics of cancer with reference to p53 and Bcl2. Cancer therapy (Chemo – purine, pyrimidine and folate analogs) Cancer and the cell cycle	

PRACTICALS

USBCHP05 (501)

1) Determination of the optimum pH of β-Amylase.
2) Determination of Km of β-Amylase from sweet potato.
3) Determination of the activity and specific activity of β-Amylase from sweet potato.
4) Effect of an inhibitor (eg. EDTA) on Amylase activity.
5) Estimation of glucose by Benedict's method.
6) Separation of sugars by circular paper chromatography

Demonstration Experiments
Separation of plant pigments by adsorption column chromatography (eg. Silica/Alumina)

USBCHP05 (502)

1) Determination of the pH of water/effluent/soil using a pH meter.
2) Determination of the conductance of water / effluent.
3) Estimation of organic content of soil –Diphenylamine method.
4) Estimation of lead by the EDTA method.
5) Estimation of copper by the Isoamyl alcohol method.
6) Determination of salinity of / chlorides in water - Silver nitrate method.
7) Determination of the Chemical Oxygen Demand of water/effluent by the potassium dichromate method

USBCHP06 (503)

1) Estimation of glucose by DNSA method.
2) Estimation of glucose by the Folin Wu method.
3) Determination of the Hemoglobin content by the Sahli's hemoglobinometer.
4) Determination of blood groups.
5) Detection of Ca^{+2} and Mg^{+2} ions in by the Eriochrome Black T-EDTA method.
6) Estimation of phosphorus by Fiske and Subbarao method

USBCHP06 (504)

1) Isolation of starch from sweet potato.
2) Extraction of lipid from oil seeds by the cold percolation method.
3) Estimation of DNA by the Diphenylamine method
4) Isolation and spooling of DNA from onion / moong

SCHEME OF EXAMINATION

Biochemistry, as an interdisciplinary subject, consists of 06 (Six) Units of T.Y.B.Sc. Carrying 400 marks in Fifth Semester, as follows:

COURSE CODE	Title of Paper	Semester end Examination marks	Total Marks
USBCH501	Metabolism & Analytical Techniques	100	100
USBCH502	Environmental Science	100	100
USBCH503	Genetics & Recombinant DNA Technology	100	100
USBCH504	Immunology & Pathophysiology	100	100
	TOTAL		**400**

PRACTICALS:		
COURSE CODE	**Marks per course**	**Total per semester**
USBCHP05	100	
USBCHP06	100	
TOTAL		**200**

SCHEME OF PRACTICAL EXAMINATION
SEMESTER V

Course USBCHP05 & USBCHP06	**Experiments**	**Marks**
Day 1	a. Chromatographic separation	20
	b. Enzymology	30
	c. Volumetric estimation	20
	d. pH and conductance	10
	e. Certified Journal*	10
	f. *Viva voce*	10
	TOTAL	**100**

Course USBCHP05 & USBCHP06	**Experiments**	**Marks**
Day 2	a. Colorimetric estimation	20
	b. Isolation	20
	c. Volumetric estimation	20
	d. Hematology (two experiments)	20
	e. Certified Journal*	10
	f. *Viva voce*	10
	TOTAL	**100**

SCHEME OF EXAMINATION FOR PRACTICAL OF SEMESTER V

1. The Semester V practical examination shall be conducted by respective colleges on behalf of the University
2. There shall be 02 (Two) examiners to conduct the practical examination –one Internal examiner and other external examiner
3. The external examiner shall be on the panel of examiner approved by the University of Mumbai.
4. The college shall invite one such examiner from approved panel as an external examiner
5. Duration for the Practical examination for Semester V
   a) Two days of 02 sessions on each day
   b) Total no. of sessions = 4
   c) Each session: 3½ hours.
   d) Morning session: 9.00 am to 12.30 pm
      Afternoon session: 1.00 pm to 4.30 pm.

* Candidate without duly certified journals SHALL NOT be allowed to appear for the University practical examination.

SEMESTER VI
T.Y.B.Sc. – BIOCHEMISTRY (6 units)
USBCH601
METABOLISM & ANALYTICAL TECHNIQUES - II

Learning objective:

The paper will help to understand the concepts of metabolism and its importance in the proper functioning of each cell. This paper also aims to acquaint the learner with the maintenance of life processes of various biomolecules like lipids and proteins - reactions / pathways involved in oxidation and synthesis of biomolecules.

The Paper aims to teach the learner the action, signal transduction and physiological role of important hormones.

The learner should also comprehend the principle, working and applications of analytical technique of centrifugation, spectrophotometry, electrophoresis, radioactivity that serve important tools in deciphering the structure and function of biomolecules.

Learning outcome

At the end of the course the learner should

- understand breakdown and synthesis of fatty acids and amino acids and appreciate experiments carried out by scientists to enable understand the pathways and cycles of metabolism.
- understand basic concepts related to metabolism, be familiar with the various metabolic pathways and should be able to appreciate the importance of enzymes and coenzymes in pathophysiology of diseases.
- be able to appreciate the various hormones, their actions, regulations and clinical significance.
- have learnt the principle, working and applications of various analytical techniques and be able to appreciate the contribution of these techniques (colorimeter/ spectrophotometer, Centrifuges, electrophoresis and radioisotopes) as tools in understanding the structure and function of biomolecules.

Unit No.	Topic No.	Topics	No. of L
I	**1.0**	**Lipid metabolism**	**15**
	1.1	Lipid metabolism – Catabolism - Knoop's experiment; Beta oxidation of even carbon saturated fatty acids (C4 to C20) Energetics of fatty acid	

		oxidation. Beta oxidation of odd carbon chain fatty acid	
	1.2	Anabolism – FAS complex; Fatty acid biosynthesis (palmitic acid); Ketone body formation, utilization, and the physiological significance of Ketone bodies in Diabetes mellitus, Starvation, Pregnancy and Alcoholism.	
II	**2.0**	**Amino acid & protein metabolism and Hormones & Signal transduction**	**15**
	2.1	Amino acid and protein metabolism – Reactions of amino acids – Transamination [GOT/GPT and mechanism of transamination] ; Decarboxylation [His, Trp, Glu, and mechanism of decarboxylation] , Deamination [oxidative – NAD(P) linked dehydrogenases and D & L - Amino acid oxidases, Non oxidative – Asp, Cys, Ser]	
	2.1.2	Glucogenic and ketogenic amino acids	
	2.1.3	Urea cycle – Cellular location, sequence of reactions, Labeling of N atom, transport of NH_3	
	2.2 2.2.1	**Hormone action and signal transduction** Hormone receptors (membrane and intracellular)	
	2.2.2	Introduction to G protein, G protein coupled receptor, Effect of epinephrine on glycogen synthesis and breakdown: amplification cascade with G proteins, cAMP (as second messenger), adenylate cyclase, kinases	
	2.2.3	IP3 and Calcium as second messenger	
III	**3.0**	**Centrifugation and Spectrophotometry**	**15**
	3. 1 3.1.1 3.1.2 3.1.3 3.1.4	**Centrifugation** RCF, RPM and derivation of an equation relating the two; Nomogram; Sedimentation coefficient and factors affecting; Derivation of sedimentation velocity, Wall effect Types and applications of centrifuges – Clinical, High speed, Ultra centrifuge - preparative and analytical. Types of centrifugation and its applications– Differential, Rate zonal, Isopycnic, Types of rotors Preparation of density gradient, Sample application, choice of rotors, Recovery pf sample Numerical problems based on above concepts	
	3.2 3.2.1. 3.2.2 3.2.3	**Spectrophotometry** Beer-Lambert law, derivation, limitations & applications in the estimation of sugar [DNSA] and protein [Biuret]; concepts of Lambda max; determination of molar extinction coefficient Construction and working of a simple colorimeter and UV/ Vis spectrophotometer Numerical problems based on the above concepts	

IV	**4.0**	**Electrophoresis & Radioactivity**	**15**
	4.1 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6	**Electrophoresis** Principle: Factors affecting the rate of migration of sample in an electric field Moving boundary and Zone electrophoresis; Components of electrophoresis unit/apparatus Various support media - paper, cellulose acetate, agar, agarose and polyacrylamide Technique of electrophoresis with staining/visualization method • agarose electrophoresis for separation of DNA • Native PAGE for separation of proteins • SDS PAGE for molecular weight determination; • Discontinuous electrophoresis • Other applications of electrophoresis: blotting techniques- Southern, Northern, and Western Isoelectric Focusing of protein	
	4.2	**Radioactivity-** Isotopes, Radioactive decay; Decay constant; Half-life; Measurement of radioactivity (principle)	

T.Y.B.Sc. – BIOCHEMISTRY (6 units)
USBCH602
NUTRITION & PHARMACOLOGY

Learning objectives:

- Gain knowledge about proximate principles, nutritional status and balanced diet.
- Assess energy and anthropometric parameters.
- Introduce the concept of diet management, nutrition at various stages of life and diseases related to diet.
- Give basic insights in pharmacology, pharmacokinetics and mechanism of action of therapeutic drugs.

Learning outcomes:

At the end of the course a learner should

- be able to appreciate the role of nutrients in diet to understand nutritional status and concept of balanced diet which will help to identify the overall nutrition to be given to men and women at various age groups.
- be familiarized with dietary management in diseases.
- be able to utilize critical thinking skills in discussing the concept of pharmacokinetics and pharmacotherapy.
- be able to explain various therapeutic drugs in use.

Unit No.	Topic No.	Topics	No. of L
I	**1.0**	**Nutrition**	**15**
	1.1 1.1.1 1.1.2 1.1.3	Principles of nutrition Nutrients [Proximate principles, vitamins and minerals (macro and micro- role of Ca, Mg, Na, K and Fe, Zn)], dietary fibre. Nutritional status [malnutrition (protein energy and protein calorie) and over nutrition] Balanced diet	
	1.2.1 1.2.2 1.2.3	Energy Assessment - RQ, BMR; Anthropometry – BMI, Waist:hip ratio; Protein quality indices: Chemical score of amino acids, Protein Deficiency Corrected Amino Acid Score, Net Protein utilization	
II	**2.0**	**Diet Management**	**15**
	2.1	Concepts like Balanced diet, Meal planning.	
	2.2	Nutrition during pregnancy, lactation, infancy, toddlerhood, preschool stage, school going children, and adolescence, adulthood and geriatric	

	2.3	Dietary Management in :- Obesity, Diabetes Mellitus, Hypertension, Peptic ulcer , Obstructive Jaundice	
III	**3.0**	**Pharmacology**	
	3.1 3.1.1 3.1.2 3.1.3 3.1.4	General pharmacology Pharmacodynamics, Physicochemical properties of drugs, Drug absorption: through-GIT, pulmonary, renal, placental and blood-brain barrier Bioavailability and Bioequivalence Drug Distribution, Metabolism and Excretion	**15**
	3.2	Bioassays: Preclinical and clinical evaluation, Therapeutic drug monitoring	
	3.3	Pharmacokinetics: LD_{50}, ED_{50}, Half Life, Loading dose, Maintenance dose, Therapeutic dose, Therapeutic Index, Drug plasma concentration, Volume of distribution, Clearance	
IV	**4.0**	**Mechanism of Drug Action and Therapeutic drugs**	
	4.1 4.2 4.2.1 4.2.2 4.2.3	Mechanism of action of drugs: i. Specific interaction – receptor mediated ii. Partially specific – drugs via enzymes iii. Nonspecific interactions – antimetabolites and antiseptics iv. Through Antibodies v. Placebo effects Therapeutic drugs: (Mechanism of action and adverse effects) Anti-inflammatory – non steroid anti-inflammatory NSAID [Ibuprofen], Salicylates – [Aspirins] Cardiovascular drugs- CVS [Ca channel blocker-Amlodipine, and Beta blocker – Proprenolol Antibiotic – Penicillin and Sulphonamide Antacid- Proton pump blocker –Omeprazole	**15**

T.Y.B.Sc. – BIOCHEMISTRY (6 units)
USBCH603
BIOSTATISTICS AND BIOINFORMATICS

Learning objectives:

- Introduces fundamental concepts and definitions for biostatistics.
- Explain concept of probability and its distribution.
- Presents hypothesis testing
- To understand basic concepts in bioinformatics which is an interdisciplinary program offering substantial training in both the biological sciences and the physical & mathematical sciences.

Learning outcomes:

At the end of the course the learner should

- understand the basic principles of probability and how they relate to biostatistics
- become familiar with the mathematical and statistical theory underlying the applications of biostatistical methods to interpret statistical results correctly, effectively and in context.
- be able to interpret relationships among living things and analyze and solve biological problems, using basic biological concepts, grounded in foundational theories with the help of bioinformatics tools.
- be able to apply existing software effectively to extract information from large databases and to use this information in biological sciences

Unit No	Topic No	Topics	No. of L
I	**1.0** 1.1.1 1.1.2 1.1.3	**BIOSTATISTICS AND DESCRIPTIVE STATISTICS** Introduction: scope and applications of biostatistics Common statistical terms: Sources, nature and presentation of data; Measurement and scales of measurement Descriptive statistics: Measures of central tendency- Mean, Median and mode	
	1.2	Measures of dispersion- Range, percentiles, variance, SD, Mean deviation,	**15**
	1.3	**Probability** Concept of probability: definition Probability distribution: normal distribution and normal Curve, Asymmetric distribution Statistical problems based on the above concepts	
II	**2.0**	**BIOINFORMATICS**	
	2.1	**Bioinformatics:** Definition, Aims and History of Bioinformatics Applications of Bioinformatics in – Sequence analysis, Molecular modeling and drug designing, Phylogeny/evolution, Ecology &	**15**

		population studies, Medical informatics and agriculture. Introduction to Genomics and Proteomics Databases- Definition & types – Public domain database, Sequence database, Structural database, Motif database, Genome database, Proteome database, Annotated sequence database. Full form & function in brief of - GenBank, EMBL, PIR, SWISS PROT, PDB, GDB. Sequence analysis Tools - Explain the following terms in brief - BLAST, FASTA, L-ALIGN, CLUSTAL- X & W, RASMOL, Software for protein sequencing - PROSPECT, AMMP, COPIA (Explanation of the terms in brief) Micro-array analysis-concept and applications	
III	**3.0** 3.1 3.2 3.3 3.4	**HYPOTHESIS TESTING** - Introduction; Single population mean, difference between population means Type I and Type II errors, One-tailed and two tailed tests Z-test Statistical problems based on the above concepts	
IV	**4.0** 4.1 4.2	**HYPOTHESIS TESTING** t-test- Paired and unpaired Chi-square Statistical problems based on the above concepts	**15**

T.Y.B.Sc. – BIOCHEMISTRY (6 units)
USBCH604-S
IMMUNOLOGY & PATHOPHYSIOLOGY-II

Learning objectives:

- Understand the complement system needed for cytolysis of foreign particles.
- Deal with major histocompatibility molecules which are important for immune responses, also for evoking transplant rejections.
- Explain the structure and pathophysiology of HIV and other viruses
- Understand the disorders of endocrine system and ageing, which include diseases related to endocrine hormones and relation to nonendocrine system.

Learning outcomes:

At the end of the course the learner should

- understand the pathways that activate the complement system
- be familiar with the MHC; its structure and classes, specific role of each class of MHC and importance in immune response and graft rejection.
- grasp a contemporary understanding of classification, structure and mechanism of replication of viruses along with pathophysiology symptoms and preventive measures of AIDS.
- understand the basic concepts of demography and epidemiology of aging and pathophysiology and issues in common diseases of older people.

Unit No	Topic No	Topics	No. of L
I	**1.0**	**Antigen- Antibody interactions & Complement system**	**15**
	1.1 1.1.1 1.1.2 1.1.3 1.1.4 1.1.5	Antigen- Antibody interactions: Forces involved, antibody affinity, antibody avidity. Precipitation reactions – Oudins, Ouchterlony Agglutination reactions: Blood typing, bacterial agglutination, Passive agglutination, agglutination inhibition, Coomb's test. Immunoelectrophoresis; Principles of Radioimmunoassay, ELISA, Immunofluorescence	
	1.2 1.2.1 1.2.2 1.2.3	Complement Components of complement; Complement activation – Classical & alternate pathway; formation of membrane attack complex. Biological consequences of complement activation.[in brief]	
II	**2.0**	**Major histocompatibility complex &Transplant immunology**	**15**
	2.1. 2.1. 1	Major histocompatibility complex: MHC polymorphism & organization of MHC genes- class I &	

	2.1.2	class II; Cellular distribution & structure of class I & II molecules; Self MHC restriction of T cells. Role of antigen presenting cells.	
	2.2	Transplant immunology: Types of transplant; immunological basis of allograft rejection.	
	2.3	Autoimmunity: Organ specific –Myasthenia gravis; Hashimoto's thyroiditis, Insulin dependent diabetes mellitus Systemic – Rheumatoid arthritis, Multiple sclerosis, Systemic lupus erythematosus (immunological basis of these autoimmune diseases)	
III	**3.0**	**Pathophysiology of viral diseases**	**15**
	3.1	Structure and mechanism of replication in: 1. Vaccinia 2. Polio 3. Influenza 4. Hepatitis 5. Rabies or Ebola virus	
	3.2	AIDS: Structure and genetics basis of AIDS virus. Replication of AIDS Virus. Symptoms and Causes of AIDS. AIDS Therapy.	
IV	**4.0**	**Endocrine Diseases & Ageing**	**15**
	4.1 4.1.1 4.1.2 4.1.3	Endocrine diseases*:* Diabetes mellitus. Hyper and Hypothyroidism, Cushing's syndrome, Acromegaly	
	4.2	Diabetes insipidus.	
	4.2	Ageing: Definition of ageing. Molecular changes during ageing. Theories of Ageing.	
	4.3	Alzheimer's disease, Parkinson's diseases	

PRACTICALS - SEMESTER VI

USBCHP07 (601)

1) Separation of amino acids by circular paper chromatography
2) Estimation of Ascorbic acid Iodimetrically.
3) Determination of the optimum pH of Acid phosphatase / Urease.
4) Determination of the Km of Acid phospahatase / Urease.
5) Estimation of lactose by Cole's ferricyanide method
6) Estimation of glucose Iodometrically

Demonstration Experiments

Separation of plant pigments/ Oils by Thin Layer Chromatography

USBCHP07 (602)

1) Estimation of fluoride in water by the Alizarin red method
2) Determination of the Dissolved Oxygen content of water/effluent by the Winkler's Iodometric method - Azide modification.
3) Determination of the Biological Oxygen Demand of water/effluent
4) Determination of the acidity and alkalinity of water/ effluent.
5) Estimation of $CaCO_3$ of soil - Bromothymol Blue method
6) Immunoprecipitation reaction of antigen and antibody.
7) Diagnostic test for typhoid - Widal Qualitative
8) Diagnostic test for typhoid - Widal Quantitative

USBCHP08 (603)

1) Estimation of protein by the Folin-Lowry method.
2) Estimation of iron by Wong's method.
3) Monograph of acetyl salicylate (identification, assay and purity as per IP)
4) Monograph of sucrose (identification, assay and purity as per IP)

Demonstration Experiments

1. Separation of serum proteins by PAGE

USBCHP08 (604)

1) Biostatistics – Problems
2) Isolation of RNA yeast / liver
3) Isolation of casein from milk.
4) Estimation of RNA by Orcinol method.

Demonstration Experiment

1) Isolation of plasmids
2) Agarose gel electrophoresis
3) Chromosomal DNA and Plasmid DNA

SCHEME OF EXAMINATION

Biochemistry, as an interdisciplinary subject, consists of 06 (Six) Units of T.Y.B.Sc. carrying 400 marks in Sixth Semester, as follows :

COURSE CODE	Title of Paper	Semester End Examination marks	Total Marks
USBCH601	Metabolism & Analytical Techniques II	100	100
USBCH602	Nutrition & Pharmacology	100	100
USBCH603	Biostatistics &Bioinformatics	100	100
USBCH604	Immunology & Pathophysiology	100	100
	TOTAL		**400**

PRACTICALS:		
COURSE CODE	**Marks per course**	**Total per semester**
USBCHP07	100	
USBCHP08	100	
TOTAL		**200**

SCHEME OF PRACTICAL EXAMINATION
SEMESTER VI

Course USBCHP07 & USBCHP08	**Experiments**	**Marks**
Day 1	a. Chromatographic separation	20
	b. Enzymology	30
	c. Volumetric estimation	20
	d. Immunology	10
	e. Certified Journal*	10
	f. *Viva voce*	10
	TOTAL	**100**

Course USBCHP07 & USBCHP08	**Experiments**	**Marks**
Day 2	a. Biostatistics	20
	b. Monograph	20
	c. Colorimetric estimation	20
	d. Isolation	20
	e. Certified Journal*	10
	f. *Viva voce*	10
	TOTAL	**100**

Scheme of Examination for practical of Semester VI

1. The Semester VI practical examination shall be conducted by the University of Mumbai
2. There shall be 02 (Two) external examiners appointed by the University from the panel of approved examiners
3. Duration for the Practical examination for Semester VI
   a) Two days of 2 sessions on each day
   b) Total no. of sessions = 4
   c) Each session: 3½ hours.
   d) Morning session: 9.00 am to 12.30 am
      Afternoon session: 1.00 pm to 4.30 pm.

*Candidate without duly certified journals SHALL NOT be allowed to appear for the University practical examination.

Scheme of Examination for Third year Science Undergraduate students

Scheme of Theory examination at T.Y.B.Sc. (Sem V and Sem VI)

1) Each theory paper will be of **100** marks
2) Each theory paper will be of **3** hours duration
3) Each theory paper will contain **05** questions of **20** marks each as follows:

T.Y.B.Sc. theory question paper pattern with marks distribution

Q. No.	Unit/ s	Sub Q.	Type and Choice	Marks	Total marks per question
1.	I	A	Four objective questions – fill in the blanks, match the columns etc.	04	20
		B	Short answers – any one out of two	04	
		C	Long answers – • Any two, out of three of 06 marks each • Any one out of two for 12 / 06+ 06 / 08+ 04 marks	12	
2.	II	A	Four objective questions – fill in the blanks, match the columns etc.	04	20
		B	Short answers – any one, out of two	04	
		C	Long answers – • Any two out of three of 06 marks each • Any one out of two for 12 / 06+ 06 / 08+ 04 marks	12	
3.	III	A	Four objective questions – fill in the blanks, match the columns etc.	04	20

		B	Short answers – any one out of two	04	
		C	Long answers – • Any two out of three of 06 marks each • Any one out of two for 12 / 06+ 06 / 08+ 04 marks	12	
4.	IV	A	Four objective questions – fill in the blanks, match the columns etc.	04	20
		B	Short answers – any one out of two	04	
		C	Long answers – • Any two out of three of 06 marks each • Any one out of two for 12 / 06+ 06 / 08+ 04 marks	12	
5.	I - IV	A	Any four definitions etc. of 02 marks each; a or b from unit I, c or d from unit II, e or f from unit III, g or h from unit IV	08	20
		B	Any six true or false with justification of 02 marks each from units I to IV	12	

External Examination for practical

Sr. No.	Particulars for External Practical Examination		Marks
	Particulars for External Practical Examination Semester End Practical Examination		100 Marks
1	Laboratory Work	80 Marks	
2	Journal	10 Marks	
3	Viva	10 Marks	

SUGGESTED READING

1) Lehninger's- Principles of Biochemistry by David L. Nelson
2) Harper's Illustrated Biochemistry by Robert K. Murray
3) Biochemistry by Donald Voet
4) Biochemistry by Jeremy M. Berg
5) Biochemistry (2 Volume Set): The Chemical Reactions of Living Cells by David E. Metzler
6) Modern Experimental Biochemistry by Rodney F. Boyer
7) Basic Concepts in Biochemistry: A Student's Survival Guide by Hiram F. Gilbert
8) Analytical Biochemistry by David Holme
9) International Biochem by Stryer Tymoczko Berg
10) Biophysical Chemistry Upadhyay
11) Biochemistry by Dr. A.C. Deb
12) Essentials of Pharmacotherapeutics by FSK Brara
13) Textbook of Medical Biochemistry by M.N. Chatterjea & Ranashinde
14) Immunology by Goldsby and Kuby
15) iGenetics by Russel
16) Gene Biotechnology by Jogdand
17) Biostatistics by Arora
18) Methods in Biostatistics by Mahajan
19) General Principles of Biochemical Investigation by William & Wilson
20) Environmental Chemistry by A.K.De
21) Biotechnology by U.Satyanarayana
22) Advance in Biotechnology by Jogdand
23) Biochemical Calculation by Segel
24) Biochemical Methods by Sadashivam
25) Introductory Practical Biochemistry by Sawhney
26) Practical Biochemistry by David Plummer

Late Shri. Vishnu Waman Thakur Charitable Trust's
Bhaskar Waman Thakur College of Science,
Yashvant Keshav Patil College of Commerce,
Vidhya Dayanand Patil College of Arts,
(VIVA College)
(NAAC ACCREDITED-'B' Grade, CGPA 2.69)

All HODs/ coordinators are instructed to fill the following as per the academic year. Each subject's program outcome/ Course outcome has to be filled. The new syllabus of all subjects has it which can be used for reference. Please fill for the following academic years and mention it correctly, even if the same syllabus was followed for subsequent academic year you will have to fill it. Following is the example for your reference:

Academic year : 2022- 2023

Name of Department: English

Class: TYBA

Program Outcomes:

- To introduce students to English Literature of the 16th, 17th and 18thcenturies.
- To show them how background influences shaped the writer's thinking.
- To present them to the literary masters who dominated the scene
- To familiarize students with different writing styles that each age adopted.
- To introduce the learners to important critical terms
- To make them aware of the nature and function of literature and criticism
- To impart the technique of close reading of literary texts
- To enable them to understand various literary theories and critical approaches
- To familiarize the learners with the tenets of practical criticism
- To develop amongst learners an insight into the process of word formation and transformation
- To develop amongst them an insight into the sounds, stress patterns and intonations in the English language to improve their speaking skills
- To develop among them an insight into the structure of the English language and to provide knowledge of the rules of grammar
- To help them learn grammatical analysis and description and the skills of sentence transformation
- To introduce the mechanics of writing for effective writing for various domains

Program Specific Outcomes:

- To understand the distinctive features of English literature of the 16th, 17th and 18th centuries
- To comprehend how background influences shaped the writer's thinking.
- To recognize and appreciate the literary masters who dominated the scene.
- To grasp the different writing styles that each age adopted.
- use some important critical terms
- become aware the nature and function of literature and criticism
- impart the technique of close reading of literary texts
- understand the various literary theories and critical approaches
- be familiar with the tenets of practical criticism
- Gain a basic understanding of phonetics, morphology and word transformation

- Have improved speaking skills
- Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation
- Write effectively in various domains.

SEMESTER - V

Course Code: - UAENG501	**Course Title:** Paper IV- 16th to 18 th Century English Literature –I

Course Outcomes:

- The students would be able :
- 1) To understand the distinctive features of English literature of the 16th, 17th and 18th centuries
- 2) To comprehend how background influences shaped the writer's thinking.
- 3) To recognize and appreciate the literary masters who dominated the scene.
  4) To grasp the different writing styles that each age adopted.
-

Course Code: UAENG502	**Course Title:** Paper V- Literary Criticism-I

Course outcomes:
The students would be able :

- 1) use some important critical terms
- 2) become aware the nature and function of literature and criticism
- 3) impart the technique of close reading of literary texts
- 4) understand the various literary theories and critical approaches
- 5) be familiar with the tenets of practical criticism

Course Code: UAENG503A	**Course Title:** Paper VI -- Grammar and the Art of Writing-I

Course outcomes:
The students would be able :

- 1. Gain a basic understanding of phonetics, morphology and word transformation
- 2. Have improved speaking skills
- 3. Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation
- 4. Write effectively in various domains.

Course Code:	**Course Title:**

Course Outcomes:
The students would be able :

-

Course Code:	**Course Title:**

Course outcomes:
The students would be able :

-

Course Code:	**Course Title:**
Course outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
SEMESTER VI	
Course Code: UAENG601	**Course Title:** Paper IV- 16th to 18th Century English Literature - II
Course Outcomes: The students would be able : • The students would be able : • 1) To understand the distinctive features of English literature of the 16th, 17th and 18th centuries • 2) To comprehend how background influences shaped the writer's thinking. • 3) To recognize and appreciate the literary masters who dominated the scene. • 4) To grasp the different writing styles that each age adopted.	
Course Code: UAENG602	**Course Title:** Paper V- Literary Criticism - II
Course Outcomes: The students would be able : • 1) use some important critical terms • 2) become aware the nature and function of literature and criticism • 3) impart the technique of close reading of literary texts • 4) understand the various literary theories and critical approaches • 5) be familiar with the tenets of practical criticism	
Course Code: UAENG603A	**Course Title:** Paper VI -- Grammar and Art of writing – II
Course Outcomes: The students would be able : • 1. Gain a basic understanding of phonetics, morphology and word transformation • 2. Have improved speaking skills • 3. Have developed adequate knowledge of the rules of grammar, grammatical analysis and sentence transformation • 4. Write effectively in various domains.	
Course Code:	**Course Title:**
Course Outcomes:	

The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	
Course Code:	**Course Title:**
Course Outcomes: The students would be able : •	

UNIVERSITY OF MUMBAI

No. UG/ 8 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty is invited to this office Circular Nos. UG/264 of 2017-18, dated 23rd October, 2017, UG/287 of 2017-18, dated 30th October, 2017and UG/263 of 2017-18, dated 23rd October, 2017 relating to syllabus of the Bachelor of Science (B.Sc.) degree course.

They are hereby informed that the recommendations made by the Board of Studies in Physics at its meeting held on 23rd April, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.26 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.Sc. in Physics including Applied Component - Electronic Instrumentation (EI) & Computer Course (CS) (Sem -V & VI), has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
12th June, 2018

To

The Principals of the affiliated Colleges & Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.26/05/05/2018

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No. UG/ 8 -A of 2018 MUMBAI-400 032 12th June, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Science & Technology,
2) The Chairman, Board of Studies in Physics,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

UNIVERSITY OF MUMBAI

SYLLABUS FOR SEM - V & VI

Program: B.Sc.

Course: Physics

(Credit Based Semester and Grading System
w. e. f. the academic year 2018–2019)

T.Y.B.Sc. Physics Syllabus: Credit Based Semester and Grading System to be implemented from the Academic year 2018-2019.

SEMESTER V				
Theory				
Course	**UNIT**	**TOPICS**	**Credits**	**Lectures per Week**
USPH501	I	Mathematical Methods in Physics	**2.5**	**4**
	II	Mathematical Methods in Physics		
	III	Thermal and Statistical Physics		
	IV	Thermal and Statistical Physics		
USPH502	I	Solid State Physics	**2.5**	**4**
	II	Solid State Physics		
	III	Solid State Physics		
	IV	Solid State Physics		
USPH503	I	Atomic Physics	**2.5**	**4**
	II	Atomic Physics		
	III	Molecular Physics		
	IV	Molecular Physics		
USPH504	I	Electrodynamics	**2.5**	**4**
	II	Electrodynamics		
	III	Electrodynamics		
	IV	Electrodynamics		
Practicals				
USPHP05	Practicals of Course USPH501 + Course USPH502		**2.5**	**6**
USPHP06	Practicals of Course USPH503 + Course USPH504		**2.5**	**6**
Project				
USPHPR1	USPH501 + USPH502 + USPH503 + USPH504		**1**	**4**

SEMESTER VI				
Theory				
Course	**UNIT**	**TOPICS**	**Credits**	**Lectures per Week**
USPH601	I	Classical Mechanics	**2.5**	**4**
	II	Classical Mechanics		
	III	Classical Mechanics		
	IV	Classical Mechanics		
USPH602	I	Electronics	**2.5**	**4**
	II	Electronics		
	III	Electronics		
	IV	Electronics		
USPH603	I	Nuclear Physics	**2.5**	**4**
	II	Nuclear Physics		
	III	Nuclear Physics		
	IV	Nuclear Physics		
USPH604	I	Special Theory of Relativity	**2.5**	**4**
	II	Special Theory of Relativity		
	III	Special Theory of Relativity		
	IV	Special Theory of Relativity		
Practicals				
USPH605	Practicals of Course USPH601 + Course USPH602		**2.5**	**6**
USPH606	Practicals of Course USPH603 + Course USPH604		**2.5**	**6**
Project				
USPHPR2	USPH601 + USPH602 + USPH603 + USPH604		**1**	**4**

SCHEME OF THEORY, PRACTICALS AND PROJECT EXAMINATION
(SEM- V & VI)

I.	**Theory: External Examination: 100 marks**			
	Each theory paper shall be of **THREE** hours duration.			
	Each paper shall consist of FIVE questions. All questions are compulsory and will have internal options. Choice in papers has to be 1.5 times.			
	Q – I :	From Unit – I		
	Q – II :	From Unit – II		
	Q – III :	From Unit - III		
	Q – IV :	From Unit - IV		
	Q – V :	Will consist of questions from all the FOUR Units with equal weightage of marks allotted to each Unit.		
II.	**Practicals and Project:** The External Practical Examination will be conducted as per the following scheme.			
Sr. No.	**Particulars of External Practical and Project Examination**			**Total Marks**
1	Laboratory Work	Experiment-1= 60 M	Experiment-2 = 60 M	120
2	Journal	10	10	20
3	Viva	10	10	20
			Sub Total =	**160**
III.	**Project**	Internal Examiner (20 M)	External Examiner (20 M)	**40**
			Grand Total	**200**

Passing Criteria:

1. A student should be considered as passed in the practical examination provided he/she fulfills the following passing criteria
    a. Minimum of 20 marks in each practical component - i.e. **USPHP07** and **USPHP08.**
    b. Minimum of 10 marks in Project Component
    c. And cumulatively scoring 80 marks (i.e. 40 % of 200 marks)

Component	Maximum Marks	Minimum Passing Marks
USPHP07	80	20
USPHP08	80	20
Project 2	40	10
Total	**200**	**80**

Scheme of Examination:

1. The University (external) examination for Theory and Practical shall be conducted at the end of each Semester and the evaluation of Project work at the end of the each Semester.
2. The candidate should appear for **THREE** Practical sessions of **three hours each** as part of his/her Practical course examination.
3. The candidates shall appear for external examination of 2 practical courses each carrying 80 marks and presentation of project work carrying 20 marks at the end of each semester.
4. The candidates shall also appear for internal presentation of project work carrying 20 marks at the end of each semester.
5. The candidate shall prepare and submit for practical examination a certified Journal based on the practical course with **6** experiments from each group.
6. The certified journal must contain a minimum of **12** regular experiments (**6** from each group), **with** minimum **5** demonstration experiments in semester VI. A separate index and certificate in journal is must for each semester course.
7. At the time of practical examination, the candidate must also submit the certified Project Report prepared as per the guidelines given in the Syllabus.

A candidate will be allowed to appear for the practical examination only if the candidate submits a certified journal of TYBSc Physics or a certificate from the Head of the Department to the effect that the candidate has completed the

practical course of TYBSc Physics as per the minimum requirements and a project completion report duly certified by the project in-charge and Head of the Department.

III. Visits: Visits to industry, national research laboratories, and scientific exhibitions should be encouraged.

SEMESTER V

Theory Course - USPH501: Mathematical, Thermal and Statistical Physics

Learning outcomes: From this course, the students are expected to learn some mathematical techniques required to understand the physical phenomena at the undergraduate level and get exposure to important ideas of statistical mechanics.

The students are expected to be able to solve simple problems in probability, understand the concept of independent events and work with standard continuous distributions. The students will have idea of the functions of complex variables; solve nonhomogeneous differential equations and partial differential equations using simple methods. The units on statistical mechanics would introduce the students to the concept of microstates, Boltzmann distribution and statistical origins of entropy. It is also expected that the student will understand the difference between different statistics, classical as well as quantum.

Unit - I	**Probability**	(15 lect.)
Review of basic concepts, introduction, sample space, events, independent events, conditional probability, probability theorems, methods of counting (derivation of formulae not expected), random variables, continuous distributions (omit joint distributions), binomial distribution, the normal distribution, the Poisson distribution. Ref: MB – 15.1-15.9 Expected to cover solved problems from each section and solve at least the following problems:		

section 2: 1-5, 11-15, **section 3:** 1, 3, 4, 5, **section 4:** 1, 3, 5,13, 21, **section 5:** 1, 10, 13, **section 6:** 1 to 9, **section 8:** 1 and 3, **section 9:** 2, 3, 4, 9.		
Unit -II	**Complex functions and differential equations**	(15 lect.)
1. Functions of complex variables: The exponential and trigonometric functions, hyperbolic functions, logarithms, complex roots and powers, inverse trigonometric and hyperbolic functions, some applications. Ref.: MB: 2.11 to 2.16 Expected to cover all solved problems. In addition, solve the following problems: **section 2:** 16 – 2, 3, 8, 9, 10.		
2. Second-order nonhomogeneous equations with constant coefficients, partial differential equations, some important partial differential equations in physics, method of separation of variables. Ref : CH :5.2.4, 5.3.1 to 5.3.4 Expected to cover all solved problems. In addition, solve the following problems: 5.17 a to e, 5.23, 5.26, 5.29 to 5.35.		
Unit -III	**Statistical Thermodynamics**	(15 lect.)
Microstates and configurations, derivation of Boltzmann distribution, dominance of Boltzmann distribution, physical meaning of the Boltzmann distribution law, definition of , the canonical ensemble, relating Q to q for an ideal gas, translational partition function, equipartition theorem, energy, entropy ER: 13.1 to 13.5, 14.1, 14.2, 14.4, 14.8, 15.1, 15.4		
Unit -IV	**Classical and Quantum Statistics**	(15 lect.)
The probability of a distribution, The most probable distribution, Maxwell-Boltzmann statistics, Molecular speeds. Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula,		

The Planck radiation formula, Fermi-Dirac statistics, Comparison of results. AB : 15.2 to 15.5, 16.1 to 16.6

References:

1.	MB: Mathematical Methods in the Physical sciences: Mary L. Boas Wiley India, 3rd ed.
2.	ER: Thermodynamics, Statistical Thermodynamics and Kinetics: T. Engel and P. Reid (Pearson).
3.	AB: Perspectives of Modern Physics: Arthur Beiser, (Mc Graw Hill International).
4.	CH: Introduction to Mathematical Methods: Charlie Harper (PHI Learning).

Additional References:

1.	Mathematical Physics: A K Ghatak, Chua – 1995 Macmillian India Ltd.
2.	Mathematical Method of Physics: Riley, Hobson and Bence, Cambridge (Indian edition).
3.	Mathematical Physics: H. K. Das, S. Chand & Co.
4.	Mathematical Methods of Physics: Jon Mathews & R. L. Walker, W A Benjamin inc.
5.	A Treatise on heat: Saha and Srivastava (Indian press, Allahabad)
6.	Statistical Physics: F. Reif (Berkeley Physics Course, McGraw Hill)
7.	Introductory Statistical Mechanics: R. Bowley and M. Sanchez (Oxford Science Publications).
8.	An Introduction to Thermal Physics: D. V. Schroeder (Pearson).
9.	PROBABILITY: Schaum's Outlines Series by S. Lipschutz and M. L. Lipson (Mc Graw Hill International).

Theory Course - USPH502: Solid State Physics

Learning Outcomes: On successful completion of this course students will be able to:

1. Understand the basics of crystallography, Electrical properties of metals, Band Theory of solids, demarcation among the types of materials, Semiconductor Physics and Superconductivity.
2. Understand the basic concepts of Fermi probability distribution function, Density of states, conduction in semiconductors and BCS theory of superconductivity.
3. Demonstrate quantitative problem solving skills in all the topics covered.

Unit - I	**Crystal Physics**	(15 lect.)

The crystalline state, Basic definitions of crystal lattice, basis vectors, unit cell, primitive and non-primitive cells, The fourteen Bravais lattices and the seven crystal systems, elements of symmetry, nomenclature of crystal directions and crystal planes, Miller Indices, spacing between the planes of the same Miller indices, examples of simple crystal structures, The reciprocal lattice and X-ray diffraction.

Ref: Elementary Solid State Physics-Principles and Applications: M. Ali Omar, Pearson Education, 2012 : (1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.6)

Unit -II	**Electrical properties of metals**	(15 lect.)

1. Classical free electron theory of metals, Drawbacks of classical theory, Relaxation time, Collision time and mean free path
2. Quantum theory of free electrons, Fermi Dirac statistics and electronic distribution in solids, Density of energy states and Fermi energy, The Fermi distribution function, Heat capacity of the Electron gas, Mean energy of electron gas at 0 K, Electrical conductivity from quantum mechanical considerations, Failure of Sommerfeld's free electron Theory
3. Thermionic Emission

Ref.: Solid State Physics: S. O. Pillai, New Age International. 6th Ed.

Chapter 6: II, III, IV, V, XIV, XV, XVI, XVII, XVIII, XX, XXXV, XXXI.

Unit -III	**Band Theory of Solids and Conduction in Semiconductors**	(15 lect.)

1. Band theory of solids, The Kronig- Penney model (Omit eq. 6.184 to 6.188), Brillouin zones, Number of wave functions in a band, Motion of electrons in a one-dimensional periodic potential, Distinction between metals, insulators and intrinsic semiconductors.

   Ref.: Solid State Physics: S. O. Pillai, New Age International, 6th Ed.

   Chapter 6: XXXVI, XXXVII, XXXVIII, XXXIX, XXXX, XXXXI

2. Electrons and Holes in an Intrinsic Semiconductor, Conductivity of a Semiconductor, Carrier concentrations in an intrinsic semiconductor, Donor and Acceptor impurities, Charge densities in a semiconductor, Fermi level in extrinsic semiconductors, Diffusion, Carrier lifetime, The continuity equation, Hall Effect.

   Ref.: Electronic Devices and Circuits: Millman, Halkias & Satyabrata Jit. (3rd Ed.) Tata McGraw Hill.: 4.1 to 4.10.

Unit -IV	**Diode Theory and superconductivity**	(15 lect.)

1. Semiconductor-diode Characteristics: Qualitative theory of the p-n junction, The p-n junction as a diode, Band structure of an open-circuit p-n junction, The current components in a p-n junction diode, Quantitative theory of p-n diode currents, The Volt-Ampere characteristics, The temperature dependence of p-n characteristics, Diode resistance.

   Ref.: Electronic Devices and Circuits: Millman, Halkias & Satyabrata Jit. (3rd Ed.) Tata McGraw Hill.: 5.1 to 5.8

2. Superconductivity: Experimental Survey, Occurrence of Superconductivity, destruction of superconductivity by magnetic field, The Meissner effect, London equation, BCS theory of superconductivity, Type I and Type II Superconductors, Vortex state.

   Ref.: Introduction to Solid State Physics-Charles Kittel, 7th Ed. John Wiley &

Sons: Topics from Chapter 12.

Main References:

1.	Elementary Solid State Physics-Principles and Applications: M.Ali Omar, Pearson Education, 2012.
2.	Solid State Physics: S. O. Pillai, New Age International, 6th Ed.
3.	Electronic Devices and Circuits: Millman, Halkias & Satyabrata Jit. (3rd Ed.) Tata McGraw Hill.
4.	Introduction to Solid State Physics - Charles Kittel, 7th Ed. John Wiley & Sons.
5.	Modern Physics and Solid State Physics: Problems and solutions New Age International.
Additional References:	
1.	Solid State Physics: A. J. Dekker, Prentice Hall.
2.	Electronic Properties of Materials: Rolf Hummel, 3rd Ed. Springer.
3.	Semiconductor Devices: Physics and Technology, 2nd Ed. John Wiley & Sons.
4.	Solid State Physics: Ashcroft & Mermin, Harcourt College Publisher.

Theory Course - USPH503: Atomic and Molecular Physics

Learning Outcome: Upon successful completion of this course, the student will understand

- the application of quantum mechanics in atomic physics
- the importance of electron spin, symmetric and antisymmetric wave functions and vector atom model
- Effect of magnetic field on atoms and its application
- Learn Molecular physics and its applications.

- This course will be useful to get an insight into spectroscopy.

Unit - I		(15 lect.)
1. Hydrogen atom: Schrödinger's equation for Hydrogen atom, Separation of variables, Quantum Numbers: Total quantum number, Orbital quantum number, Magnetic quantum number. Angular momentum, Electron probability density (Radial part). 2. Electron spin: The Stern-Gerlach experiment, Pauli's Exclusion Principle Symmetric and Anti-symmetric wave functions. Ref – Unit – I - B: 9.1 to 9.9, B: 10.1, 10.3. 2		
Unit -II		(15 lect.)
1. Spin orbit coupling, Total angular momentum, Vector atom model, L-S and j-j coupling. Origin of spectral lines, Selection rules. 2. Effect of Magnetic field on atoms, the normal Zeeman effect and its explanation (Classical and Quantum), The Lande g - factor, Anomalous Zeeman effect. Ref – Unit – II - B: 10.2, 10.6, 10.7, 10.8, 10.9. B : 11.1 and 11.2		
Unit -III		(15 lect.)
1. Molecular spectra (Diatomic Molecules): Rotational energy levels, Rotational spectra, Vibrational energy levels, Vibrational-Rotational spectra. Electronic Spectra of Diatomic molecules: The Born-Oppenheimer approximation, Intensity of vibrational-electronic spectra: The Franck-Condon principle. 2. Infrared spectrometer & Microwave spectrometer . Ref – Unit – III - B: 14.1, 14.3, 14.5, 14.7		
Unit -IV		(15 lect.)
1. Raman effect: Quantum Theory of Raman effect, Pure Rotational Raman spectra: Linear molecules, symmetric top molecules, Asymmetric top molecules, Vibrational Raman spectra: Raman activity of vibrations, Experimental set up of Raman Effect. 2. Electron spin resonance: Introduction, Principle of ESR, ESR spectrometer		

3. Nuclear magnetic resonance: Introduction, principle and NMR instrumentation. **Ref – Unit – IV -** 1. BM: 6.11, 6.1.3. 2. BM: 4.1.1, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.3.1. GA: 8.6.1 2. GA: 11.1,11.2and 11.3 3. GA: 10.1,10.2,10.3

References:

1.	B: Perspectives of Modern Physics : Arthur Beiser Page 8 of 18 McGraw Hill.
2.	BM: Fundamentals of Molecular Spectroscopy : C. N. Banwell & E. M. McCash (TMH).(4th Ed.)
3.	GA: Molecular structure and spectroscopy : G Aruldhas (2nd Ed) PHI learning Pvt Ltd.
4.	Atomic Physics (Modern Physics): S.N.Ghoshal. S.Chand Publication (for problems on atomic Physics).

Theory Course - USPH504: Electrodynamics

Learning outcomes:

On successful completion of this course students will be able to:

1) Understand the laws of electrodynamics and be able to perform calculations using them.
2) Understand Maxwell's electrodynamics and its relation to relativity
3) Understand how optical laws can be derived from electromagnetic principles.
4) Develop quantitative problem solving skills.

Unit - I	**Electrostatics**	(15 lect.)
1. Review of Coulomb & Gauss law, The divergence of **E**, Applications of Gauss'		

law, The curl of **E**. Introduction to potential, Comments on potential, The potential of a localized charge distribution. Poisson's equation and Laplace's equation. Solution and properties of 1D Laplace equation. Properties of 2D and 3D Laplace equation (without proof).

2. Boundary conditions and Uniqueness theorems, Conductors and Second Uniqueness theorem, The classic image problem- point charge and grounded infinite conducting plane and conducting sphere.

DG: 2.1.1 to 2.1.3, 2.2.2 to 2.2.4, 2.3.1 to 2.3.4
DG: 3.1.1 to 3.1.4, 3.1.5, 3.1.6, 3.2.1 to 3.2.4

Unit -II	**Electrostatics in Matter and Magnetostatics**	(15 lect.)

1. Dielectrics, Induced Dipoles, Alignment of polar molecules, Polarization, Bound charges and their physical interpretation, Gauss' law in presence of dielectrics, A deceptive parallel, Susceptibility, Permittivity, Dielectric constant and relation between them, Energy in dielectric systems.

2. Review of Biot-Savart's law and Ampere's law, Straight-line currents, The Divergence and Curl of **B**, Applications of Ampere's Law in the case of a long straight wire and a long solenoid, Comparison of Magnetostatics and Electrostatics, Magnetic Vector Potential.

DG: 4.1.1 to 4.1.4, 4.2.1, 4.2.2, 4.3.1, 4.3.2, 4.4.1, 4.4.3
DG: 5.2.1, 5.3.1 to 5.3.4, 5.4.1

Unit -III	**Magnetostatics in Matter and Electrodynamics**	(15 lect.)

1. Magnetization, Bound currents and their physical interpretation, Ampere's law in magnetized materials, A deceptive parallel, Magnetic susceptibility and permeability.

2. Energy in magnetic fields, Electrodynamics before Maxwell, Maxwell's correction to Ampere's law, Maxwell's equations, Magnetic charge, Maxwell's equations in matter, Boundary conditions.

DG: 6.1.1, 6.1.4, 6.2.1, 6.2.2, 6.2.3, 6.3.1, 6.3.2, 6.4.1
DG: 7.2.4, 7.3.1 to 7.3.6

Unit -IV	**Electromagnetic Waves**	(15 lect.)

1. The continuity equation, Poynting's theorem

2. The wave equation for **E** and **B**, Monochromatic Plane waves, Energy and momentum in electromagnetic waves, Propagation in linear media, Reflection and transmission of EM waves at normal incidence, Reflection and transmission of EM

waves at oblique incidence. DG : 8.1.1, 8.1.2 DG : 9.2.1 to 9.2.3, 9.3.1 to 9.3.3

References	
1.	DG: Introduction to Electrodynamics, David J. Griffiths (3rd Ed) Prentice Hall of India.
Additional References	
1.	Introduction to Electrodynamics: A. Z. Capria and P. V. Panat, Narosa Publishing House.
2.	Engineering Electrodynamics: William Hayt Jr. & John H. Buck (TMH).
3.	Foundations of Electromagnetic Theory: Reitz, Milford and Christy.
4.	Solutions to Introduction to Electrodynamics: David J. Griffiths (3rd Ed) Prentice Hall of India.

PRACTICALS - SEMESTER V

The T. Y. B. Sc. Syllabus integrates the regular practical work with a series of skill experiments and the project. There will be separate passing head for project work. During the teaching and examination of Physics laboratory work, simple modifications of experimental parameters may be attempted. Attention should be given to basic skills of experimentation which include:

i)	Understanding relevant concepts.
ii)	Planning of the experiments
iii)	Layout and adjustments of the equipments
iv)	Understanding designing of the experiments
v)	Attempts to make the experiments open ended
vi)	Recording of observations and plotting of graphs
vii)	Calculation of results and estimation of possible errors in the observation of results

i) Regular Physics Experiments: A minimum of **06** experiments from each of the course are to be performed and reported in the journal.

ii) Skill Experiments: All the skill experiments are compulsory and must be reported in the journal. Skills will be tested during the examination through viva or practical.

The certified journal must contain a minimum of **12** regular experiments (**06** from each group), **with ALL** Skill experiments in semester V. A separate index and certificate in journal is must for each semester course.

iii) Project Includes:

a)	Review articles/ PC Simulation on any concept in Physics/ Comparative & differentiative study/Improvement in the existing experiment (Design and fabrication concept) /Extension of any regular experiment/Attempt to make experiment open-ended/Thorough survey of existing active components (devices, ICs, methods, means, technologies, generations, applications etc. / any innovative projects having the concept of physics.
b)	Two students (maximum) per project.
c)	For evaluation of project, the following points shall be considered … • Working model (Experimental or Concept based simulation) • Understanding of the project • Data collection • Data Analysis • Innovation/Difficulty • Report

There will be **THREE** turns of **3Hrs each** for the examination of practical courses.

SEMESTER V	
PRACTICAL COURSE: USPHP05	
Sr. No.	**Name of the Experiment**
1	Determination of ‘g’ by Kater’s pendulum

2	Surface tension of soap solution
3	Elastic constants of a rubber tube
4	Determination of dielectric constant
5	Logarithmic decrement
6	Searle's Goniometer
7	Determination of Rydberg's constant
8	Edser's 'A' pattern
9	Determination of wavelength by Step slit
10	Determination of e/m by Thomson's method
11	R. I. by total internal reflection
12	Velocity of sound in air using CRO
PRACTICAL COURSE: USPHP06	
Sr. No.	**Name of the Experiment**
1	Mutual inductance by BG.
2	Capacitance by parallel bridge
3	Hysteresis loop by CRO
4	L/C by Maxwell's bridge
5	Band gap energy of Ge diode
6	Design and study of transistorized astable multivibrator (BB)
7	Design and study of Wien bridge oscillator
8	Design and study of first order active low pass filter circuit (BB)
9	Design and study of first order active high pass filter circuit (BB)
10	Application of IC 555 timer as a ramp generator (BB)
11	LM 317 as constant current source
12	Counters Mod 2, 5, 10 (2 x 5, 5 x 2)
SKILL EXPERIMENTS	
Sr. No.	**Name of the Experiment**
1	Estimation of errors from actual experimental data

2	Soldering and testing of an astable multivibrator (Tr./IC555) circuit on PCB
3	Optical Leveling of Spectrometer
4	Schuster's method
5	Laser beam profile
6	Use of electronic balance: Find the density of a solid cylinder
7	Dual trace CRO: Phase shift measurement
8	C1/C2 by B G
9	Internal resistance of voltage and current source
10	Use of DMM to test diode, transistor and β factor

References:	
1.	Advanced course in Practical Physics: D. Chattopadhya, PC. Rakshit & B. Saha (8th Edition) Book & Allied Pvt. Ltd.
2.	BSc Practical Physics: Harnam Singh. S. Chand & Co. Ltd. – 2001.
3.	A Text book of Practical Physics: Samir Kumar Ghosh New Central Book Agency (4th edition).
4.	B Sc. Practical Physics: C. L. Arora (1st Edition) – 2001 S. Chand & Co. Ltd.
5.	Practical Physics: C. L. Squires – (3rd Edition) Cambridge University Press.
6.	University Practical Physics: D C Tayal. Himalaya Publication.
7.	Advanced Practical Physics: Worsnop & Flint.

SEMESTER VI

Theory Course – USPH601: Classical Mechanics

Learning outcomes:

This course will introduce the students to different aspects of classical mechanics. They would understand the kinds of motions that can occur under a central potential and their applications to planetary orbits. The students should also appreciate the effect of moving coordinate system, rectilinear as well as rotating. The students are expected to learn the concepts needed for the important formalism of Lagrange's equations and derive the equations using D'Alembert's principle. They should also be able to solve simple examples using this formalism. The introduction to simple concepts from fluid mechanics and understanding of the dynamics of rigid bodies is also expected. Finally, they should appreciate the drastic effect of adding nonlinear corrections to usual problems of mechanics and nonlinear mechanics can help understand the irregularity we observe around us in nature.

Unit - I	**Central Force**	(15 lect.)
1. Motion under a central force, the central force inversely proportional to the square of the distance, Elliptic orbits, The Kepler problem. 2. Moving origin of coordinates, Rotating coordinate systems, Laws of motion on the rotating earth, The Foucault pendulum, Larmor's theorem. KRS: 3.13 - 3.15, 7.1 - 7.5.		
Unit -II	**Lagrange's equations**	(15 lect.)
1. D'Alembert's principle, Constraints, Examples of holonomic constraints, examples of nonholonomic constraints, degrees of freedom and generalized coordinates, virtual displacement, virtual work, D'Alembert's principle, illustrative problems. 2. Lagrange's equations (using D'Alembert's principle), properties of Lagrange's equations, illustrative problems, canonical momentum, cyclic or ignorable coordinates. PVP: 4.2 to 4.9, 5.2 to 5.4, 7.2, 7.3.		

Unit -III	**Fluid Motion and Rigid body rotation**	(15 lect.)
1. Kinematics of moving fluids, Equation of motion for an ideal fluid, Conservation laws for fluid motion, Steady flow. 2. Rigid dynamics: introduction, degrees of freedom, rotation about an axis: orthogonal matrix, Euler's theorem, Eulerian angles, inertia tensor, angular momentum of rigid body, Euler's equation of motion of rigid body, free motion of rigid body, motion of symmetric top (without notation). KRS : 8.6 to 8.9 PVP: 16.1 to 16.10		
Unit -IV	**Non Linear Mechanics**	(15 lect.)
1. Nonlinear mechanics: Qualitative approach to chaos, The anharmonic oscillator, Numerical solution of Duffing's equation. 2. Transition to chaos: Bifurcations and strange attractors, Aspects of chaotic behavior (Logistic map). BO: 11.1, 11.3 to 11.5		

References	
1.	PVP: Classical Mechanics, P. V. Panat (Narosa).
2.	KRS: Mechanics : Keith R. Symon, (Addision Wesely) 3rd Ed.
3.	BO: Classical Mechanics- a Modern Perspective: V. D. Barger and M. G. Olsson. (Mc Graw Hill International 1995 Ed.)
Additional References	
1.	Classical Mechanics: Herbert Goldstein (Narosa 2nd Ed.).
2.	An Introduction to Mechanics: Daniel Kleppner & Robert Kolenkow Tata Mc Graw Hill (Indian Ed. 2007).
3.	Chaotic Dynamics- an introduction: Baker and Gollub (Cambridge Univ. Press).
4.	Classical Mechanics: J. C. Upadhyaya (Himalaya Publishing House).

Theory Course – USPH602: Electronics

Learning Outcome:

On successful completion of this course students will be able to:

1. Understand the basics of semiconductor devices and their applications.
2. Understand the basic concepts of operational amplifier: its prototype and applications as instrumentation amplifier, active filters, comparators and waveform generation.
3. Understand the basic concepts of timing pulse generation and regulated power supplies
4. Understand the basic electronic circuits for universal logic building blocks and basic concepts of digital communication.
5. Develop quantitative problem solving skills in all the topics covered.

Unit - I		(15 lect.)
1. Field effect transistors: JFET: Basic ideas, Drain curve, The transconductance curve, Biasing in the ohmic region and the active region, Transconductance, JFET common source amplifier, JFET analog switch, multiplexer, voltage controlled resistor, Current sourcing. 2. MOSFET: Depletion and enhancement mode, MOSFET operation and characteristics, digital switching. 3. SCR – construction, static characteristics, Analysis of the operation of SCR, Gate Triggering Characteristics, Variable half wave rectifier and Variable full wave rectifier, Current ratings of SCR. 4. UJT: Construction, Operation, characteristics and application as a relaxation oscillator. 1. MB: 13.1 to 13.9 2. MB: 14.1, 14.2, 14.4, 14.6. 3. AM: 28.1, 28.5		
Unit -II		(15 lect.)
1. Differential Amplifier using transistor: The Differential Amplifier, DC and AC analysis of a differential amplifier, Input characteristic-effect of input bias, offset current and input offset voltage on output, common mode gain, CMRR.		

2. Op Amp Applications: Log amplifier, Instrumentation amplifiers, Voltage controlled current sources (grounded load), First order Active filters, Astable using OP AMP, square wave and triangular wave generator using OP AMP, Wein-bridge oscillator using OP AMP, Comparators with Hysteresis, Window Comparator.

1. MB: 17.1 to 17.5
2. MB: 20.5, 20.8, 21.4, 22.2, 22.3, 22.7, 22.8, 23.

Unit -III		(15 lect.)

1. Transistor Multivibrators: Astable, Monostable and Bistable Multivibrators, Schmitt trigger.

2. 555 Timer: Review Block diagram, Monostable and Astable operation Voltage Controlled Oscillator, Pulse Width modulator, Pulse Position Modulator, Triggered linear ramp generator.

3. Regulated DC power supply: Supply characteristics, series voltage regulator, Short circuit protection (current limit and fold back) Monolithic linear IC voltage Regulators. (LM 78XX, LM 79XX, LM 317, LM337).

1. AM: 18.11
2. KVR: 14.5.2.1, 14.5.2.5, 14.5.2.6, 14.5.4.1
3. MB: 23.8, 23.9
4. MB: 24.1, 24.3, 24.4

Unit -IV		(15 lect.)

1. Logic families: Standard TTL NAND, TTL NOR, Open collector gates, Three state TTL devices, MOS inverters, CMOS NAND and NOR gates, CMOS characteristics.

2. Digital Communication Techniques: Digital Transmission of Data, Benefits of Digital Communication, Disadvantages of Digital Communication, Parallel and Serial Transmission, Pulse Modulation, Comparing Pulse-Modulation Methods (PAM, PWM, PPM), Pulse-Code Modulation.

1. ML: 6.2, 6.4, 6.6, 6.7, 7.2 to 7.4.
2. LF: 7.1, 7.2, 7.4

References	
1.	MB: Electronic Principles, Malvino & Bates -7th Ed TMH Publication.
2.	AM: Electronic Devices and Circuits, Allen Mottershead -PHI Publication.
3.	KVR: Functional Electronics, K.V. Ramanan-TMH Publication.
4.	ML: Digital Principles and Applications, Malvino and Leach (4th Ed)(TMH).
5.	LF: Communication Electronics: Principles and applications, Louis E Frenzel 4th edition TMH Publications.

Theory Course – USPH603: Nuclear Physics

Objectives:

The course is built on exploring the fundamentals of nuclear matter as well as considering some of the important applications of nuclear physics. Topics include decay modes – (alpha, beta & gamma decay), nuclear models (liquid drop model, introduction to shell model), Applications of Nuclear Physics in the field of particle accelerators and energy generation, nuclear forces and elementary particles. The lecture course will be integrated with problem solving.

Learning Outcomes:

- Upon successful completion of this course, the student will be able to understand
  the fundamental principles and concepts governing classical nuclear and particle physics and have a knowledge of their applications interactions of ionizing radiation with matter the key techniques for particle accelerators the physical processes involved in nuclear power generation.
- Knowledge on elementary particles will help students to understand the fundamental constituents of matter and lay foundation for the understanding of unsolved questions about dark matter, antimatter and other research oriented topics.

Unit - I	**Alpha & Beta Decay**	(15 lect.)

1. Alpha decay: Velocity, energy, and Absorption of alpha particles: Range, Ionization and stopping power, Nuclear energy levels. Range of alpha particles, alpha particle spectrum, Fine structure, long range alpha particles, Alpha decay paradox: Barrier penetration (Gamow's theory of alpha decay and Geiger-Nuttal law).

2. Beta decay: Introduction, Velocity and energy of beta particles, Energy levels and decay schemes, Continuous beta ray spectrum-Difficulties encountered to understand it, Pauli's neutrino hypothesis, Detection of neutrino, Energetics of beta decay.

1. IK: 13. 1, 13.2, 13.5, SBP: 4. II. 1, 4. II. 2, 4. II. 3, 1.II.3
2. IK: 14.1, 14.7, SBP: 4. III. 1, 4. III. 2, 4. III. 3, 4. III. 5, SNG : 5.5.

Unit -II	**Gamma Decay & Nuclear Models**	(15 lect.)

1. Gamma decay: Introduction, selection rules, Internal conversion, nuclear isomerism, Mossbauer effect.

2. Nuclear Models: Liquid drop model, Weizsacker's semi-empirical mass formula, Mass parabolas - Prediction of stability against beta decay for members of an isobaric family, Stability limits against spontaneous fission. Shell model (Qualitative), Magic numbers in the nucleus.

1. SBP: 4. IV. 1, 4. IV.2, 4. IV. 3, 4. IV. 4, 9.4
2. SBP: 5.1, 5.3, 5.4, 5.5. AB: 11.6-pages (460,461).

Unit -III	**Nuclear Energy & Particle Accelerators**	(15 lect.)

1. Nuclear energy: Introduction, Asymmetric fission - Mass yield, Emission of delayed neutrons, Nuclear release in fission, Nature of fission fragments, Energy released in the fission of U235, Fission of lighter nuclei, Fission chain reaction, Neutron cycle in a thermal nuclear reactor (Four Factor Formula), Nuclear power and breeder reactors, Natural fusion Possibility of controlled fusion.

2. Particle Accelerators: Van de Graaff Generator, Cyclotron, Synchrotron, Betatron and Idea of Large Hadron Collider.

1. SBP: 6.1, 6.3 to 6.9, 9.6, 9.7, 8.1,8.2,8.3
2. SBP: 1.I.4 (i), 1.I.4 (ii), 1.I.4 (iii), 1.I.4 (iv), 6.9, AB: 13.3

Unit -IV	**Nuclear force & Elementary particles**	(15 lect.)

1. Nuclear force: Introduction, Deuteron problem, Meson theory of Nuclear Force- A qualitative discussion.

2. Elementary particles: Introduction, Classification of elementary particles, Particle interactions, Conservation laws (linear &angular momentum, energy, charge, baryon number & lepton number), particles and antiparticles (Electrons and positrons, Protons and anti-protons, Neutrons and anti-neutrons, Neutrinos and anti-neutrinos), Photons, Mesons, Quark model (Qualitative).

1. SBP: 8.6
2. DCT: 18.1, 18.2,18.3, 18.4 , 18.5 to 18.9 AB: 13.5

References	
1.	AB: Concepts of Modern Physics: Arthur Beiser, Shobhit Mahajan, S Rai Choudhury (6th Ed.) (TMH).
2.	SBP: Nuclear Physics, S.B. Patel (Wiley Eastern Ltd.).
3.	IK: Nuclear Physics, Irving Kaplan (2nd Ed.) (Addison Wesley).
4.	SNG: Nuclear Physics, S. N. Ghoshal (S. Chand & Co.)
5.	DCT: Nuclear Physics, D. C. Tayal (Himalayan Publishing House) 5th ed.
Additional References	
1.	Modern Physics: Kenneth Krane (2nd Ed.), John Wiley & Sons.
2.	Atomic & Nuclear Physics: N Subrahmanyam, Brij Lal. (Revised by Jivan Seshan.) S. Chand.
3.	Atomic & Nuclear Physics: A B Gupta & Dipak Ghosh Books & Allied (P) Ltd.
4	Introduction to Elementary Particles: David Griffith, Second Revised Edition, Wiley-VCH.

Theory Course – USPH604: Special Theory of Relativity

Learning outcomes:

This course introduces students to the essence of special relativity which revolutionized the concept of physics in the last century by unifying space and time, mass and energy, electricity and magnetism. This course also gives a very brief introduction of general relativity. After the completion of the course the student should be able to

1. Understand the significance of Michelson Morley experiment and failure of the existing theories to explain the null result
2. Understand the importance of postulates of special relativity, Lorentz transformation equations and how it changed the way we look at space and time, Absolutism and relativity, Common sense versus Einstein concept of Space and time.
3. Understand the transformation equations for: Space and time, velocity, frequency, mass, momentum, force, Energy, Charge and current density, electric and magnetic fields.
4. Solve problems based on length contraction, time dilation, velocity addition, Doppler effect, mass energy relation and resolve paradoxes in relativity like twin paradox etc.

Unit - I		(15 lect.)

Introduction to Special theory of relativity:
Inertial and Non-inertial frames of reference, Galilean transformations, Newtonian relativity, Electromagnetism and Newtonian relativity. Attempts to locate absolute frame: Michelson- Morley experiment (omit derivation part), Attempts to preserve the concept of a preferred ether frame: Lorentz Fitzgerald contraction and Ether drag hypothesis (conceptual), Stellar aberration, Attempt to modify electrodynamics.

Relativistic Kinematics - I: Postulates of the special theory of relativity, Simultaneity, Derivation of Lorentz transformation equations. Some consequences of the Lorentz transformation equations: length contraction, time dilation and meson experiment, The observer in relativity.

RR: 1.1 to 1.9, 2.1 to 2.5

Unit -II		(15 lect.)
Relativistic Kinematics - II: The relativistic addition of velocities, acceleration transformation equations, Aberration and Doppler effect in relativity, The common sense of special relativity. **The Geometric Representation of Space-Time:** Space-Time Diagrams, Simultaneity, Length contraction and Time dilation, The time order and space separation of events, The twin paradox. RR: 2.6 to 2.8, Supplementary topics A1, A2, A3, B1, B2, B3.		
Unit -III		(15 lect.)
Relativistic Dynamics: Mechanics and Relativity, The need to redefine momentum, Relativistic momentum, Alternative views of mass in relativity, The relativistic force law and the dynamics of a single particle, The equivalence of mass and energy, The transformation properties of momentum, energy and mass. RR: 3.1 to 3.7		
Unit -IV		(15 lect.)
Relativity and Electromagnetism: Introduction, The interdependence of Electric and Magnetic fields, The Transformation for E and B, The field of a uniformly moving point charge, Force and fields near a current-carrying wire, Force between moving charges, The invariance of Maxwell's equations. The principle of equivalence and general relativity, Gravitational red shift. RR: 4.1 to 4.7. Supplementary topic C1, C2, C3, C4. **Note: (A good number of problems to be solved from Resnick).**		

References	
1.	RR: Introduction to Special Relativity: Robert Resnick (Wiley Student Edition).
2.	Special theory of Relativity: A. P. French.
3.	Very Special Relativity – An illustrated guide: by Sander Bais - Amsterdam University Press.
4.	Chapter 1: Concepts of Modern Physics by Arthur Beiser.
5.	Chapter 2: Modern Physics by Kenneth Krane.

SEMESTER VI

The T. Y. B. Sc. Syllabus integrates the regular practical work with a series of demonstration experiments and the project. There will be separate passing head for project work. During the teaching and examination of Physics laboratory work, simple modifications of experimental parameters may be attempted. Attention should be given to basic skills of experimentation which include:

i)	Understanding relevant concepts.
ii)	Planning of the experiments.
iii)	Layout and adjustments of the equipments
iv)	Understanding designing of the experiments
v)	Attempts to make the experiments open ended
vi)	Recording of observations and plotting of graphs
vii)	Calculation of results and estimation of possible errors in the observation of results.

i) Regular Physics Experiments: A minimum of **06** experiments from each of the practical course are to be performed and reported in the journal.

ii) Demonstration Experiments: The demonstration experiments are to be performed by the teacher in the laboratory and students should be encouraged to participate and take observation wherever possible.

Demonstration experiments are designed to bring about interest and excitement in Physics. Students are required to enter details of these 'demonstration' experiments in their journal.

The certified journal must contain a minimum of **12** regular experiments (**06** from each practical course), **MINIMUM 06** demonstration experiments in semester VI. A separate index and certificate in journal is must for each course in each semester.

iii) Project Details:

a)	**Project Includes:** Review articles/Simulation on PC on any concept in Physics/ Comparative & differentiative study/Improvement in the existing experiment (Design and fabrication concept) /Extension of any regular experiment/Attempt to make experiment open-ended/Thorough survey of existing active components (devices, ICs, methods, means, technologies, generations, applications etc. / any innovative projects using the concept of physics.
b)	Students/project : 02 (maximum)
c)	Evaluation of the project: The following points shall be considered. • Working model (Experimental or Concept based simulation) • Understanding of the project • Data collection • Data Analysis • Innovation/difficulty • Report

There will be **THREE** turns of **three hours each** for the examination of practical courses.

SEMESTER VI	
PRACTICAL COURSE: USPHP07	
Sr. No.	**Name of the Experiment**
1	Surface tension of mercury by Quincke's method
2	Thermal conductivity by Lee's method
3	Study of JFET characteristics
4	JFET as a common source amplifier
5	JFET as switch (series and shunt)
6	UJT characteristics and relaxation oscillator
7	Study of Pulse width modulation (BB)

8	Study of Pulse position modulation (BB)
9	Determination of h/e by photocell
10	R. P. of Prism
11	Double refraction
12	Lloyd's single mirror: determination of wavelength
PRACTICAL COURSE: USPHP08	
Sr. No.	**Name of the Experiment**
1	Determination of M/C by using BG
2	Self-inductance by Anderson's bridge
3	Hall effect
4	Solar cell characteristics and determination of V_{oc}, I_{sc} and P_{max}
5	Design and study of transistorized monostable multivibrator (BB)
6	Design and study of transistorized bistable multivibrator (BB)
7	Application of Op-Amp as a window comparator
8	Application of Op-Amp as a Log amplifier
9	Application of IC 555 as a voltage to frequency converter (BB)
10	Application of IC 555 as a voltage to time converter (BB)
11	LM-317 as variable voltage source
12	Shift register
DEMONSTRATION EXPERIMENTS	
Sr. No.	**Name of the Experiment**
1	Open CRO, Power Supply, and Signal Generator: block diagrams
2	Data sheets: Diodes, Transistor, Op-amp & Optoelectronic devices
3	Zeeman Effect
4	Michelson's interferometer
5	Constant deviation spectrometer (CDS)
6	Digital storage oscilloscope (DSO)
7	Determination of Op-Amp parameters (offset voltage, slew rate,

	input impedance, output impedance, A_{CM})
8	Transformer (theory, construction and working), types of transformers and energy losses associated with them.
9	Use of LCR meter
10	Lux meter / Flux meter

References:

1.	Advanced course in Practical Physics: D. Chattopadhya, PC. Rakshit & B. Saha (8^{th} Edition) Book & Allied (P) Ltd.
2.	BSc Practical Physics: Harnam Singh. S. Chand & Co. Ltd. – 2001.
3.	A Text book of Practical Physics: Samir Kumar Ghosh New Central Book Agency (4^{th} edition).
4.	B Sc. Practical Physics: C. L. Arora (1^{st} Edition) – 2001 S. Chand & Co.
5.	Practical Physics: C. L. Squires – (3^{rd} Edition) Cambridge Univ. Press.
6.	University Practical Physics: D C Tayal, Himalaya Publication.
7.	Advanced Practical Physics: Worsnop & Flint.

UNIVERSITY OF MUMBAI
No. UG/51 of 2018-19

CIRCULAR:-

Attention of the Principals of the affiliated Colleges and Directors of the recognized Institutions in Humanities and Sci. & Tech. Faculty is invited to this office Circular No. UG/107 of 2010, dated 29th May, 2010 and Circular No. UG/108 of 2010 dated 28th May, 2010 relating to syllabus of the B.A./B.Sc. degree course.

They are hereby informed that the recommendations made by the Board of Studies in Statistics at its meeting held on 3rd May, 2018 have been accepted by the Academic Council at its meeting held on 5th May, 2018 **vide** item No. 4.69 and that in accordance therewith, the revised syllabus as per the (CBCS) for the T.Y.B.A./B.Sc. in Statistics (Sem - V & VI), has been brought into force with effect from the academic year 2018-19, accordingly. (The same is available on the University's website www.mu.ac.in).

(Dr. Dinesh Kamble)
I/c REGISTRAR

MUMBAI – 400 032
26th June, 2018

To

The Principals of the affiliated Colleges & Directors of the recognized Institutions in Humanities and Sci. & Tech. Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.69/05/05/2018

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No. UG/ 51 -A of 2018 MUMBAI-400 032 26th June, 2018

Copy forwarded with Compliments for information to:-

1) The I/c Dean, Faculty of Humanities and Science & Technology,
2) The Chairman, Board of Studies in Statistics,
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Co-Ordinator, University Computerization Centre,

(Dr. Dinesh Kamble)
I/c REGISTRAR

UNIVERSITY OF MUMBAI

Syllabus for the T.Y.B.Sc.
Programme: B.Sc.

Sem. V & Sem. VI

Course: STATISTICS

(As per Credit Based Choice System
with effect from the academic year 2018–2019)

T. Y. B. Sc. STATISTICS SYLLABUS

CREDIT BASED AND CHOICE SYSTEM

TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2018-19

SEMESTER V

Theory

Course	UNIT	TOPICS	Credits	L ectures
USST501	I	PROBABILITY	2.5	15
	II	INEQUALITIES AND LAW OF LARGE NUMBERS		15
	III	JOINT MOMENT GENERATING FUNCTION, TRINOMIAL AND MULTINOMIAL DISTRIBUTION		15
	IV	ORDER STATISTICS		15
Course	**UNIT**	**TOPICS**	**Credits**	**L ectures**
USST502	I	POINT ESTIMATION AND PROPERTIES OF ESTIMATORS	2.5	15
	II	METHODS OF POINT ESTIMATION		15
	III	BAYESIAN ESTIMATION METHOD & INTERVAL ESTIMATION		15
	IV	INTRODUCTION TO LINEAR MODELS		15
Course	**UNIT**	**TOPICS**	**Credits**	**L ectures**
USST501	I	EPIDEMIC MODELS	2.5	15
	II	BIOASSAYS		15
	III	CLINICAL TRIALS		15
	IV	CLINICAL TRIALS and BIOEQUIVALENCE		15

Course	UNIT	TOPICS	Credits	L ectures
USST504A (Elective)	I	FUNDAMENTALS OF R	2.5	15
	II	SIMPLE LINEAR REGRESSION MODEL		15
	III	MULTIPLE LINEAR REGRESSION MODEL		15
	IV	VALIDITY OF ASSUMPTIONS		15
Course	**UNIT**	**TOPICS**	**Credits**	**L ectures**
USST504B (Elective)	I	INTRODUCTION	2.5	15
	II	NUMPY, PANDAS AND DATA EXPLORATION		15
	III	DESCRIPTIVE STATISTICS AND STATISTICAL METHODS		15
	IV	INFERENTIAL STATISTICS		15

Course	Practicals	Credits	Lectures per week
USSTP05	Practicals of course USST501+USST502	3	8
USSTP06	Practicals of course USST503+USST504	3	8

Course Code	Title	Credits
USST501	**PROBABILITY AND DISTRIBUTION THEORY**	**2.5 Credits (60 Lectures)**
Unit I : PROBABILITY (i) Basic definitions: Random Experiment, Outcome, Event, Sample Space, Complementary, Mutually Exclusive, Exhaustive and Equally Likely Events. (ii) Mathematical, Statistical, Axiomatic and Subjective probability. (iii) Addition Theorem for (a) two (b) three events (iv) Conditional Probability: Multiplication Theorem for two, three events. (v) Bayes' theorem. (vi) Theorems on Probability of realization of : (a) At least one (b) Exactly m (c) At least m of N events A_1, A_2, $A_3 \ldots A_N$. Classical occupancy problems, Matching and Guessing problems. Problems based on them.		**15 Lectures**
Unit II : INEQUALITIES AND LAW OF LARGE NUMBERS (i) Markov Inequality (ii) Tchebyshev's Inequality (iii) Boole's Inequality (iv) Cauchy Schwartz's Inequality (v) Weak law of large numbers. (Ref.9,10)		**15 Lectures**

Unit III: JOINT MOMENT GENERATING FUNCTION, TRINOMAIL DISTRIBUTION AND MULTINOMIAL DISTRIBUTION (i) Definition and properties of Moment Generating Function (MGF) of two random variables of discrete and continuous type. Necessary and Sufficient condition for independence of two random variables. Concept and definition of Bivariate MGF. **(ii) Trinomial distribution** Definition of joint probability distribution of (X, Y). Joint moment generating function, moments μ_{rs} where r=0, 1, 2 and s=0, 1, 2. Marginal & Conditional distributions. Their Means & Variances. Correlation coefficient between (X, Y). Distribution of the Sum X+Y Extension to Multinomial distribution with parameters (n, p1, p2,…pk-1) where p1+ p2,+…pk-1+ pk = 1. Expression for joint MGF. Derivation of: joint probability distribution of (Xi, Xj). Conditional probability distribution of Xi	**15 Lectures**
Unit IV: ORDER STATISTICS (i) Definition of Order Statistics based on a random sample. (ii) Derivation of: (a) Cumulative distribution function of r^{th} order statistic. (b) Probability density functions of the r^{th} order statistic. (c) Joint Probability density function of the r^{th} and the s^{th} order statistic (r<s) (d) Joint Probability density functions of all n ordered statistics. (e) Distribution of Maximum observation (n^{th} order statistic) and Minimum observation (first order statistic) in case of uniform and Exponential distribution . (f) Probability density function of the difference between r^{th} and s^{th} order statistic (r<s) in case of uniform and Exponential distribution (Ref.2,3,4)	**15 Lectures**

REFERENCES

1. Feller W: An introduction to probability theory and it's applications, Volume: 1, Third edition, Wiley Eastern Limited.
2. Hogg R V. & Craig Allen T.: Introduction to Mathematical Statistics, Fifth edition, Pearson Education (Singapore) Pvt. Ltd.
3. Mood A. M., Graybill F. A., Boes D. C.: Introduction to the theory of statistics, Third edition, Mcgraw- Hill Series.

4. Hogg R. V. and Tanis E.A. : Probability and Statistical Inference, Fourth edition, McMillan Publishing Company.
5. Gupta S C & Kapoor V K: Fundamentals of Mathematical statistics, Eleventh edition, Sultan Chand & Sons.
6. Biswas S.: Topics in Statistical Methodology, First edition, Wiley Eastern Ltd.
7. Kapur J. N. & Saxena H. C.: Mathematical Statistics, Fifteenth edition, S. Chand and Company.
8. Chandra T.K. & Chatterjee D.: A First Course in Probability, Second Edition, Narosa Publishing House.
9. S.C. Gupta and V.K.Kapoor : Fundamental of Mathematical Statistics,Sultan Chand and Sons
10. V K Rohatgi: An Introduction to probability and Mathematical Statistics,

Course Code	Title	Credits
USST502	**THEORY OF ESTIMATION**	**2.5 Credits (60 Lectures)**

Unit I : POINT ESTIMATION AND PROPERTIES OF ESTIMATORS — **15 Lectures**

- **Notion of a Parameter and Parameter Space.**
- **Problem of Point estimation.**
- **Definitions : Statistic, Estimator and Estimate.**
- **Properties of a good estimator** :

1. Unbiasedness **:**Definition of an unbiased estimator, Illustrations and examples.
   Proofs of the following results:

(i) Two distinct unbiased estimators of $U(\theta)$ give rise to infinitely many unbiased estimators.

(ii) If T is an unbiased estimator of θ then U(T) is an unbiased estimator of $U(\theta)$ provided $U(\cdot)$ is a linear function.

2. Consistency**:**Definition of Consistency.
Sufficient condition for consistency , proof & Illustrations

3. Sufficiency **:**Concept and Definition of sufficient statistic. Neyman's Factorization theorem (without proof).Exponential family of probability distributions and sufficient statistics.

4. Relative efficiencyof an estimator & illustrative examples.

• **Minimum variance unbiased estimator(MVUE) and Cramer Rao Inequality:** 1.Definition of MVUE 2. Uniqueness property of MVUE (proof). 3. Fisher's information function 4.Regularity conditions. 5. Statement and proof of Cramer-Rao inequality. 6. Cramer-Rao lower bound (CRLB), Efficiency of an estimator using CRLB. 7. Condition when equality is attained in Cramer Rao Inequality and its use in finding MVUE. Ref. 1,3,8	
UNIT II : METHODS OF POINT ESTIMATION • **Method of Maximum Likelihood Estimation (M.L.E.) :** **1.** Definition of likelihood as a function of unknown parameter for a random sample from: Discrete distribution & Continuous distribution. **2.** Derivation of Maximum likelihood estimator (M.L.E.) for parameters of Standard distributions (case of one and two unknown parameters). **3**. Properties of MLE (without proof). • **Method of Moments :** 1. Derivation of Moment estimators for standard distributions (case of one and two unknown parameters) • Illustrations of situations where MLE and Moment Estimators are distinct and their comparison using Mean Square error. • **Method of Minimum Chi-square and Modified Minimum Chi-Square** Ref: 1,2,3	**15 Lectures**

UNIT III: BAYESIAN ESTIMATION METHOD & INTERVAL ESTIMATION • **Bayes Estimation:** 1. Prior distribution, Posterior distribution 2. Loss function, Risk function 3. Types of Loss function: Squared error Loss function (SELF), Absolute error Loss function (AELF) 4. Bayes' risk. 5.Bayes' method of finding Point estimator (assuming SELF) **Examples** : (i) Binomial- Beta (ii) Poisson- Gamma (iii) Gamma-Gamma (iv) Normal-Normal • **Interval Estimation:** 1. Concept of confidence interval & confidence limits. 2. Definition of Pivotal quantity and its use in obtaining confidence limits. 3. Derivation of 100(1-α) % equal tailed confidence interval for : (a)The population mean : $\mu, \mu_1 - \mu_2$ (population variance known/ unknown) (b) the population variance: $\sigma^2, \frac{\sigma_1^2}{\sigma_2^2}$(Normal distribution). Confidence interval for the parameters of Binomial, Poisson and Exponential distributions. Ref. 1,2,3	**15 Lectures**
UNIT IV:INTRODUCTION TO LINEAR MODELS • **Explanation of General Linear Model of full rank with assumptions.** **Model:** $\mathbf{Y} = \mathbf{X}\beta + \underline{\mathbf{e}}$ **where** $\underline{\mathbf{e}} \sim \mathbf{N}(\mathbf{0}, \sigma^2\mathbf{I})$ • **Derivation of** : 1) Least squares estimator of $\underline{\beta}$ 2) $E(\hat{\beta})$ 3) $V(\hat{\beta})$	**15 Lectures**

• **GuassMarkoff theorem for full rank Model: $Y = X\beta + e$.** • **Derivation of :** 1) $E(l'\tilde{\beta})$ 2) $V(l'\tilde{\beta})$. • **Confidence interval for $l'\beta$ when σ^2 is known.** • **Confidence interval of $\hat{\beta}$ when σ^2 is known.** Ref. 9,10.	

Reference books:

1. HoggR.V., CraigA.T.: Introduction to Mathematical Statistics, Fourth Edition; Collier McMillan Publishers.
2. HoggR.V., TannisE. A.: Probability and Statistical Inference, Third Edition; Collier McMillan Publishers.
3. Rohatgi, V. K, EhsanesSaleh A.K. Md.: An introduction to Probability Theory and Mathematical Statistics, Second Edition, Wiley series in Probability and Statistics.
4. John E. Freund's Mathematical Statistics: I. Miller, M. Miller; Sixth Edition; Pearson Education Inc.
5. HoelP.G.: Introduction to Mathematical Statistics; Fourth Edition; John Wiley & Sons Inc.
6. GuptaS.C., KapoorV.K.: Fundamentals of Mathematical Statistics; Eighth Edition; Sultan Chand & Sons.
7. KapurJ.N., SaxenaH.C.: Mathematical Statistics; Fifteenth Edition; S. Chand & Company Ltd.
8. AroraSanjay and BansiLal : New Mathematical Statistics, SatyaPrakashan, New Market, New Delhi,5(1989)

9. A.M.Kshirsagar; Linear Models

10. F.A. Graybill; An Introduction to Linear Models

2Course Code	Title	Credits
USST503	**BIOSTATISTICS**	**2.5 Credits (60 lectures)**
Unit I : EPIDEMIC MODELS (i) The features of Epidemic spread. Definitions of various terms involved. Simple mathematical models for epidemics: Deterministic model without removals (for 'a' introductions), Carrier model. (ii) Chain binomial models. Reed-Frost and Greenwood models. Distribution of individual chains and total number of cases. Maximum likelihood estimator of `p' and its asymptotic variance for households of sizes up to 4. (Ref. 1)		**15 Lectures**
Unit II : BIOASSAYS (i) Meaning and scope of bioassays. Relative potency. Direct assays. Fieller's theorem. (ii) Indirect assays. Dose-response relationship. Conditions of similarity and Monotony. Linearizing transformations. Parallel line assays. Symmetrical (2, 2) and (3, 3) parallel line assays. Validity tests using orthogonal contrasts. Point Estimate and Interval Estimate of Relative potency. (iii)Quantal Response assays. Tolerance distribution. Median effective dose ED50 and LD50. Probit and Logit analysis. (Ref.2, 3)		**15 Lectures**
Unit III : CLINICAL TRIALS : Introduction to clinical trials : The need and ethics of clinical trials. Common terminology used in clinical trials. Over view of phases (I-IV). Introduction to ICH E9 guidelines, Study Protocol, Case record/Report form, Blinding (Single/Double) Randomized controlled (Placebo/Active controlled), Study Designs (Parallel, Cross Over). Types of Trials : Inferiority, Superiority and Equivalence, Multicentric		**15 Lectures**

Trial. Inclusion/Exclusion Criteria. Sample size estimation. (Ref. 4, 5, 6, 7, 8)	
Unit IV : CLINICAL TRIALS and BIOEQUIVALENCE : Statistical tools : Analysis of parallel Design using Analysis of Variance. Concept of odds ratio. Concept of Repeated Measures ANOVA. Survival analysis for estimating Median survival time, Kaplan-Meire approach for survival analysis. BIOEQUIVALENCE : Definitions of Generic Drug product. Bioavailability, Bioequivalence, Pharmacokinetic (PK) parameters C_{max}, AUC_t , $AUC_{0-\infty}$, T_{max}, K_{el}, T_{half}. Estimation of PK parameters using `time vs. concentration' profiles. Designs in Bioequivalence: Parallel, Cross over (Concept only). Advantages of Crossover design over Parallel design. Analysis of Parallel design using logarithmic transformation (Summary statistics, ANOVA and 90% confidence interval). Confidence Interval approach to establish bioequivalence (80/125 rule). (Ref. 4, 5, 6, 7, 8, 9)	**15 Lectures**

REFERENCES :

1. Bailey N.TJ. : The Mathematical theory of infectious diseases, Second edition, Charles Griffin and Co. London.
2. Das M.N. and Giri N.C. : Design and Analysis of Experiments, Second edition, Wiley Eastern.
3. Finney D.J. : Statistical Methods in Biological Assays, First edition, Charles Griffin and Co. London.
4. Sanford Boltan and Charles Bon : Pharmaceutical Statistics, Fourth edition, Marcel Dekker Inc.
5. Zar Jerrold H. :Biostatistical Analysis, Fourth edition, Pearson's education.
6. Daniel Wayne W. : Biostatistics . A Foundation for Analysis in the Health Sciences, 7th Edition, Wiley Series in Probability and Statistics.
7. Friedman L. M., Furburg C., Demets D. L. : Fundamentals of Clinical Trials, First edition, Springer Verlag.
8. Fleiss J. L. The Design and Analysis of Clinical Experiments, Second edition, Wiley and Sons.
9. Shein-Chung-Chow ; Design and Analysis of Bioavailability & Bioequivalence studies, Third Edition, Chapman & Hall/CRC Biostatistics series.

	Title	Credits
USST504A	**Regression Analysis using R software**	**2.5 Credits (60 lectures)**

Unit I : Fundamentals of R — **15 Lectures**

Introduction to R features of R, installation of R, Starting and ending R session, getting help in R , Value assigning to variables

Basic Operations : +, -, *, ÷, ^, sqrt

Numerical functions : log 10, log , sort, max, unique, range, length, var, prod, sum, summary, dim, sort, five num etc

Data Types : Vector, list, matrices, array and data frame

Variable Type and factor : logical, numeric, integer, complex, character

Data Manipulation : Selecting random N rows, removing duplicate row(s), dropping a variable(s), Renaming variable(s), sub setting data, creating a new variable(s), selecting of random fraction of row(s), appending of row(s) and column(s), simulation of variables.

Data Processing : Data import and export, setting working directory, checking structure of Data :Str(), Class(), Changing type of variable (for eg as.factor, as.numeric)

Data Visualisation using ggplot: Simple bar diagram, subdivided bar diagram, multiple bar diagram pie diagram, Box plot for one and more variables, histogram, frequency polygon, scatter plot

eg plot() (Ref.6, 7, 8, 9,10)	
Unit II : Simple linear regression model Assumptions of the model, Derivation of ordinary least square (OLS) estimators of regression coefficients for simple, Properties of least square estimators (without proof), Coefficient of determination R^2 and adjusted R^2 , Procedure of testing a) Overall significance of the models b) Significance of individual coefficients c) Confidence intervals for the regression coefficients Data Pre-processing: Detection and treatment of missing value(s)and outliers, Variable selection and Model building, Interpretation of output produced by lm command in R. Weighted Least Square Method, Polynomial Regression Models. (Ref. 1,2,3,4,5)	**15 Lectures**
Unit III : Multiple linear regression model Derivation of ordinary least square (OLS) estimators of regression coefficients for multiple regression models, Coefficient of determination R^2 and adjusted R^2 , Procedure of testing a) Overall significance of the models b) Significance of individual coefficients c) Confidence intervals for the regression coefficients Data Pre-processing: Detection and treatment of missing value(s) and outliers, Variable selection and Model building, Interpretation of output produced by lm command in R. (Ref. 1,2,3,4,5)	**15 Lectures**
Unit IV : Validity of Assumptions Residual Diagnostics: Standardized residuals, Studentized residuals, residual plots, Interpretation of four plots of ,Interpretation output produced by plot command in R and corrective measures such as transformation of response variable, testing normality of data . Autocorrelation: Concept and detection using Durbin Watson Test, Interpretation of output produced by DW-test function in R, Heteroscedasticity: Concept and detection using Breusch –Pagan-Godfrey Test, Interpretation of output produced by bptest function in R, Multicollinearity: Concept and detection using R^2 and t-ratios ii) pairwise correlation between repressors iii) Variance Inflation Factor(VIF), Interpretation of output produced by mctest function in R, Consequences of using OLS estimators in presence of Autocorrelation, Heteroscedasticity and Multicollinearity, Remedial measures, Ridge Regression : Concept and case study using R, (Ref. 1,2,3,4,5)	**15 Lectures**

References:

1) Draper, N. R. and Smith, H. (1998), Applied Regression Analysis (John Wiley), Third Edition.
2) Montgomery, D. C., Peck, E. A. and Vining, G. G. (2003), Introduction to Linear Regression Analysis (Wiley).
3) Neter, J., W., Kutner, M. H. ;Nachtsheim, C.J. and Wasserman, W.(1996), Applied Linear Statistical Models, fourth edition, Irwin USA.
4) DamodarGujrati, Sangetha,Basic Econometrics, fourth edition, McGraw Hill Companies.
5) William Geene (1991), Econometrics Analysis, first edition, Mc Millan Publishing Company.
6) Crawley, M. J. (2006). Statistics - An introduction using R. John Wiley, London
7) Purohit, S.G.; Gore, S.D. and Deshmukh, S.R. (2015). Statistics using R, second edition. Narosa Publishing House, New Delhi.
8) Shahababa , B. (2011). Biostatistics with R, Springer, New York
9) Verzani, J. (2005). Using R for Introductory Statistics, Chapman and Hall /CRC Press, New York
10) Asha Jindal (Ed.)(2018), Analysing and Visualising Data with R software- A Practical Manual, Shailja Prakashan, K.C.College.

	Title	Credits
USST504B	**Statistical Data Analysis using PYTHON**	**2.5 Credits (60 lectures)**
Unit I : Introduction To PYTHON Software Python Setup Python Arithmetic Basic Data Types Variables Lists Tuples and Strings Dictionaries and sets Ref: 1,2,3		**15 Lectures**
Unit II : Numpy, Pandas and Data Exploration numpy arrays: Creating arrays crating n-dimensional arrays using np.array and array operations(indexing and slicing, transpose, mathematical operations) pandas dataframes: Creating series and dataframes and Operations on series and dataframes Reading and writing data: From and to Excel and CSV files		**15 Lectures**

Control statements: if, if-else, if-elif, while loop, for loop Defining functions: def statement Text data operations: len, upper, lower, slice, replace, contains Frequency Tables Ref: 1,2,3	
Unit III : Descriptive statistics and Statistical Methods Plotting: using "matplotlib"(Histograms, Box plots, Scatter plot, Bar plot, Line plot) Descriptive Statistics: mean, median, mode, min, max, quantile, std, var, skew, kurt, correlation Probability distributions: (using scipy.stats) Simulation from distributions, computations of probabilities, Cumulative probabilities, quantiles and drawing random sample using functions for following distributions: Binomial, Poisson, Hypergeometric, normal, exponential, gamma, Cauchy, Lognormal,Weibull, uniform, laplace ,Graphs of pmf/pdf by varying parameters for above distributions and Fitting of distributions.. Ref: 1,2,3	**15 Lectures**
Unit IV : *Inferential Statistics* Hypothesis testing and T-Tests: (using scipy.stats, math)ttest_1samp, ttest_ind(2 sample test), ttest_rel(paired), Type I and Type II error Chi-square tests: (using scipy.stats) chisquare, chi2 ANOVA: (using scipy.stats) f_oneway Linear regression: from sklearn import linear model and use linearmodel.linearregression function. Ref: 1,2,3	**15 Lectures**

REFERENCES :

1. Python for Data Analysis by O'Reilly Media (Second Edition)

2. How to think like a computer scientist learning with Python by Allen Downey.

3. Python for Data Analysis by Armando Fernandgo

DISRIBUTION OF TOPICS FOR PRACTICALS

SEMESTER V

COURSE CODE USSTPO5 :

Sr. No.	Practical topics from USST501		Sr. No.	Practical topics from USST502
5.1.1	Probability-I		5.2.1	MVUE and MVBUE
5.1.2	Probability-II		5.2.2	Methods of Estimation
5.1.3	Inequalities and WLLN		5.2.3	Baye's Estimaion
5.1.4	Trinomial and Multinomial Distribution		5.2.4	Confidence Interval
5.1.5	Order statistics-I		5.2.5	Linear model
5.1.6	Order statistics-II		5.2.6	Use of R software

COURSE CODE USSTPO6 :

Sr. No.	Practical topics from USST503		Sr. No.	Practical topics from USST504A	Sr. No.	Practical topics from USST504B
5.3.1	Epidemic Models		5.4A.1	Fundamentals of R	5.4B.1	Descriptive statistics
5.3.2	Direct Assays		5.4A.2	Graphs using R	5.4B.2	Correlations and Simple Regression
5.3.3	Parallel Line Assays		5.4A.3	Diagrams using R	5.4B.3	Probability Distributions :Discrete
5.3.4	Quantal Response Assays		5.4A.4	Simple Linear Regression using R	5.4B.4	Probability Distributions :Continuous
5.3.5	Clinical Trials		5.4A.5	Weighted Least Square using R	5.4B.5	Statistical Test: t test Chisquare and F test
5.3.6	Bioequivalance		5.4A.6	Multiple Linear Regression and Ridge Regression using R	5.4B.6	ANOVA

T. Y. B. Sc. STATISTICS SYLLABUS

CREDIT BASED AND CHOICE SYSTEM

TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2018-19

SEMESTER VI

Theory

COURSE	UNIT	TOPICS	CREDITS	LECTURES
USST601	I	BIVARIATE NORMAL DISTRIBUTION	2.5	15
	II	GENERATING FUNCTIONS		15
	III	STOCHASTIC PROCESSES		15
	IV	QUEUING THEORY		15
USST602	I	MOST POWERFUL TESTS	2.5	15
	II	UNIFORMLY MOST POWERFUL & LIKELIHOOD RATIO TESTS		15
	III	SEQUENTIAL PROBABILITY RATIO TESTS		15
	IV	NON-PARAMETRIC TESTS		15
USST603	I	LINEAR PROGRAMMING PROBLEM	2.5	15
	II	INVENTORY CONTROL		15
	III	REPLACEMENT		15
	IV	SIMULATION AND RELIABILITY		15
USST604A (Elective)	I	MORTALITY TABLES	2.5	15
	II	COMPOUND INTEREST AND ANNUITIES CERTAIN		15
	III	LIFE ANNUITIES		15
	IV	ASSURANCE BENEFITS		15
USST604B (Elective)	I	INTRODUCTION TO BASIC STATISTICS	2.5	15
	II	SIX SIGMA		15
	III	CONTROL CHARTS I		15
	IV	CONTROL CHARTS II		15

Course	Practicals	Credits	Lectures per week
USSTP07	**Practicals of course USST601+USST602**	**3**	**8**
USSTP08	**Practicals of course USST603+USST604**	**3**	**8**

Course Code	Title	Credits
USST601	**DISTRIBUTION THEORY AND STOCHASTIC PROCESSES**	**2.5 Credits (60 lectures)**
Unit I : BIVARIATE NORMAL DISTRIBUTION (i) Definition of joint probability distribution (X, Y). Joint Moment Generating function, moments μ_{rs} where r=0, 1, 2 and s=0, 1, 2. Marginal & Conditional distributions. Their Means & Variances. Correlation coefficient between the random variables. Necessary and sufficient condition for the independence of X and Y. Distribution of aX + bY, where 'a' and 'b' are constants. (ii) Distribution of sample correlation coefficient when $\rho = 0$.Testing the significance of a correlation coefficient. Fisher's z – transformation. Tests for i) H_0: $\rho = \rho_0$ ii) H_0: $\rho_1 = \rho_2$, Confidence interval for ρ. (Ref. 2,3,5,9)		**15 Lectures**
Unit II : GENERATING FUNCTIONS Definitions of generating function and probability generating function. Expression for mean and variance in terms of generating functions. Definition of a convolution of two or more sequences. Generating function of a convolution. Generating functions of the standard discrete distributions. Relation between: i) Bernoulli and Binomial distributions ii) Geometric and Negative Binomial distributions in terms of convolutions. (Ref.1,5)		**15 Lectures**
Unit III : STOCHASTIC PROCESSES Definition of stochastic process. Postulates and difference differential equations for : (i)Pure birth process, (ii)Poisson process with initially 'a' members, for a =0 and a >0, (iii)Yule Furry process, (iv)Pure death process, (v)Death process with $\mu_n=\mu$, (vi) Death process with $\mu_n= n\mu$, (vii)Birth and death process, (viii)Linear growth model. Derivation of P_n (t), mean and variance where ever applicable. (Ref.1,7,9)		**15 Lectures**
Unit IV : QUEUING THEORY Basic elements of the Queuing model. Roles of the Poisson and Exponential distributions. Derivation of Steady state probabilities for birth and death process. Steady state probabilities and various average characteristics for the following models: (i) (M/M/1) : (GD/ ∞ /∞) (ii) (M/M/1) : (GD/ N /∞) (iii) (M/M/c) : (GD/∞/∞) (iv) (M/M/c) : (GD/ N /∞) (v) (M/M/∞) : (GD/ ∞ /∞) (Ref.6)		**15 Lectures**

REFERENCES:

1. Feller W: An introduction to probability theory and it's applications, Volume: 1, Third edition, Wiley Eastern Limited.
2. Hogg R. V. & Craig A.T.: Introduction to Mathematical Statistics, Fifth edition, Pearson Education (Singapore) Pvt Ltd.
3. Mood A M, Graybill F A, Bose D C: Introduction to the theory of statistics, Third edition, Mcgraw- Hill Series.
4. Hogg R. V. and Tanis E.A.: Probability and Statistical Inference, Fourth edition, McMillan Publishing Company
5. Gupta S C & Kapoor V K: Fundamentals of Mathematical statistics, Eleventh edition, Sultan Chand & Sons.
6. Taha H.A.: Operations Research: An introduction, Eighth edition, Prentice Hall of India Pvt. Ltd.
7. Medhi J: Stochastic Processes, Second edition, Wiley Eastern Ltd.
8. Biswas S.: Topics in Statistical Methodology (1992), First edition, Wiley Eastern Ltd.
9. Kapur J. N., Saxena H. C.: Mathematical Statistics, Fifteenth edition, S. Chand and Company

Course Code	Title	Credits
USST602	**TESTING OF HYPOTHESIS**	**2.5 Credits (60 lectures)**

Unit I : MOST POWERFUL TESTS — **15 Lectures**

- Problem of testing of hypothesis.
- Definitions and illustrations of i) Simple hypothesis ii) Composite hypothesis iii)Null Hypothesis iv) Alternative Hypothesis v)Test of hypothesis vi) Critical region vii) Type I and Type II errors viii) Level of significance ix) p-value x) Size of the test xi) Power of the test xii) Power function of a test xiii) Power curve.
- Definition of most powerful test of size α for a simple hypothesis against a simple alternative hypothesis. Neyman-Pearson fundamental lemma. Randomised test (Ref. 1,2,10)

Unit II :UNIFORMLY MOST POWERFUL& LIKELIHOOD RATIO TESTS — **15 Lectures**

- Definition, Existence and Construction of Uniformly most powerful (UMP) test (Ref. 1,2,10)
- Likelihood ratio principle: Definition of test statistic and its asymptotic distribution (statement only). Construction of LRT for the mean of Normal distribution for (i) Known σ^2 (ii) Unknown σ^2(two sided alternatives).LRT for variance of normal distribution for (i) known μ (ii) unknown μ (two sided alternatives hypothesis) (Ref. 1,2,3,4)

Unit III: SEQUENTIAL PROBABILITY RATIO TESTS — **15 Lectures**

- Sequential test procedure for testing a simple null hypothesis against a simple alternative hypothesis. Its comparison with fixed sample size (Neyman-Pearson) test procedure.
- Definition of Wald's SPRT of strength (α, β). Graphical/Tabular procedure for carrying out SPRT. Problems based on Bernoulli, Binomial. Poisson, Normal & Exponential distributions. (Ref. 1,6,7,8)

Unit IV: NON-PARAMETRIC TESTS — **15 Lectures**

- Need for non parametric tests.
- Distinction between a parametric and a non parametric test.
- Concept of a distribution free statistic. Single sample and two sample Nonparametric tests. (i) Sign test (ii) Wilcoxon's signed rank test (iii) Median test (iv) Mann–Whitney test (v) Run test (vi) Fisher exact test (vii) Kruskal -Wallis test (viii) Friedman test

• Assumptions, justification of the test procedure for small & large samples . (Ref.5,9)	

REFERENCES:

1. Hogg R.V. and Craig A.T: Introduction to Mathematical Statistics, Fourth edition London Macmillan Co. Ltd.
2. Hogg R.V. and Tanis E.A.: Probability and Statistical Inference, Third edition Delhi Pearson Education.
3. Lehmann, E. L: Testing of Statistical Hypothesis, Wiley &Sons
4. Rao, C. R.: Linear Statistical Inference and its applications, Second Edition Wiley Series in Probability and Statistics.
5. Daniel W.W.:Applied Non Parametric Statistics, First edition Boston-Houghton Mifflin Company.
6. Wald A.: Sequential Analysis, First edition New York John Wiley & Sons
7. Gupta S.C. and Kapoor V.K.: Fundamentals of Mathematical Statistics, Tenth edition New Delhi S. Chand & Company Ltd.
8. Sanjay Aroraand BansiLal: New Mathematical Statistics, SatyaPrakashan, New Market, New Delhi, 5(1989).
9. Sidney Siegal& N John Castellan Jr.:Non parametric test for behavioral sciences, McGraw Hill c-1988
10. A. Mood , F. Graybill& D. Boes:Introduction to the theory of Statistics- McGraw Hill

Course Code	Title	Credits
USST603	**OPERATIONS RESEARCH TECHNIQUES**	**2.5 Credits (60 lectures)**
Unit I : LINEAR PROGRAMMING PROBLEM Two-Phase Simplex Method, Algorithm. Dual Simplex Method, Algorithm. Post Optimality Sensitivity Analysis. Effect on optimal solution to the LPP and improvement in the solution due to (i) Change in cost coefficient, (ii)Change in the element of requirement vector, (iii) Addition/deletion of a variable,(iv) Addition/deletion of a constraint. (All expressions without proof) (Ref. 2, 3)		**15 Lectures**
Unit II : INVENTORY CONTROL Introduction to Inventory Problem **Deterministic Models :** Single item static EOQ models for (i) Constant rate of demand with instantaneous replenishment, with and without shortages. (ii) Constant rate of demand with uniform rate of replenishment, with and without shortages. (iii)Constant rate of demand with instantaneous replenishment without shortages, with at most two price breaks. **Probabilistic models :** Single period with (i) Instantaneous demand (discrete and continuous) without setup cost. (ii) Uniform demand (discrete and continuous) without set up cost. (Ref. 1, 2, 3)		**15 Lectures**
Unit III : REPLACEMENT Replacement of items that deteriorate with time and value of money (i) remains constant, (ii) changes with time. Replacement of items that fail completely : Individual replacement and Group replacement policies. (Ref. 3)		**15 Lectures**
Unit IV : SIMULATION AND RELIABILITY Concept and Scope of simulation. Monte Carlo Technique of Simulation.Generation of random numbers using (i) Mid. Square Method and (ii) Multiplicative Congruential Method. Inverse method of generation of random observations from (i) Uniform distribution, (ii) Exponential distribution, (iii) Gamma distribution, (iv) Normal distribution. Simulation techniques applied to inventory and queueing model. (Ref. 1, 4) RELIABILITY: Concept of reliability, Hazard-rate. Bath tub curve. Failure time distributions : (i) Exponential, (ii) Gamma, (iii) Weibull, (iv)		**15 Lectures**

Gumbel, Definitions of increasing (decreasing) failure rate.System Reliability. Reliability of (i) series ; (ii) parallel system of independent components having exponential life distributions. Mean Time to Failure of a system (MTTF).	(Ref. 5,6)

REFERENCES :

1. Vora N. D. : Quantitative Techniques in Management, Third edition, McGraw Hill Companies.
2. Kantiswarup, P.K. Gupta, Manmohan: Operations Research, Twelfth edition, Sultan Chand & sons.
3. Sharma S. D. : Operations Research, Eighth edition, Kedarnath Ramnath & Co.
4. Taha Hamdy A. : Operations Research : Eighth edition, Prentice Hall of India Pvt. Ltd.
5. Barlow R. E. and Prochan Frank : Statistical Theory of Reliability and Life Testing Reprint, First edition, Holt, Reinhart and Winston.
6. Mann N. R., Schafer R.E., Singapurwalla N. D.: Methods for Statistical Analysis of Reliability and Life Data. First edition, John Wiley & Sons.

Course Code	Title	Credits
USST604A	**ACTURIAL SCIENCE**	**2.5 Credits (60 lectures)**
Unit I: MORTALITY TABLES Various mortality functions. Probabilities of living and dying. The force of mortality. Estimation of μx from the mortality table. Central Mortality Rate. Laws of mortality: Gompertz's and Makeham's first law. Select, Ultimate and Aggregate mortality tables. Stationary population. Expectation of life and Average life at death. (Ref.2,3)		15 Lectures
Unit II: COMPOUND INTEREST AND ANNUITIES CERTAIN Accumulated value and present value, nominal and effective rates of interest. Varying rates of interest. Equation of value. Equated time of payment. Present and accumulated values of annuity certain (immediate and due) with and without deferment period. Present value for perpetuity (immediate and due) with and without deferment Period. Present and accumulated values of (i) increasing annuity (ii) increasing annuity when successive instalments form arithmetic progression (iii) annuity with frequency different from that with which interest is convertible. Redemption of loan. (Ref.2)		15 Lectures
Unit III: LIFE ANNUITIES Present value in terms of commutation functions of Life annuities and Temporary life annuities (immediate and due) with and without deferment period. Present values of Variable, increasing life annuities and increasing Temporary life annuities (immediate and due). (Ref.1,2)		15 Lectures
Unit IV: ASSURANCE BENEFITS Present value of Assurance benefits in terms of commutation functions of : (i) pure endowment assurance (ii) temporary assurance (iii) endowment assurance (iv) whole life assurance (v) double endowment assurance (vi) special endowment assurance (vii) deferred temporary assurance. Net premiums: Net level annual premiums (including limited period of payment) for various assurance plans .Natural and Office premiums. (Ref.1,2)		15 Lectures

***REFERENCES*:**

1. Neill A. : Life Contingencies, First edition, Heineman educational books London
2. Dixit S.P., Modi C.S., Joshi R.V.: Mathematical Basis of Life Assurance, First edition Insurance Institute of India.
3. Gupta S. C. &. Kapoor V. K.: Fundamentals of Applied Statistics, Fourth edition, Sultan Chand & Sons.

Course Code	Title	Credits
USST604B	**INTRODUCTION TO SIX SIGMA**	**2.5 Credits (60 lectures)**
Unit I : INTRODUCTION TO BASIC STATISTICS Descriptive Statistics, Data Distribution, Skewness, Kurtosis, Box and Whisker plots, Inferential Statistics (Sample, Population, Normal Distribution, CLT theorem, Sampling distribution of mean), Hypothesis testing with Normal and Non-Normal data : [*1 and 2 sample tests, 1 sample variance, One way ANOVA, Mann-Whitney U test, Kruskal-Wallis test, Moods median test, Chi-square test*], Regression analysis, Designed experiments. (Ref. 1,2)		**15 Lectures**
Unit II : SIX SIGMA History and concept, Basic Principles, Goals, six sigma v/s TQM, ISO 9000, Traditional Management, Quality defined, VOC and CTQ, Quality measurement to six sigma, Seven tools of quality and its application: 1) Histogram or Stem and Leaf display. 2) Check sheet. 3) Pareto Chart. 4) Cause and Effect diagram (Fish bone Diagram) 5) Defect concentration diagram. 6) Scatter diagram. 7) Control charts (**Only concept of control chart**), DMAIC with case study, introduction to Lean Six Sigma. (Ref. 3,4,5,6,7,8,9,10)		**15 Lectures**
Unit III : CONTROL CHARTS I Introduction, Chance and assignable causes, Statistical basis of the control chart: Basic principles of control chart (Shewhart control charts), Choice of control limits, Sample size and sampling frequency, Rational subgroups, Analysis of patterns on control charts, Discussion of sensitizing rules for control chart. Introduction to the concept of attribute, Defect. P, np, c and u charts, their uses. p-chart with variable sample size. Operating-Characteristic function, Average run length. Applications of variable control charts.*(In addition problems involving setting up standards for future use is also expected),* Guidelines to implement control charts. *(In addition problems involving setting up standards for future use is also expected)*. Ref. 11,12,13,14,15,16)		**15 Lectures**
Unit IV : CONTROL CHARTS II Control chart for variables variables. X-Bar, R, S [*sample standard deviation*] (Construction, charts based on standard values, Interpretation), Operating-Characteristic function, Average run length. Applications of variable control charts. Introduction to process capability concept, Specification limits, natural		**15 Lectures**

tolerance limits and their comparisons, estimate of percent defectives, Capability ratio and Capability indices(Cp), Capability performance indices Cpk with respect to machine and process interpretation, relationship between i) Cp and Cpk ii) Defective parts per million and Cp (Ref. 11,12,13,14,15,16)	

References:

1. Fundamental of Mathematical Statistics, Gupta and Kapoor.
2. Probability and Random process by T. Veerarajan.
3. Six Sigma For Business Excellence, (2005), Penelope Przekop, McGraw-Hill Six Sigma Handbook, by Pyzdek, McGraw Hill Education; 4 edition (1 July 2017).
4. The Certified Six Sigma Green Belt Handbook, Roderick A. Munro and Govindarajan Ramu , American Society for Quality (ASQ),
5. What Is Design For Six Sigma,(2005), Roland Cavanagh, Robert Neuman, Peter Pande, Tata McGraw-Hill
6. The Six Sigma Way: How GE, Motorola, And Other Top Companies Are Honing Their Performance, (2000), Peter S. Pande, Robert P. Neuman, Roland R. Cavanagh, McGraw-Hill
7. What Is Lean Six Sigma,(2004), Mike George, Dave Rowlands, Bill Kastle, McGraw-Hill
8. Six Sigma Deployment,(2003), Cary W. Adams, Charles E Wilson Jrs, Praveen Gupta, Elsevier Science.
9. Six Sigma For Beginners: Pocket Book (2018), Rajiv Tiwari Kindle Edition
10. Introduction to Statistical Quality Control(2009), Montgomery, Douglas, C ,Sixth Edition, John Wiley & Sons.Inc.:.
11. Statistical Quality Control: E.L.Grant. 2nd edition, McGraw Hill, 1988.
12. Quality Control and Industrial Statistics: Duncan. 3rd edition, D.Taraporewala sons & company.
13. Quality Control: Theory and Applications: Bertrand L. Hansen, (1973),Prentice Hall of IndiaPvt. Ltd..
14. Introduction to Statistical Quality Control(2009), Montgomery, Douglas, C. , Sixth Edition, John Wiley & Sons, Inc.:
15. Quality Control (1976), I.V. Burr, Mardekkar, New York,
16. Fundamentals of Applied Statistics , Gupta and Kapoor

DISRIBUTION OF TOPICS FOR PRACTICALS

SEMESTER VI

COURSE CODE USSTPO7 :

Sr. No.	Practical topics from USST601		Sr. No.	Practical topics from USST602
6.1.1	Bivariate Normal Disribution		6.2.1	Testing of Hypothesis - I
6.1.2	Tests for correlation and Interval estimation		6.2.2	Testing of Hypothesis - II
6.1.3	Generating Function		6.2.3	SPRT
6.1.4	Stochastic Process		6.2.4	Non-parametric Test - I
6.1.5	Queuing Theory - I		6.2.5	Non-parametric Test - II
6.1.6	Queuing Theory - II		6.2.6	Use of R software

COURSE CODE USSTPO8 :

Sr. No.	Practical topics from USST603		Sr. No.	Practical topics from USST604A	Sr. No.	Practical topics from USST604B
6.3.1	L.P.P.		6.4A.1	Mortality table I	6.4B.1	**Descriptive statistics**
6.3.2	Inventory I		6.4A.2	Mortality table II	6.4B.2	**Testing of hypothesis**
6.3.3	Inventory II		6.4A.3	Annuities I	6.4B.3	**Seven Tools of Quality**
6.3.4	Replacement		6.4A.4	Annuities II	6.4B.4	**Attribute control charts**
6.3.5	Simulation		6.4A.5	Life Annuities	6.4B.5	**Variable Control Charts and Capability Analysis**

6.3.6	Reliability		6.4A.6	Assurance benefits	6.4B.6	Practical based on 1,2,3,4,5 using MS-Excel

Semester End Examination:
Theory: At the end of the semester, Theory examination of three hours duration and 100 marks based on the four units shall be held for each course.

Pattern of Theory question paper at the end of the semester for each course:

There shall be Five compulsory questions of twenty marks each with internal option.
Question 1 based on Unit I.
Question 2 based on Unit II.
Question 3 based on Unit III.
Question 4 based on Unit IV.
Question 5 based on all Four Units combined.

Semester End Examination Practicals : At the end of the semester, Practical examination of 3 hours duration and 100 marks (80+10*+10**) shall be held for each course as shown below:

Practical Course	Part A	Part B	Duration	Marks out of
USSTP05	Questions from USST501	Questions from USST502	3 hours	80
USSTP06	Questions from USST503	Questions from USST504	3 hours	80
USSTP07	Questions from USST601	Questions from USST602	3 hours	80
USSTP08	Questions from USST603	Questions from USST604	3 hours	80

*: Practical journal 10 marks, **: Viva 10 marks
Pattern of practical question paper at the end of the semester for each course:
Every paper will consist of two parts A and B. Every part will consist of two questions of 40 marks each. Students to attempt one question from each part.

Guidelines for conducting University examination of Paper on Statistical software at T.Y. B.Sc. Semester V

a. The examination will be conducted in Statistics laboratory on computers.
b. Provision of at least 15 computers with necessary R / Python / MSExcel software installed should be made available by the centre. Battery backup in case of power failure is essential.
c. Duration of examination is one and hal hours.
d. The examination will be conducted batch wise. A batch will consist of at most 15

candidates.

e. The batches examined simultaneously will have same question paper. However there will be separate question paper for each batch in case more (than one) batches are required to be formed.

f. A candidate will solve the question paper given to him/ her on computer and the output of work done by him/her will be evaluated by the examiner.

g. In case of partial power failure proportionate additional time may be given at that centre for the concerned batch.

h. One internal examiner and one external examiner will be appointed for this examination.

Workload Theory: 4 lectures per week per course. Practicals: 4 lecture periods per course per week per batch. All four periods of the practicals shall be conducted in succession together on a single day.

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