

ISLAMIAH COLLEGE
(AUTONOMOUS)
VANIYAMBADI – 635 752

(AIDED & SELF FINANCE)



SYLLABI BOOK- VI

7th Academic Council

13th September 2015

DEPARTMENT OF ENGLISH SYLLABUS

For
All the First Year Undergraduate Courses

SEMESTERS- I &II

FOUNDATION ENGLISH ENVIRONMENTAL STUDIES VALUE EDUCATION (UNDER CBCS)

2015-2016

B.A. ENGLISH											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100

	CC	U5EN1001	Main	CC01	Indian literature in English	5	5	3	25	75	100
	CC	U5EN1002	Main	CC02	Fiction	4	3	3	25	75	100
	CC	U5ENAL11	Allied I	CC03	Literary Forms	5	4	3	25	75	100
	EC	U5ENAL12	Allied II	EC03	The History of English Literature I [1350-1850]	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5EN2001	Main	CC04	English Prose	5	5	3	25	75	100
	CC	U5EN2002	Main	CC05	English Drama	4	3	3	25	75	100
	CC	U5ENAL21	Allied III	CC06	The Social History of England	5	4	3	25	75	100
	EC	U5ENAL22	Allied IV	EC06	The History of English Literature II [1851-1950]	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

ISLAMIAH COLLEGE (AUTONOMOUS), VANIYAMBADI
I SEMESTER
PART II - ENGLISH I
COURSE CODE: U5FEN101

Objective:

The prime objective of this paper is to promote the linguistics competence into the minds of the young learners through teaching the basics of English and acquainting them with situational dialogues and expose the learners to the production and receptive skills.

Unit I Grammar

Parts of Speech

1. Noun
2. Pronoun
3. Adjective

4. Verb
5. Adverb
6. Preposition
7. Conjunction
8. Interjection
- A. Articles

Unit II

Infinitives
Participles
Gerunds
Auxiliaries and Modals
Subject Verb Agreement
Tenses
Language Lab – *1 hour per week*

Unit III

Conversational Dialogues in Social Context

1. To introduce yourself
2. Making request
3. Seeking permission
4. Seeking clarification
5. Invitation

Unit IV

Conversational Dialogues at work place

1. In a shop
2. At the airport
3. Telephone banking
4. At a restaurant
5. Getting a driving license

Unit V

Writing

1. Short messages
2. Spotting errors
3. Note – making
4. Jumbled sentences
5. Comprehension

TEXT BOOKS:

1. Foundation English for Semester I – published by Islamiah College (Autonomous), Vaniyambadi, 2013.
2. Text for Environmental Studies, Erach Bharucha, University Grants Commission, New Delhi, 2004

SEMESTER – I
ENVIRONMENTAL STUDIES
COURSE CODE: U5ENV101

Unit I

1. Definition
2. Scope
3. Importance
4. Awareness

Unit II

Natural Resources

1. Forest Resources
2. Water Resources
3. Mineral Resources
4. Energy Resources
5. Land Resources

Unit III

1. Food Resources
2. Energy Resources
3. Land Resources

Unit IV

1. Concept of Ecosystem
2. Types of Ecosystems
3. Forest Ecosystem

Unit V

1. Grassland Ecosystem
2. Desert Ecosystem
3. Aquatic Ecosystem

TEXT BOOK:

Environmental Studiies – UGC Syllabus – Periyar EVR College, Jayam Publications,
Tiruchirapalli

SEMESTER – II
PART – II ENGLISH II
COURSE CODE: U5FEN201

Unit I Prose

1. Stephen Leacock : My Lost Dollar
2. Anita Desai : A Devoted Son
3. R.K. Narayan : Sweet for Angels

Unit II Poetry

1. Nissim Ezeikel : Night of the Scorpion
2. Robert Frost : The Road Not Taken
3. William Wordsworth: Daffodils

Unit III Grammar

1. Active and passive voice
2. Direct and indirect speech
3. Degrees of comparison

Unit IV Soft Skills

- A. Time management
 - i. Importance of time
 - ii. Characteristics of management tasks
 - iii. Determining time elements
 - iv. Time management techniques
- B. Entrepreneurship
 - i. Entrepreneur and its role
 - ii. Essentials steps to become an entrepreneur
 - iii. EDP training

Unit V Writing

- i. Report writing
- ii. Cover letter
- iii. Curriculum vitae

TEXT BOOK:

1. Foundation English for Semester II – published by Islamiah College (Autonomous), Vaniyambadi, 2013.

VALUE EDUCATION
COURSE CODE: U5VED201

Unit I

1. Definition and relevance in present day
2. Good values to be followed by individuals
3. Values related to self, society, culture, organization, country development, goodness and self-esteem

Unit II Family

1. Family and family values – responsibility of the family
2. Neutralization of anger, adjustability and threats of family life
3. Status of women in family – society, caring for needy and elders, time allotment and sharing

Unit III Ethics

1. Definition –Types – Ethical Values
2. Professional Ethics – Mass Media Ethics – Advertisement Ethics
3. Leadership qualities – personality development

Unit IV Social Values

1. Definition –faith - service - secularism – social senses and commitment
2. Students and Politics – Social Awareness – Consumer Awareness
3. Rights and Responsibility – Rights to Food and Shelter, good education, medical care and attention, to earn in right and good manner

Unit V Global Issues

1. Definition – Effect of International Affairs on values of life – Issues of Globalization
2. Environmental Issues
3. Mutual respect for different culture, religion and their values

TEXT BOOK:

Value Education: M. Uma Maheswari & K.R. Lakshmi Narayanan, Nanilam Pathipagam, Chennai

SEMESTER-I
INDIAN LITERATURE IN ENGLISH
CORE PAPER-I
COURSE CODE: U5EN1001

UNIT-I: POETRY

1. Rabindranath Tagore: Selections from Gitanjali (Lyrics 35, 36 and 50)

UNIT-II: POETRY

1. A.K.Ramanujan : “A River”

Prescribed Text

Selections in units 1 and 2 are from The Lotus and Rose – An Anthology of Indian Writing in English (Vol.III Poetry) – Edited by Anand Kumar Raju, Blackie & Sons.

UNIT-III: PROSE

Jawaharlal Nehru: Selections from the Discovery of India – Macmillan
G.K. Gokhale: “The Elevation of the Depressed Classes”
Nirad C Chaudhari: “The Eternal Silence of Infinite Crowds”

UNIT-IV: DRAMA

M.R. Anand: Coolie
Girish Karnad: Hayavadana – Oxford University Press

UNIT-V: FICTION

R.K. Narayan: English Teacher

Text Prescribed

For Units 1 and 2

Vol.3 Blackie and sons, 1992

For Unit 3

A.K.Raju.ed. The Lotus and Rose – An Anthology of Indian Writing In English.

Vol.4 Blackie and sons, 1992

Girish Karnad. Hayavadana Oxford: OUP.1997

Reference Books

1. K.R.Srinivasa Iyenger: Indian Writing in English, Sterling Publishers, New Delhi
2. M.K.Naik – A History of Indian English Literature, Satitya Akademi, New Delhi.
3. H.M.Williams – Indo-Anglian Literature 1800-1970: A Survey, Orient Longman, Chennai.

FICTION

CORE PAPER-II

COURSE CODE: U5EN1002

UNIT-I

Jane Austen – Pride and Prejudice

UNIT-II

Joesph Conard -Heart of Darkness

UNIT-III

George Orwell - Animal Farm

UNIT-IV

Thomas Hardy - The Mayor of Casterbridge

UNIT-V

Graham Greene - The Power and the Glory

LIERARY FORMS

ALLIED PAPER I

COURSE CODE: U5ENAL11

UNIT-I

The Essay, The Short Story, Biography, Autobiography

UNIT-II

The Lyric, The Sonnet, The Elegy, The Epic

UNIT-III

The Miracle and Mystery Plays, Comedy, Tragedy, Tragic-Comedy

UNIT-IV

The Dramatic Monologue, Soliloquy and Aside, The Absurd Drama, The One Act Play.

UNIT-V

The Detective Novel, The Stream of Consciousness Novel, The Realistic Novel.

Reference Books

1. William Henry Hudson: An Introduction to the Study of Literature, Kalayani Publishers, Ludhiana
2. Birjadish Prasad: A Background to the Study of English Literature (Revised Edition); Macmillan Company, Chennai.
3. R.J.Rees: English Literature – An Introduction for foreign Readers, Macmillan, London. K.R. Srinivasa Iyenger and Prema nanda kumar: introduction to the study of the English Literature; Asia Publishing House, Bombay.

THE HISTORY OF ENGLISH LITERATURE – I (1350-1850)
ALLIED PAPER II
COURSE CODE: U5ENAL12

PROSE

Unit-1

Thomas More, Bacon, Philip Sidney, Steele, Addison, Dr. Johnson, G. K. Chesterton, George Orwell, A. G. Gardiner.

POETRY

Unit-2

Chaucer, Spencer, Shakespeare, Donne, Dryden and Pope

Unit-3

Blake, Wordsworth, Shelley, Keats, Tennyson, Arnold, W.B. Yeats and T.S. Eliot

DRAMA

Unit-4

Mystery play, Shakespeare, Ben Jonson, Goldsmith, Sheridan, G.B. Shaw

FICTION

Unit-5

Defoe, Jane Austen, Walter Scott, Dickens, George Eliot, Thomas Hardy, E.M. Forster

Book for Reference;

An Outline History of English Literature - Hudson

SEMESTER-II
ENGLISH PROSE
CORE PAPER-III
COURSE CODE: U5EN2001

Unit-1

Francis Bacon	: ‘Of Studies’
Francis Bacon	: ‘Of Revenge’

Unit-2

Joseph Addison : Sir Roger and Will Wimble

Unit-3

Oliver Goldsmith : Man in Black
Charles Lamb : Poor Relations

Unit-4

Stephen Leacock : My Lost Dollar
George Orwell : Sporting Spirit

Unit-5

Robert Lynd : Pocket Money
C.E.M.Joad : A Dialogue on Civilization

Content as in:

A collection of prose - (Compiled by) Department of English,
Islamiah College, Vaniyambadi

**ENGLISH DRAMA
CORE PAPER-IV
COURSE CODE: U5EN2002**

Detailed

Unit-1

Christopher Marlowe : Doctor Faustus

Unit-2

Bernard Shaw : Pygmalion

Non-Detailed

Unit-3

Oliver Goldsmith : She Stoops to Conquer

Unit-4

Synge : The Playboy of the Western World

Unit-5

Samuel Beckett : Waiting for Godot

**THE SOCIAL HISTORY OF ENGLAND
ALLIED PAPER III
COURSE CODE: U5ENAL21**

UNIT-I (16th C)

The Reformation in England
Dissolution of the Monasteries

UNIT-II (17th C)

English Colonial Expansion
Coffee- House Life

UNIT-III (18th C)

Causes and Effects of Industrial Revolution
Agrarian Revolution

UNIT-IV (19th C)

Anti-Slavery Movement
The Influence of Science on Victorian England

UNIT-V (20th C)

Means of Communication
Education in the 20th Century

**THE HISTORY OF ENGLISH LITERATURE-II (1851-1950)
ALLIED PAPER IV
COURSE CODE: U5ENAL22**

UNIT-I (PROSE)

G.K. Chesterton
George Orwell

UNIT-II (POETRY)

Matthew Arnold

Alfred Lord Tennyson

UNIT-III (POETRY)

W.B. Yeats

W.H. Auden

UNIT-IV (DRAMA)

T.S. Eliot

Samuel Beckett

UNIT-V (NOVEL)

Charles Dickens

Thomas Hardy

DEPARTMENT OF BUSINESS ADMINISTRATION

SEMESTERS- I & II **(UNDER CBCS)**

2015-2016

B.B.A											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5BA1001	Main	CC01	Principles of Management	5	5	3	25	75	100
	CC	U5BA1002	Main	CC02	Business Organization	4	3	3	25	75	100
	EC	U5BAAL11	Allied I	EC03	Business Mathematics and Statistics I	5	4	3	25	75	100
	EC	U5BAAL12	Allied II	EC04	Fundamentals of Computer	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC05	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC06	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5BA2001	Main	CC03	Managerial Communication	5	5	3	25	75	100
	CC	U5BA2002	Main	CC04	Banking and Financial System	4	3	3	25	75	100
	EC	U5BAAL21	Allied III	EC07	Business Mathematics and Statistics II	5	4	3	25	75	100
	EC	U5BAAL22	Allied IV	EC08	Training and Development of	4	3	3	25	75	100

					Employees						
					TOTAL	30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

SEMESTER I
PRINCIPLES OF MANAGEMENT
COURSE CODE: U5BA1001

UNIT-1

Management-Importance-Definition-Nature and Scope of Management-
Management process-Role and Function of a manager-Levels of management-
Management vs. Administration-Management as an art or science-Management as a
Profession-Management Approaches (Henry Fayol, F.W.Taylor, Elton Mayo's
Contribution only).

UNIT-2

Planning-Nature-Importance-Steps in planning-Types of plans-Objectives-
Policies-Procedures-And methods-Nature and types of policies-Decision making-Process
of Decision Making-Types of Decision-Problem involved in Decision Making.

UNIT-3

Organisation-Types of organization structure-Span of control-Departmentation-
Informal Organisation

UNIT-4

Authority-Delegation-Difference between Authority and Power- Decentralization-
Responsibility-Staffing-Sources of Recruitment-Selection process-Training

UNIT-5

Coordination-Need of coordination-Types-Techniques-Distinction between
coordination and cooperation-Requisites for Excellent coordination-Controlling-Meaning
and Importance of Controls-Control process

TEXT BOOKS:

P.C Tripathi & P.N.Reddy -Principles of Management-Tata Mc.Graw Hill
Prasad L.M- Principles and Practice of Management
R.N. Gupta- Principles of Management- S.Chand Pub

REFERENCE BOOKS:

Guptha CB- Business Management
Peter-F, Drucker- Principles of Management
Harold Koontz-aryasri & heniz weirich- Principles of Management- Tata Mc.Graw Hill

BUSINESS ORGANISATION
COURSE CODE: U5BA1002

UNIT-1

Business-Meaning-Types of Business-Industry-Types of Industry-Commerce and Trade-Profession-Differences between Business and Profession- Difference between Profession and Employment-Organisation-Meaning and Principles of Business Organisation

UNIT-2

Forms of Business Organisation-Sole Trader-Partnership-Differences between Sole Trader and -Joint Stock Companies-Differences between Partnership firm and Joint stock company-Cooperatives Societies-MNC's

UNIT-3

Location of Industry-Factors Influencing Location and Size-Industrial Estate-District Industries Center

UNIT-4

Corporate Social responsibility-Business Ethics-Unethical practices in business

UNIT-5

Business combination-Causes-Types-Simple combination-Compound combination- Trade Association and Chamber of Commerce-Differences between Trade Association and Chamber of Commerce

TEXT BOOKS:

1. Bhutan Y.K- Business Organisation
2. Prakesh Jagadesh- Business Organisation and Management
3. Reddy P.N and Gulshan S.S.- Principles of Business Organisation and Management.
4. Vasudevan and Radhaswami- Business Organisation
5. M.C.Shukla- Business Organisation and Management.

BUSINESS MATHEMATICS AND STATISTICS-1
COURSE CODE: U5BAAL11

OBJECTIVES:

To apply the concepts of statistics and Mathematics in Business

UNIT-1

Statistics-Definition-Scope and Limitation-Presentation of Data-Diagrammatic and Graphical Representation of Data

UNIT-2

Measures of Central Tendency-Mean-Median and Mode-GM and HM-Advantages and Limitations

UNIT-3

Measures of Dispersion-Range-Mean Deviation-Quartile Deviation-Standard Deviation-Coefficient Variation-Measures of Skewness-Karl Pearson and Bowleys methods

UNIT-4

Mathematics for Finance-Simple and Compound Interest-Annuities-Sinking Funds-Discount and Present-Values

UNIT-5

Basic Calculus-Rules for Differentiation-Maxima and Minima and their Application to Business

Note: The proportion between theory and problems shall be 20:80

BOOK REFERENCE:

1. J.K. Sharma- Business Statistics- Pearson Publications
2. P. Naveentham- Business Statistics and Mathematics
3. P.R. Vital- Business Statistics and Mathematics

FUNDAMENTALS OF COMPUTER COURSE CODE: U5BAAL12

Unit I Computer Fundamentals

Introduction- Characteristics of Computers- Classification (Digital, Analog, Hybrid), Micro, Mini and Super Computers - Personal and Advance Computer-Operating System

Unit II Components of Computer

Input devices-Types-KeyBoard- Mouse-Output Devices-Classification of Output-Printers- Plotters- Monitors

Unit III MS Office

MS Office – Introduction – Word pad, Note pad. Standard Menu (file – edit-view-insert) -format menu-of MS Word, Excel and Power point,

Unit IV Data communication and Networking

Concept of Data Communication and Networking – Types of Network, Communication Media, Mode of transmission analysis, Digital transmission, Different Topologies

Unit V Internet

Internet basics- Basic Internet terms – Getting connected to Internet – Internet application –Electronic Mail – How E-Mail works - Searching the Web.

Books Recommended:

1. Fundamental of Computers-Rajaraman, Prentice Hall

2. Computer Today –B. Sandra
3. Fundamental of Computer –P.K. Sinha
4. Elementary Computer Application –Sharma, Upadyay and Agarwal
5. Computer Fundamentals –Sinha,P - BPB Publication , Jaipur
6. Introduction to Computers –Norton, Peter , Tata Mc Graw hills, New Delhi
7. Computer Fundamental – Anubha Jain , Deep Shikha Bhargav
8. Computer Fundamentals – V.K. Jain
9. A first course in computer – Vikas Publishing House
10. Introduction to Computer Science – ITL Education Solution Ltd.

SEMSESTER II
MANAGERIAL COMMUNICATION
COURSE CODE: U5BA2001

UNIT-1

Business Communication -Meaning- Importance- Objectives- Communication process- Types of communication- Methods of communication- Barriers to communication.

UNIT-II

Business letters -Structure of a Business letter- Qualities of a good Business letter- Letter of enquiry-Letter of Order- Execution of order letter- Cancellation of Order -Letter of Complaints- Collection letter.

UNIT-III

Circular letters -Banking Correspondence -Insurance Correspondence

UNIT-IV

Application for Situation- Secretarial Correspondence-Preparation of Agenda and Minutes-Annual Report

UNIT-V

Communication Media- Telegrams –Telephone –Telex –Fax - Cell phones- Internet.

TEXT AND REFERENCE BOOKS:

1. Rajendra pal and Korlehalli-Essentials of Business Communication
2. Pillai and Bagawathi-Modern Commercial Correspondence
3. A.N.Kapoot- Business Communication
4. Sandhanam.R- Business Communication
5. Ramesh and Patten shetty- Business English and Correspondence
6. L.Gartside- Modern Business and Correspondence

BANKING & FINANCIAL SYSTEM
COURSE CODE: U5BA2002

UNIT-I

Definition of bank - Origin of banks - Types of bank - Unit bank- Merits and Demerits of unit bank- Branch bank- Its merits and demerits - Mixed banking - Retail banking - Wholesale banking-Universal banking.

UNIT-II

Function of modern commercial banks-Savings accounts-Current account-Difference between savings account and current accounts- Fixed Deposit - Recurring Deposit - Granting of loan -Clean loan- Secured loan- Over draft- Cash credit.

UNIT-III

Role of Reserve Bank of India -Co-operative banks -NABARD (National Bank for Agriculture and Rural Development) - EXIM Bank. Economic and Monetary implications of modern banking operations - Concepts of social responsibility of banks

UNIT-IV

Financial System-Components –Financial Institutions – Financial Market-Services of stock exchange – Financial Instruments (Promissory Note, Bill of Exchange and Cheque only).

UNIT-V

Financial Services (Factoring, Leasing, Hire Purchase, Housing Finance, Credit Card only) E-Banking.

TEXT AND REFERENCE BOOKS:

1. B.Santhanam, Sundaram & Varshney-Banking and financial system.
2. B.Santhanam-Banking theory law and practice
3. Kandasami.K.P.-Banking law and practice.

BUSINESS MATHEMATICS AND STATISTICS-II
COURSE CODE: U5BAAL21

OBJECTIVES

To apply the concepts of Mathematics and Statistics in Business

UNIT-1

Matrix Theory-operations of Determinants-Inverse of a Square Matrix (not more than 3rd order)

UNIT-2

Solving Simultaneous Equations using Matrix Method-Integration and thier application to business

UNIT-3

Correlation-Karl Pearson's Correlation-Concurrent Deviation Method-Rank Correlation-Regression lines-Regression Coefficients-Properties of Regression Coefficient.

UNIT-4

Time Series-Components of Time Series-Measurements of Trend-Semi Average Method-Moving Average Method-Methods of Least Squares

UNIT-5

Index Numbers-Weighted and UnWeighted Index Numbers-Cost of Living Index Numbers

Note: The proportion between theory and problems shall be 20:80

BOOKS FOR REFERENCE:

1. J.K.Sharma-Business Statistics-Pearsons Publications
2. P.Navaneetham-Business Statistics & Mathematics
3. P.R.Vittal-Business Statistics & Mathematics
4. S.P.Gupta-Elementary Statistical Method.

TRAINING AND DEVELOPMENT OF EMPLOYEES COURSE CODE: U5BAAL22

Objective:

To provide an in-depth understanding of the role of Training in the HRD and to enable the course participants to manage the Training Systems and Processes

UNIT I: Introduction

Concepts of Training and Development – Identifying Training Needs – Structure and Functions of Training Development – Evaluation of Training Programme – Role, Responsibilities and Challenges to Training Managers

UNIT II: Training Techniques:

On the Job Training Techniques – Coaching – Apprenticeship – Job Rotation – Job Instruction Training – Training by Supervisors – Off the Job Training Techniques – Lecture, Conference, Group Discussion.

UNIT III: Career Planning:

Concept of Career – Career Stages – Career Planning and Development – Steps in Career Planning – Methods of Career Planning and Development

UNIT IV: Management Development Program (MDP):

Concept of Management Development – Need and Importance – Process – Components of MDP – Management Development Institutes – Productivity Councils

UNIT V: Training Institutions:

Need for Training in India – Government Policy on Training – Training Institutes in India

TEXT BOOKS:

1. Manpower Planning, Selection, Training & Development – Aggarwala D V, Deep & Deep Publications.
2. Training for Development – Rolf Lynton & Udai Pareek, Sage Publications.

DEPARTMENT OF COMMERCE

SEMESTERS- I & II (UNDER CBCS)

2015-2016

B.Com. COMMERCE							
S. No.	Course		S. No.	Course Title	I	U	W
							MAX. MARKS

		Code	Course						CIA	ESE	TOTAL
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	CC	U5CO1001	Main	CC01	Financial Accounting I	5	5	3	25	75	100
	CC	U5CO1002	Main	CC02	Business Organisation	4	3	3	25	75	100
	EC	U5COAL11	Allied I	EC03	Business Economics I	5	4	3	25	75	100
	EC	U5COAL12	Allied II	EC04	Business Communication	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

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	EC	U5FEN201	English	EC06	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5CO2001	Main	CC03	Financial Accounting II	5	5	3	25	75	100
	CC	U5CO2002	Main	CC04	Business Management	4	3	3	25	75	100
	EC	U5COAL21	Allied III	EC07	Business Economics II	5	4	3	25	75	100
	EC	U5COAL22	Allied IV	EC08	Business Computer Applications	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

Core Paper - I FINANCIAL ACCOUNTING – I (Course Code: U5CO1001)

Semester: I Hours: 5 Credits: 5 Marks: ESE (75) + CIA (25)

Objective: To impart theoretical and practical knowledge of fundamental accounting principles.

UNIT – I: Introduction

Basic Accounting Concepts – Accounting Conventions – Journal – Ledger – Preparation of Trial Balance – Errors – Types and Rectification of Errors.

UNIT – II: Final Accounts

Preparation of Final Accounts – Trading Account – Profit and Loss Account – Balance Sheet – Adjustment Entries - Bank Reconciliation Statement

UNIT – III: Depreciation Accounting

Meaning of Depreciation – Causes of Depreciation – Methods of providing Depreciation – Straight Line Method – Diminishing Balance Method (Excluding change in the method of depreciation) – Annuity Method – Sinking Fund Method – Concept of Depreciation under Companies Act, 2013

UNIT IV: Average Due Date and Fire Insurance Claims

Determination of Due Date – Calculation of Interest Fire Insurance Claims – Need for fire Insurance – Computation of claim to be lodged for loss of stock – Average Clause

UNIT V: Single Entry System

Single Entry System - Objectives – Definition – Features – Limitations of Single Entry System – Differences between Single Entry System and Double Entry System– Ascertainment of profit through Networth Method (Statement of Affairs) and Conversion Method

Note: Weightage of marks: Theory 20% and Problems 80%

Reference Books:

1. M.C.Shukla, T.S.Grewal, S.C. Gupta, Advanced Accounts – Volume I, S.Chand & Co., - New Delhi.
2. S.P. Jain and K.L.Narang, Financial Accounting, Kalyani Publishers, Ludhiana.
3. R.L.Gupta and M. Radhaswamy, Financial Accounting, Sultan Chand & Sons., New Delhi.
4. Mukherji & M. Hanif, Financial Accounting, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
5. T.S. Reddy and Murthy, Financial Accounting, Margham Publications, Chennai.

Core Paper – II BUSINESS ORGANISATION (Course Code: U5CO1002)

Semester: I Hours: 4 Credits: 3 Marks: ESE (75) + CIA (25)

Objective: To acquaint the students with the basic concepts of business and commercial organisations.

UNIT-I: Nature of Business

Business - Meaning – Characteristics – Objectives - Classification of business Activities - Industry - Commerce - Trade - Distinction between trade and commerce – E-Commerce.

UNIT-II: Size of Business Units

Criteria for measuring size of business – Factors determining the size – Classification of business according to size – Micro – Small – Medium – Large – Importance of MSME units – Benefits available to MSMEs.

UNIT-III: Forms of Business Enterprises

Forms of Business Organisation - Sole Proprietorship – HUF - Partnership Firm – Limited Liability Partnership (LLP) - Co-operative societies - Joint Stock Companies – One Person Company (OPC) - Public Utilities – Public Enterprises - Public Private Partnership (PPP) – MNCs

UNIT-IV: International Business

International Business - Meaning – Scope – Objectives – Advantages – Disadvantages - Difference between domestic trade and international trade – Recent trends in business world.

UNIT-V: Trade Associations

Business Combinations – Meaning – Advantages – Limitations – Types - Trade Association – Trade Union - Chamber of Commerce - FICCI - Difference between Trade Association and Chamber of Commerce.

Reference Books:

1. C.B.Gupta, Business Organisation and Management, Sultan Chand & Sons, New Delhi.
2. C.D.Balaji and G. Prasad, Business Organization, Margham Publications, Chennai.
3. Motihar, Business Organisation, Vrinda Publications (P) Ltd., Delhi.
4. R.N. Gupta, Business Organisation & Management, S.Chand & Co., New Delhi.
5. Y.K. Bhusan, Business Organisation, Sultan Chand & Sons, New Delhi.

Allied Paper - I BUSINESS ECONOMICS – I (Course Code: U5COAL11)

Semester: I Hours: 5 Credits: 4 Marks: ESE (75) + CIA (25)

Objective: To familiarise students with basic concepts in economics and its application in business.

UNIT – I: Business Economics

Meaning – Definition – Characteristics –Importance – Scope – Difference between Business Economics and Economics – Differences between Micro economics and Macro economics – Role and responsibilities of a Business Economist.

UNIT – II: Utility Analysis

Meaning – Characteristics – Cardinal – Ordinal – Total utility – Marginal utility – Law of diminishing marginal utility – Law of equi-marginal utility – Indifference curve analysis

UNIT – III: Demand

Meaning – Definition – Characteristics – Types of Demand - Factors determining demand – Demand curve - Elasticity of demand – Types – Overview of Demand forecasting techniques.

UNIT – IV: Production and Costs

Production - Meaning – Factors – Production Function – Law of Variable Proportions – Economies of Scale – Cost Concepts – Break-Even Analysis.

UNIT – V: Supply

Meaning – Factors affecting supply – Supply schedule – Supply curve – Law of supply – Elasticity of supply – Determinants of elasticity of supply

Reference Books:

1. Agarwal M.D., and Som Deo, Business Economics, Ramesh Book Depot, New Delhi.
2. Mehta P.L., Managerial Economics, Sultan Chand & Sons. New Delhi.
3. Sankaran S, Business Economics, Margham Publications, Chennai.
4. Mithani. D.M., Managerial Economics – Theory and Application, Himalaya Publishing House Pvt. Ltd., Mumbai.
5. Ahuja H.L., Business Economics, S.Chand & Co. Ltd., New Delhi.

Allied Paper - II
BUSINESS COMMUNICATION
(Course Code: U5COAL12)

Semester: I **Hours: 4** **Credits: 3** **Marks: ESE (75) + CIA (25)**

Objective: To familiarize students with the principles of Business Communication and to train them to draft various business letters.

UNIT – I: Communication

Communication - Meaning – Objectives – Importance of effective communication in business - Types of communication – Verbal and Non-verbal – Formal and Informal – Directions of Communication - Principles – Barriers of Communication.

UNIT – II: Business Letters

Business letter – Functions - Kinds of business letters – Essentials of an effective business letter – Lay-out of a business letter – Tips for writing an effective business letter – Etiquettes for E-Correspondence.

UNIT – III: Enquiries and Replies

Enquiries – Status Enquiry - Replies – Offers and Quotations – Important terms used in offers and Quotations – Orders and their execution – Tenders – Guidelines for drafting tender notice – Specimen of tender notice.`

UNIT – IV: Collection Letters

Collection letter – Effective collection letter – Collection series - Replies of debtors - Circular letters - Objectives of writing Circular Letters – Specimen of circular letter.

UNIT – V: Application Letters

Introduction – Contents – Specimen of Application Letter – Bio-Data - Curriculum Vitae – Resume - Interview Call Letter.

Reference Books:

1. Rajendra Pal, J.S. Korlahalli, Essentials of Business communication, Sulthan Chand & Sons, New Delhi.
2. Shirley Taylor, Communication for business, Pearson publication, New Delhi.
3. CB Gupta, Basic Business Communication, Sultan Chand & Sons, New Delhi.
4. Dr. Sundar, Business Communication, Vijay Nicole Publishing Co., Chennai.
5. N.S. Raghunathan, B.Santhanam, Business Comm. Margham Publication, Chennai.

Core paper - III
FINANCIAL ACCOUNTING – II
(Course Code: U5CO2001)

Semester: I **Hours: 5** **Credits: 5** **Marks: ESE (75) + CIA (25)**

Objective: To impart theoretical and practical knowledge of functional aspects of Accounting.

UNIT – I: Branch Accounts

Objectives of Branch Accounts – Types of Branches – Dependent Branch – Accounting for Dependent Branches - Debtor System - Stock and Debtors System – Independent branch (Foreign Branch excluded) – Final Account System.

UNIT – II: Departmental Accounts

Distinction between Departments and Branches – Allocation of common expenses – Expenses which cannot be allocated – Preparation of Departmental Accounts - Inter-departmental transfer at cost price and selling price. (Simple problems only)

UNIT – III: Hire Purchase System & Instalment Purchase System

Hire Purchase System – Accounting Treatment – Calculation of Interest – Books of Hire Purchaser and Hire Vendor – Default and Repossession – Instalment System – Distinction between Hire Purchase and Instalment Purchase system – Accounting treatment – Books of buyer and seller.

UNIT – IV: Partnership Accounts (Admission, Retirement and Death of Partner)

Partnership – Meaning and Features – Types of Partners - Admission of a partner – Calculation of Ratios – Treatment of Goodwill – Revaluation of Assets and Liabilities – Retirement and Death of a partner.

UNIT – V: Partnership Accounts (Dissolution)

Dissolution of partnership firm – Insolvency of a Partner and Partnership Firm – Garner vs Murray – Gradual Realization and Piecemeal Distribution (Simple problems only)

Note: Weightage of marks: Theory 20% and Problems 80%

Reference Books:

1. M.C.Shukla, T.S.Grewal, S.C. Gupta, Advanced Accounts – Volume I, S.Chand & Co., New Delhi.
2. S.P. Jain and K.L.Narang, Financial Accounting, Kalyani Publishers, Ludhiana.
3. R.L.Gupta and M. Radhaswamy, Financial Accounting, Sultan Chand & Sons., New Delhi.
4. Mukherji & M. Hanif, Financial Accounting, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
5. T.S. Reddy and Murthy, Financial Accounting, Margham Publications, Chennai.

Core Paper - IV
BUSINESS MANAGEMENT
(Course Code: U5CO2002)

Semester: I Hours: 4 Credits: 3 Marks: ESE (75) + CIA (25)

Objective: To familiarise students with the principles of management and techniques used to effectively manage a business firm.

UNIT-I: An Overview of Management

Management - Meaning - Nature - Scope - Levels - Management vs. Administration – Principles of Scientific Management by Henri Fayol and by Frederick Winslow Taylor – Contributions of Peter Ferdinand Drucker and Mary Parker Follett to the field of management - The Management Process (POSDCORB).

UNIT –II: Planning

Planning – Meaning – Nature - Importance – Limitations – Principles – Types – Components (definition of various components only) – Planning Process – Forecasting – Importance – Limitations – Process - Decision-Making – Meaning - Nature – Process.

UNIT – III: Organising

Organising – Meaning – Nature – Steps – Significance – Determinants of an Organisation structure – Types – Formal and Informal – Departmentation - Span of Management – Determinants - Authority and Responsibility

UNIT – IV: Staffing and Directing

Delegation – Importance – Process – Types - Decentralisation – Merits and Demerits – Determinants – Delegation Vs. Decentralisation. Staffing – Importance. Directing – Nature – Significance – Principles – Techniques

UNIT –V: Controlling and Coordination

Controlling - Nature - Significance – Process – Overview of Traditional and Modern Control Techniques Coordination - Nature - Importance – Types - Techniques

Reference Books:

1. C.B. Gupta, Business Management Theory and Practice – Sultan Chand & Sons, New Delhi.
2. Harold Koontz, Cyril O'Donnell, Principles of Management – An Analysis of Managerial Functions, International Student, New Delhi.
3. Peter Ferdinand Drucker, Management Cases, Harper and Row Publishers, New York.
4. L.M. Prasad, Principles and Practice of Management, Sultan Chand & Sons, New Delhi.
5. J. Jayasankar, Principles of Management, Margham Publications, Chennai.

Allied Paper - III
BUSINESS ECONOMICS – II
(Subject Code: U5COAL21)

Semester: I Hours: 5 Credits: 4 Marks: ESE (75) + CIA (25)

Objective: To acquaint students with application of economic theories in National and International Economics.

UNIT – I: Market Structure

Meaning – Classification – Monopoly – Duopoly - Oligopoly - Monopolistic competition – Perfect competition (Meaning and Features only)

UNIT – II: Price and Profit

Equilibrium price – Profit maximization – Sales maximization – Theories of profit – Rent, Risk, Uncertainty, Innovations and Dynamic

UNIT –III: National Income

Definition – Circular flow – Measurement –Gross Domestic Product (GDP) – National Domestic Product (NDP) – Gross National Product (GNP) –Net National Product (NNP) – Difficulties in measurement of national income – National income and welfare

UNIT –IV: Fiscal Economics & Monetary Policy

Public revenue - Public expenditure – Fiscal Deficit - Fiscal policy - Monetary policy: Meaning - Importance – Objectives - Types - Instruments

UNIT –V: International Trade

Meaning – Theories of international trade – Classical theory – Comparative cost advantage – Modern theory of international trade - Balance of trade - Balance of payment – Components

Reference Books:

1. Agarwal M.D., and Som Deo, Business Economics, Ramesh Book Depot, New Delhi.
2. Sankaran S, Business Economics, Margham Publications, Chennai.
3. Mithani. D.M., Managerial Economics – Theory and Application, Himalaya Publishing House Pvt. Ltd., Mumbai.
4. Ahuja H.L., Business Economics, S. Chand & Co. Ltd., New Delhi.
5. Mehta P.L., Managerial Economics, Sultan Chand & Sons. New Delhi.

Allied Paper - IV (Practical)

BUSINESS COMPUTER APPLICATIONS

(Course Code: U5COAP22)

Semester: I Hours: 4 Credits: 3 Marks: ESE (75) + CIA (25)

Objective: To enable the students to acquire basic theoretical and practical knowledge in Computer and Internet and its applications in various areas of business.

Unit I: Introduction to Computer

Meaning – Definition – Importance - Features - Functions of Computer - Components of Computer - Hardware and Software - Input and Output Devices. (Basics only)

Unit II: Computer Memory and Role of Computers in Business

Introduction - Meaning - Types of Computer Memory – Primary and Secondary Memories - Types of Storage Devices - Auxiliary storage - Hard Disks, Compact Disk, Pen Drive (USB) - Role of Computers in Business. (Basics only)

Unit III: Word Document

Introduction – Uses of Word Documents - Word Basics - Various parts of a word window - Formatting Text and Documents - Line spacing – Margins - Borders and Shading - Headers and Footers – Tables - Creating table – Inserting, Changing and Deleting rows – Inserting, Changing and Deleting column - Overview of Word menu options - Word basic tool bar. (Basics only)

Unit IV: Excel/Spreadsheet

Introduction to Spreadsheet – Uses of Spreadsheet in Accounting, Finance and Marketing functions of Business – Spreadsheet basics – Parts of Spreadsheet - Creating, Inserting and Deleting Rows and Columns – Drawing Bar Charts and Pie Diagram. (Basics only)

Unit V: Powerpoint and Internet Access

Powerpoint Presentations: Basics – Creating Presentations - Using blank presentation option - Using design template option - Adding a slide - Deleting a slide - Importing Images - Transition and build effects - Numbering a slide - Saving presentation - Closing

presentation - Printing presentation elements – Making a Slideshow - Introduction to Internet – Advantages of Internet - Applications of internet in Business, Education and Governance.

Reference Books:

1. Alexis Leon & Mathews Leon, Computer Applications in Business, Vijay Nicole Imprints Pvt.Ltd. Chennai.
2. Srinivasa Vallabhan, Computer Applications in Business, Sultan Chand & Sons, New Delhi.
3. Ananthi Sheshasaayee & Sheshasaayee, Computer Applications in Business and Management, Margham Publications, Chennai.
4. Ed Bott, woody Leonhard, Using Microsoft Office 2007, Pearson Education, New Delhi.
5. Sanjay Saxena, Introduction to Computers & MS Office, Vikas Publishing House Pvt. Ltd., New Delhi.

DEPARTMENT OF COMMERCE [FINANCE & ACCOUNTS]

SEMESTERS- I & II

(UNDER CBCS)

2015-2016

B.Com. [FINANCE & ACCOUNTS]											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I /Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5FA1001	Main	CC01	Financial Accounting I	5	5	3	25	75	100
	CC	U5FA1002	Main	CC02	Industrial Law	4	3	3	25	75	100
	EC	U5FAAL11	Allied I	EC03	Business Communication	5	4	3	25	75	100
	EC	U5FAAL12	Allied II	EC04	Indian Economy	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
	EC	U5FUR201/ U5FAR201/ U5FHD201/	Language	EC05	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100

II		U5FTA201									
	EC	U5FEN201	English	EC06	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5FA2001	Main	CC03	Financial Accounting II	5	5	3	25	75	100
	CC	U5FA2002	Main	CC04	Financial Markets	4	3	3	25	75	100
	EC	U5FAAL21	Allied III	EC07	Business Law	5	4	3	25	75	100
	EC	U5FAAL22	Allied IV	EC08	Indirect Taxes	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

Core Paper – I
Financial Accounting – I
(Course Code: U5FA1001)

Semester: I

Max.Marks:75

Hours: 5

Credits: 5

Objective: To equip the students to understand basic financial accounting concepts in the background of theoretical and practical knowledge.

UNIT–I: Introduction

Basic Accounting Concepts and Conventions – Journal – Ledger – Preparation of Trial Balance – Errors – Types and Rectification of Errors

UNIT–II: Final Accounts

Preparation of Final Accounts – Trading Account – Profit and Loss Account Balance Sheet – Distinction between Capital and Revenue expenditure – Adjustments Entries – Bank Reconciliation Statement (BRS)

UNIT–III: Depreciation Accounting

Meaning of Depreciation – Causes of Depreciation – Methods of Providing Depreciation – Straight Line Method – Diminishing Balance Method – (Excluding Change in the Method of Depreciation) – Annuity Method– Sinking Fund Method – Concept of Depreciation under Companies Act 2013

UNIT–IV: Average Due date and Insurance claims

Determination of Average Due Date – Insurance claims – Loss of stock – Average clause.

UNIT–V: Single Entry system

Single Entry – Objectives – Definition – Salient features – Limitations of Single Entry – Ascertainment of Profit – Statement of Affairs Method – Conversion Method – Difference between Statement and Affairs and Balance Sheet

Note: Weightage of Marks: Theory 20% and Problems 80%

Reference Books

1. M.C. Shukla, T.S. Grewal. Advanced Accounts [Volume I] S.Chand & Co. Ltd. New Delhi.
2. T.S. Reddy & A. Murthy – Financial Accounting, Margham Publications, Chennai.
3. R.S.M. Pillai, Bagawathi & S.Uma – Advanced Accounting (Financial Accounting) Volume–I S.Chand & Co. Ltd., New Delhi
4. R. L. Gupta & V. K Gupta, Financial Accounting, Sultan Chand & Sons, New Delhi
5. S.P.Jain & K.L.Naranj, Advanced Accountancy, Kalyani Publications, New Delhi, Ludhiana.

Core Paper – II
Industrial Law
(Course Code: U5FA1002)

Semester: I

Max.Marks:75 Hours: 4

Credits: 3

Objective:

To enable the students to gain knowledge on few enactments that governs working of industries and to labour force.

UNIT – I Factories Act 1948

Factories Act 1948 – Definition and Meaning – Health, Safety and Welfare – Hazardous Process – Working Hours For Adults – Holidays – Employment of young Persons and Women – Annual Leave with Wages.

UNIT – II Workmen’s Compensation Act 1923

The Workmen’s Compensation Act 1923 – Definition of Scope – Rules Regarding Compensation – Amount and Distribution of Compensation – Fatal Accident – Media Examination – Insolvency of Employer – First Charge on Assets Transferred – Returns as to Compensation – Contracting out – Penalties.

UNIT – III Payment of Wages Act 1936, Minimum Wage Act 1948 & Payment of Gratuity Act 1972

The payment of Wages Act 1936 – Definition – Rules for payment of Wages – Deduction from wages – Registers and Records – Inspection – Appeal – Penalty of offence – Minimum Wage Act 1948 – Objectives – Scope – Applicability – Fixing minimum

wages – Payment of Gratuity Act– Objectives – Applicability – Superannuation Vs. Retirement– Calculation of Gratuity – Forfeiture of Gratuity – Controlling Authority.

UNIT – IV Industrial Dispute Act 1947

Industrial Dispute Act 1947 – Objects and Definitions – Industrial Dispute Meaning – Reference of Disputes to Grievance – Settlement Authorities – Authorities under the Act Conciliation and Adjudication Machinery – Procedure, Powers and Duties of Authorities Strike, Lockout and Layoff – Retrenchment.

UNIT – V ESI Act 1948, Employees Provident and Miscellaneous Provisions Act 1952

Constitutions of ESI – Power and Duties – ESI Fund – Contributions– General Provisions relating to Benefits – Employers Duties and Responsibilities – Theory of Notional Extension – EPS Scheme – Contribution, Advance, Advance/ Withdrawal/Final Withdrawal – Employee Pension Scheme – Employees Deposit Linked Scheme.

Reference Books:

1. Elements of Mercantile Law, N.D. Kapoor, Sultan Chand & Sons, New Delhi.
2. Legal Aspects of Business, Saravanavel & Sumathi, Kalyani Publishers, Delhi.
3. Commercial & Industrial Law, H.K.Sahoroy & N.K.Saha, New Central Book Agency, Kolkotta.
4. Commercial and Industrial Law, M.V. Dhandapani, Sultan Chand & Sons, New Delhi.
5. Commercial and Industrial Law, Dr. M.R. Srinivasan – Margham Publications, Chennai
6. Legal Systems in Business– T.S.Ravi, Margham Publications, Chennai.

Allied paper – I

Business Communication

(Course Code: U5FAAL11)

Semester: I

Hours: 5

MaxMarks:75

Credits: 4

Objective: To familiarize students with the principles of Business Communication and to train them to draft various business letters.

UNIT – I: Communication

Communication – Meaning – Objectives – Importance of effective communication in business – Types of communication – Verbal and Non-verbal – Formal and Informal – Directions of Communication – Principles – Barriers of Communication.

UNIT – II: Business Letters

Business letter – Functions – Kinds of business letters – Essentials of an effective

business letter – Lay-out of a business letter – Tips for writing an effective business letter – Etiquettes for E-Correspondence.

UNIT – III: Enquiries and Replies

Enquiries – Status Enquiry – Replies – Offers and Quotations – Important terms used in offers and Quotations – Orders and their execution – Tenders – Guidelines for drafting tender notice – Specimen of tender notice.

UNIT – IV: Collection Letters

Collection letter – Effective collection letter – Collection series – Replies of debtors – Circular letters – Objectives of writing Circular Letters – Specimen of circular letter.

UNIT – V: Application Letters

Introduction – Contents – Specimen of Application Letter – Bio-Data – Curriculum Vitae – Resume – Interview Call Letter.

Reference Books:

1. Rajendra Pal, J.S. Korlahalli, Essentials of Business Communication, Sultan Chand & Sons, New Delhi
2. Shirley Taylor, Communication for Business, Pearson Publication, New Delhi
3. CB Gupta, Basic Business Communication, Sultan Chand & Sons, New Delhi
4. Dr. Sundar, Business Communication, Vijay Nicole Publishing Co., Chennai.
5. N.S. Raghunathan, B.Santhanam, Business Communication Margham Publication, Chennai

Allied paper – II

Indian Economy

(Course Code: U5FAAL12)

Semester: I
Hours: 4

Max.Marks:75
Credits: 3

Objective

To enable the students to understand the salient features of India and her occupational structure; to assess the relative share of agriculture, Industry and Service sector in the economy and to analyze the fruits of planning.

UNIT–I Concept of Under Development

Meaning and Characteristics of Underdevelopment – Salient Features of Indian Economy – Factors responsible for development – development as distinct from growth – Obstacles to Economic Development

UNIT–II Planning

Planning in India– Meaning – Economic Planning – Types of Planning– Major objective of Five year Plans– Twelfth Five Plan.

UNIT – III Agricultural Economy

Agriculture – Role in Indian Economy (Contribution to GNP & Employment) – Problems of Low Productivity – Land Reforms – Need and Scope– Green Revolution

UNIT – IV Industrial Economy

Industry – Importance – Role of Large Scale Industries– Role of Small and Micro Enterprises – Industrial Sickness– Causes and Measures

UNIT – V New Economic Policy

New Economic Policy and its impact on Indian Economy – Liberalisation – Privatization – Globalization

Reference Books

1. Rudar Datt & Sundaram, Indian Economy, S. Chand & Co, New Delhi.
2. Dhingra.I.C., Indian Economy, Sultan Chand & Sons, New Delhi.
3. M. L. Jhingan, Economics of Development & Planning, Konark Publishers, New Delhi.
4. Dr.S. Sankaran, Indian Economy, Margham Publications, Chennai.
5. RBI Bulletin, Pramit Chaudhury, The Indian Economy, Poverty and Development, Vikas Publishing House, New Delhi.
6. Velayutham Foreign Trade, Theory & Practice, S. Chand & Co., New Delhi.

Core Paper – III Financial Accounting – II (Course Code: U5FA2001)

Semester: II

Max.Marks:75

Hours: 5

Credits: 5

Objective: To gain knowledge of accounting in General, to understand the system of Financial Account.

UNIT – I: Branch Accounts

Branch Accounts – Objectives of Branch Accounts – Types of Branches – Dependent Branch – Debtor system – Stock and Debtor system – Independent Branch (Foreign Branch Excluded) – Final Account System.

UNIT – II: Departmental Accounts

Departmental Accounts – Distinction between Department and Branches – Allocation of expenses – Interdepartmental department transfer at Cost or Selling Price. (Simple problems only)

UNIT – III: Hire Purchase System & Installment System

Hire Purchase System – Accounting treatment – Calculation of Interest – Books of Hire Purchaser and Hire Vendor – Default and Repossession – Installment System Distinction between Hire Purchase System and Installment Purchase System – Accounting treatment – Books of Buyers and Sellers

UNIT – IV: Partnership Accounts (Admission)

Partnership– Meaning and Features– Types of Partners – Admission of a Partner – Profit & Loss Appropriation account – Adjustment in Profit Sharing Ratio.

UNIT – V: Partnership Accounts (Retirement & Dissolution)

Partnership Accounts – Treatment of Goodwill – Adjustment for Goodwill – Retirement and Death of Partners– Dissolutions of Partnership Firm– Insolvency of a Partner and Partnership Firm– Garner Vs. Murray– Gradual Realisation and Piecemeal Distribution. (Simple Problems only)

Note Weightage of Marks: Theory 20% and Problems 80%.

Reference Books

1. M.C. Shukla, T.S. Grewal, Advanced Accounts, S. Chand & Co. Ltd., New Delhi.
2. T.S. Reddy, & A. Murthy, Financial Accounting, Margham Publications, Chennai.
3. R.S.N. Pillai, Bagavathi & S. Uma, Advanced Accounting {Financial Accounting} Volume, I, S. Chand & Co. Ltd., New Delhi.
4. R.L. Gupta & V.K. Gupta, Financial Accounting, Sultan Chand & Sons, New Delhi.
5. S.P.Jain & K.L. Narang, Advanced Accountancy, Kalyani Publications, New Delhi, Ludhiana.
6. Dr. S. Ganesan, S.R. Kalavathy, Thirumalai Publications, Nagarkoil.

Core Paper – IV Financial Markets (Course Code: U5FA2002)

Semester: II

Hours: 4

Max.Marks:75

Credits: 3

Objective

To know the basic ideas of Indian capital market and understand the functioning of primary and secondary markets, further to familiarize the student about stock trading.

UNIT: I Financial System in India

Functions of Financial System– Capital Markets – its Importance – Money Market – Development of Financial System in India – Weaknesses of Indian Financial System – Money Market Vs. Capital Market.

UNIT: II Primary Market

Meaning – SEBI Functions – Stock Exchange – Functions of New Issues Market – Methods of Floating New Issues – Guidelines – Steps – Instruments – Players – Recent trends – Advantages of New Issues.

UNIT: III Secondary Market

Control of Secondary Market – Recognition and Services of Stock Exchanges – Organisation of Stock Exchanges in India – Traditional Structure of Indian Stock Exchanges – Listing of Securities – A, B and C Group of Shares – Advantages, Drawbacks, Procedure, Criteria and Obligations of Listing.

UNIT: IV Trading

Registration, Procedure, Code of Conduct and Functions of Brokers – Kinds of Brokers – Method of Trading in Stock Exchange – Online Trading – NSE–NEAT System – Carryover or Badla– Genuine Trading Vs. Speculative Transactions – Stock Indices – Recent Developments.

UNIT: V Financial Derivatives

Meaning – Definition– Kinds of Financial Derivatives – Forwards, Futures, Options and Swaps

**Allied Paper – III
Business Law
(Course Code: U5FAAL21)**

Semester: II

Max.Marks:75

Hours: 5

Credits: 4

Objective

To gain a comprehensive knowledge on all aspects of legal rules as to contracts & sale of goods

UNIT – I Formation of Contracts

Essential Elements of Contracts – Types of Contract and Agreement, Rules as to offer, Acceptance and Consideration – Capacity to Contract.

UNIT – II Performance of Contract

Performance of Contract – Discharge of Contract – Breach of Contract and Remedies – Quasi Contracts

UNIT – III Indemnity and Guarantee

Indemnity and Guarantee – Features and Distinctions – Extent of Surety's Liability, Rights and Discharge of Surety – Bailment and Pledge – Features – Difference – Right and Duties of Bailor and Bailee –Right and Duties of Pawnor and Pawnee.

UNIT – IV Contract of Agency

Definition and Meaning – Creation – Ratification and Requisite – Rights of Principal and Agent – Personal Liability of Agent – Termination of Agency – Irrevocable Agency

UNIT – V Sale of Goods Act 1930

Definition of Sale – Sale Vs. Agreement to Sell – Subject Matter – Express and Implied Conditions and Warranties – Caveat Emptor and Exceptions.

Reference Books:

1. Business Laws, N.D.Kapoor, Sultan Chand & Sons, New Delhi.
2. Business Laws, M.C.Dhandapani, Sultan Chand & Sons, New Delhi.
3. Mercantile Law, M.C. Shukla, S.Chand & Co, New Delhi.
4. Business Laws, R.S.N.Pillai & Bagavathi, S.Chand & Co, New Delhi.
5. Business Laws, P.C.Tulsian, Tata McGraw Hill, New Delhi.
6. Premavathi N, Business Law, Srivishnu Publications, Chennai.

Allied Paper – IV

Indirect Taxes

(Course Code: U5FAAL22)

Semester: II

Hours: 4

Max.Marks:75

Credits: 3

Objective

To gain a comprehensive knowledge on all aspects indirect taxes viz., central excise, customs, VAT and service taxes.

UNIT-I CONCEPT OF TAXATION

Constitution of India – Taxation under Constitution – Objectives of Taxation – Canons of Taxation– Direct and Indirect Taxes –Merits– Demerits.

UNIT-II CENTRAL EXCISE DUTIES

Nature –Types – Classification of Goods – Valuation under Central Excise – Registration and Filing returns– Excise and Exports– Excise and Small Scale Industries

UNIT-III SERVICE TAX

Meaning – Characteristics– Nature of Service Tax– Service Provider and Service Receiver – Different services on which tax is payable – Exempted Services– Service Tax procedures.

UNIT-IV CUSTOM DUTIES

Scope – Types – Valuation under Customs – Custom Procedures – Import & Export Procedures – Baggage–Import & Export through Courier – Post Parcel – Exemption – Refunds.

UNIT-V VALUE ADDED TAX

Meaning – Justifications of VAT– Objectives– Advantages– Disadvantages – Types of VAT Registration – Filing of Returns – Refunds

Reference Books

1. Dr. R.K. Leki, Dr. Jogindhar Singh, Public Finance, Kalyani Publishers, New Delhi.
2. T.S. Reddy, & Y.Hari Prasad Reddy – Indirect Taxes, Margham Publications, Chennai
3. K.T. Nagabhushan Swamy, The Tamilnadu VAT Act, 2006, Nagas Publications, Chennai.
4. www.indiaimage.nic.in
5. www.cbec.gov.in

6. www.incometaxindia.gov.in
7. www.taxmann.com.

DEPARTMENT OF COMMERCE [COMPUTER APPLICATION]

SEMESTERS- I & II (UNDER CBCS)

2015-2016

B.Com. [COMPUTER APPLICATION]											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5CA1001	Main	CC01	Financial Accounting I	5	5	3	25	75	100
	CC	U5CA1002	Main	CC02	Principles of Management	4	3	3	25	75	100
	EC	U5CAAL11	Allied I	EC03	Introduction to Information Technology	5	4	3	25	75	100
	EC	U5CAAP12	Allied II	EC04	MS Office Practical I	4	3	3	25	75	100
	TOTAL					30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC05	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC06	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5CA2001	Main	CC03	Financial Accounting II	5	5	3	25	75	100
	CC	U5CA2002	Main	CC04	Business Economics	4	3	3	25	75	100

	EC	U5CAAL21	Allied III	EC07	Tally [Theory]	5	4	3	25	75	100
	EC	U5CAAP22	Allied IV	EC08	Tally [Practical]	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

SEMESTER I
CORE PAPER I
FINANCIAL ACCOUNTING – I
COURSE CODE: U5CA1001

Object:

- * To provide knowledge on the fundamental aspects of financial accounting.
- * To expose the students to various aspects of financial accounting and its current applications.

UNIT-I:

Definition of accounting – Advantages and Limitations of accounting- Need, concepts and conventions - Accounting Equation –Journal, Ledger and Preparation of Trail Balance - Rectification of errors - Self balancing ledgers.

UNIT-II:

Final Accounts - Introduction - Manufacturing Account -Trading Account - Distinction between Capital and Revenue expenditure - Profit and Loss Account - Balance Sheet - Various adjustments - Classification of Assets and Liabilities.

UNIT-III:

Depreciation, Reserves and Provisions - Depreciation, Depletion and Amortization - Objectives of providing depreciation - causes of depreciation - methods of recording depreciation - straight line method - Diminishing Balance Method

UNIT-IV:

Account current - Average Due Date - Insurance claim - Loss of stock - Average clause.

UNIT-V:

Single Entry - Objectives - Definition - Salient features - Limitations of Single Entry - Ascertainment of Profit - Statement of Affairs Method - Conversion Method - Differences between Statement and Affairs and Balance Sheet

REFERENCE BOOKS:

1. M.C.Shukla, T.S.Grewal. Advanced Accounts (volume I) S.Chand & Co., Ltd., New Delhi
2. T.S.Reddy & A.Murthy - Financial Accounting - Marghan Publications, Chennai.
3. R.S.N. Pillai, Bagawathi & S.Uma - Advanced Accounting (Financial Accounting) volume I, S.Chand & Co. Ltd., New Delhi.
4. R.L. Gupta & V.K. Gupta, Financial Accounting, Sultan Chand & Sons, New Delhi
5. S.P. Jain & K.L. Naranj, Advanced Accountancy, Kalyani Publications, New Delhi, Ludhiana.

CORE PAPER II
PRINCIPLES OF MANAGEMENT
COURSE CODE: U5CA1002

Object:

- To introduce the students to the various management concepts
- To explain the various functions of management.

UNIT-I

Concept of Management - Meaning and Definitions - Nature and Characteristics of Management - Management Vs Administration - Levels of Management - Importance of Management and Scope of Management - Principles

UNIT-II

Process of Management - Planning - Its Nature, Need Characteristics, Objectives and Importance of Planning - Types of Planning - Principles of Planning - Steps in Planning Process - Planning Premises - Forecasting - Decision Making.

UNIT-III

Organizing - Principles of Organization - Staffing Functions and Importance of Staffing - Departmentation - Authority and Responsibility - Organization Charts and Manual - Job Analysis and Job Evaluation.

UNIT-IV

Directing: Principles of Delegation - Delegation Vs Decentralization - Principles and Techniques of Directing - Span of Supervision - Fundamentals of Effective Supervision - Role of Communication

UNIT-V

Leadership - Qualities of Good Leader - Types of Leadership - Co-ordination and Control - Problems in Co-ordination - Steps Involved in Control Process.

REFERENCE BOOKS:

1. Business Management - Dr.C.B.Gupta - Sultan Chand & Sons
2. Management principles and Practices - Lallan Prasad & S.S.Gulshan & S.Chand & Co.
3. Principles of management - Koontz, Weihrich and Aryasri & Tata McGraw hill
4. Principles & Practice of Management - Dr.H.C. Das Gupta & Sahitya Bhawan Agra

ALLIED PAPER I**INTRODUCTION TO INFORMATION TECHNOLOGY****COURSE CODE: U5CAAL11****Objective:**

- To provide basic knowledge of information technology and its applications.

UNIT-I:

Introduction: History of Computer parts of Computer System, Hardware devices - Software operating system - Examples of operating system - Computer Networking - Visual Editor.

UNIT-II:

Word processing with Ms Word - starting Ms Word - Ms Environment - working with word documents - working with text - working with tables - checking spelling and grammar - printing document - spreadsheets and Ms Excel - starting Ms Excel - Ms Excel Environment - working with Excel - workbook - working with work.

UNIT-III:

Making presentation with Ms Power point - starting Ms Power point - Ms Power point Environment - working with power point - working with different views - designing presentations - printing in power point

UNIT-IV:

MS-Access: Creating a Data Base –Table –Creating forms using wizard –Generating Reports (Simple).

UNIT-V:

Computer networking basics –Networking Topology –LAN –WAN –Net working Devices –Information System Management –Information Concepts –Planning issues and the MIS Organizing issues and the MIS –Control issues and the MIS –Decision Support System.

REFERENCE BOOKS:

1. Edward Willeh, David Crower & Rohanda Crowder “MS Office 2000 Bible”, IDG Books & India -2000.
2. Sanjay Saxsena, “A First Course in Computer”, Vikas Publishing House, 2000
3. Sanjay saxsena, “MS Office 2000”, Vikas Publishing House, 2000.
4. Linda Tway, Sapphiro Pacific Lajolla, “Multimedia in Action”, Academic Press, 1995.

**ALLIED PAPER II
MS OFFICE (PRACTICALS)
COURSE CODE: U5CAAP11**

Objective:

- To impart basic knowledge of MS-Office to the students so that the students can prepare text documents and Excel sheets and ppt's for presentation.

(A) MS-WORD

1. Usage of Numbering, Bullets, Tools and Headers
2. Usage of Spell Check and Find and Replace
3. Text Formatting
4. Picture Insertion and Alignment
5. Mail Merge Concept
6. Creation of Tables, Formatting Tables
7. Splitting the Screen
8. Inserting Symbols in Documents

(B) MS-EXCEL

1. Changing of Column Width and Row Height (Column and Range of Column)
2. Moving, copying, Inserting and Deleting Rows and Columns
3. Creating Chart.
4. Using Excel Function (Date, Time)
5. Using Excel Function (Statistical Mathematics)
6. Using Excel Function (Financial)

(C) MS-POWER POINT

Working with Slides

1. Creating, saving, Running Slides
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clipart

**II SEMESTER
CORE PAPER III
FINANCIAL ACCOUNTING – II
COURSE CODE: U5CA2001**

Objectives:

- To understand the preparation of accounting for branch and departments
- To understand the treatment of partnership accounting.

UNIT-I

Branch Accounting: Meaning –Objectives –Types of Branch –Debtors System –Stock and Debtors System –Wholesale Branch –Independent Branch (Foreign Branches Excluded).

UNIT-II

Departmental Accounting: Meaning –Need –Advantages –Difference between Branch and Department Account–Apportionment of Expense- Inter Department Transfer.

UNIT-III

Hire Purchase and Installment System: Definition-Feature –Distinction –Accounting Treatment –Calculation of Interest and Cash Price-Default and Repossession –Hire Purchase Trading Account –Installment Purchase System –Meaning –Accounting Treatment.

UNIT-IV

Partnership Account: Definition –Partnership Deed –Past Adjustments and Guarantee – Admission of a Partner –Profit Sharing Ratio and Sacrificing Ratio –Preparation of New Balances Sheet Retirement of a partner Death of Partner

UNIT-V

Dissolution of a Firm: Meaning –Modes of Dissolution –Insolvency of a Partner – Garner Vs Murray's Principles –Insolvency of all partners –Piecemeal Distribution – Proportionate Capital Method –Maximum loss Method.

Reference Books:

1. R.L. Gupta & V.K. Gupta- Advanced Accounting- Sultan Chand- New Delhi.
2. T.S. Reddy & A. Murthy- Financial Accounting- Margham Publication- Chennai
3. Shulka & Grewal- Advanced Accounting- S Chand – New Delhi
4. Jain & Narang- Financial Accounting, Kalyani Publications, New Delhi
5. Jawahar Lal, Seema, Financial accounting, S. Chand & Company, New Delhi

CORE PAPER IV
BUSINESS ECONOMICS
COURSE CODE: U5CA2002

Objective:

To make the students understand the Law of demand, Demand forecasting, Cost concepts and Market structure.

UNIT – I

Nature and scope of economics – Meaning of Business economics - objectives and scope of business economics – Role and Responsibilities of a business economist Meaning of law of demand – exceptions, changes in demand – demand determinants – importance – elasticity of demand – types - measurement – its importance – demand forecasting

UNIT – II

Meaning of production – Production function – Short run and long run – economies and diseconomies of scale – Supply – determinants

UNIT- III

Cost concepts – Kinds of Cost – Cost and output relationship – revenue – total revenue – average revenue – Marginal revenue -curves under perfect & imperfect competition – Break even analysis.

UNIT – IV

Market structure – Pricing under perfect competition – Monopoly – Monopolistic competition

UNIT – V

Inflation – Trade cycle – causes – effects – Monetary policy – Fiscal Policy.

REFERENCE BOOKS

1. Business Economics - S.Sankaran
2. Business Economics - P.N.Reddy and H.R.Appanniah
3. Managerial Economics- R.L.Varasheney and K.L.Maheswari
4. Modern Economic Theory- K.K.Dewett

ALLIED PAPER III
TALLY (THEORY)
COURSE CODE: U5CAAL21

UNIT: I

Introduction to Accountancy – Introduction to Tally fundamentals – Maintenance of company Data – Concept of Ledger – Configuration of chart of Accounts – Maintaining Stock Details - How to make entries in Cash book – Purchase book – Sales book – Invoice – Purchase return book – Sales return book – Petty cash book – Configuration in tally

UNIT: II

Introduction to Bills – Details of bills – Description of: Accounting vouchers – Inventory vouchers – Cost centers and Cost categories – Entries in Trail balance – How to create new groups – master configuration – Accounts masters – readymade creation – List of groups – How to alter groups – creation of primary groups – Secondary group creation

UNIT: III

Introduction to VAT – VAT activation and classification – Creating of ledger – Stationary ledger – Display the created ledger – concepts of voucher – Creation of receipt voucher – Payment voucher – Credit note – Remove the voucher – Print the voucher – Accounting input credit on opening stock – Accounting of interstate branch transfer – VAT computation – VAT Form – CST introduction – Ledger Creation – Creating vouchers – CST reports

UNIT: IV

TDS Introduction – Configuration of Tally for TDS - Creation of balance sheets – concept of trial balance in tally – balance sheet – sales registers – Purchase registers – Sales vouchers – concept of ageing – receivable ageing – receivable ageing – TDS Report – Configuring Tally for Service Tax – Master Creation – Service Tax Reports

UNIT: V

Bank reconciliation – Concept of inventory – Inventory in tally – creation of stock category – stock groups – creation of multi stock item – inventory vouchers – Inventory reports – Printing Reports – Consolidation of Accounts and other reports – Security control

BOOKS RECOMMENDED:

1. TALLY, Sridharan, Narmadha publications, May 2003.
2. E-Commerce, a guidance, Rajamalar, Narmadha publications, May 2003.

ALLIED PAPER IV
TALLY PRACTICAL
COURSE CODE: U5CAAP21

1. Create a group in Tally
2. How to create a primary group? Explain with your own example
3. Create Ledger with your own entries from the books already available
4. Explain how to create Voucher entries including preparation of final accounts.
5. Explain how to remove voucher entries.

6. Print the Voucher you have created with all necessary entries
7. Explain how to create stock category.
8. Explain how to create groups with your own entries.
9. Explain – Multi Stock Item
10. Creation of Delivery Note – Explain with your entries.

DEPARTMENT OF HISTORY

SEMESTERS- I & II (UNDER CBCS)

2015-2016

B.A. HISTORY											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5HI1001	Main	CC01	History of India Upto 1206 AD	5	5	3	25	75	100

	CC	U5HI1002	Main	CC02	History of Tamil Nadu from Sangam Age to Imperial Cholas	4	3	3	25	75	100
	CC	U5HIAL11	Allied I	CC03	Tourism Principles and Policies	5	4	3	25	75	100
	EC	U5HIAL12	Allied II	EC03	Intellectual History of 20th Century India	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5HI2001	Main	CC04	History of India from 1206 to 1707 AD	5	5	3	25	75	100
	CC	U5HI2002	Main	CC05	History of Tamil Nadu from Second Pandiyan Empire to 1806 AD	4	3	3	25	75	100
	CC	U5HIAL21	Allied III	CC06	Tourism Resources of India	5	4	3	25	75	100
	EC	U5HIAL22	Allied IV	EC06	Intellectual History of 20th Century Tamil Nadu	4	3	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

I SEMESTER

CORE PAPER I

HISTORY OF INDIA UPTO A.D. 1206

(Hrs/Week: 5, Credit: 5)

COURSE CODE: U5HI1001

UNIT - I

Meaning, Nature and Scope of History – Ancient Indian Historiography – Sources of Indian History – Geographical Features and Its Influence on Indian History

UNIT - II

Indus Valley Civilization: Indus Script, Great Bath and Granary, Town Planning, Economy and Trade, Religious Life – Early Vedic Period: Political, Social and Economic Life – Status of Women – Religion – Later Vedic Period: Political, Social and Economic Life – Status of Women – Education – Religion

UNIT - III

Jainism: Mahavira and His Teachings, Jain Literature – Buddhism: Gautama Buddha and His Teachings, Buddhist Literature – Alexander's Invasion

UNIT - IV

Mauryan Empire: Chandragupta, Asoka, Decline of Mauryas – Gupta Empire: Chandra Gupta I, Samudra Gupta, Chandra Gupta II – Decline of Guptas – Harsha Vardhana and His Times

UNIT - V

Chalukyas – Rashtrakutas – Kakatiyas – Arab Invasion of Sindh – Turko-Afghan Invasion: Mahmud Ghazni, Muhammad Ghori

Maps:

1. Sites of Indus Valley Civilization
2. Route of Alexander's Invasion
3. Samudra Gupta's Empire
4. Ashoka's Empire
5. Harsha's Empire

Books for Reference:

1. R.C. Majumdar, H.C. Raychaudhuri & K. Dutta: An Advance History of India, Macmillan India Limited., 2004, New Delhi
2. Romila Thapar: Ancient India, Penguin India Ltd., New Delhi, 1998
3. D.N. Jha: Ancient India, Manohar Publishers, New Delhi, 2004
4. J.C. Agarwal: Ancient Indian History, S.Chand & Co., New Delhi
5. A.L. Basham: The Wonder That Was India, OUP, New Delhi
6. L. Mukerjee: Ancient India, New Delhi

I SEMESTER

CORE PAPER II

HISTORY OF TAMIL NADU FROM SANGAM AGE TO THE IMPERIAL CHOLAS (Hrs/Week: 4, Credit: 3) COURSE CODE: USHI1002

UNIT - I

Influence of Geography and Topography on the history of Tamil Nadu – Sources – Races and Tribes – Dravidians – Pre History of the Tamils – Aryanization.

UNIT - II

Physical features of Tamil Nadu in the Sangam Age – Sangam Age: Early Chera, Chola and Pandyas – Sangam Literature – The Chieftains – Socio and economic condition of Sangam people

UNIT - III

The period of Kalabrahms – Religious Practices and Culture – The Rise of Pallavas

UNIT - IV

Later Pallavas – Pandyas of Madurai – The Pallava-Chalukya conflicts – The Pallava Rashtrakuta conflicts – Decline of the Pallavas – Administration and Social life – Literature – The Pallava Art and Architecture – Bakthi Movement

UNIT - V

The Rise of the Imperial Cholas – The Chola-Pandya conflicts – The Chalukya Cholas – The Chola Overseas Empire – Decline of the Cholas – Administration and Social life – Art and Architecture

Books for Reference

1. Dikshidar V.R.R.: Studies in Tamil literature and History
2. Gopalan. A.: Pallavas of Kanchi
3. Gilbert Stater: Dravidian elements in Indian culture
4. Kanagasabai.V: The Tamils in 1800 years ago
5. Krishnasamy Aiyangar.S: Beginnings of South Indian History
6. Dr. Meenakshi C: Administration and social life under the Pallavas, University of Madras, Madras 1977.
7. Sadasivapandarathar: Previous history of Cholas.
8. Sadasivapandarathar: History of Pandyas.
9. Rajamanickam Pillai: Pallava History
10. Rajamanickam Pillai: History of Cholas.

I SEMESTER

ALLIED PAPER I

TOURISM PRINCIPLES AND POLICIES

(Hrs/Week: 5, Credit: 4)

COURSE CODE: U5HIAL11

UNIT - I

History of Tourism – Definition, Nature, Scope and Importance of Tourism – National Tourism Action Plan 1992

UNIT - II

Kinds of Tourism: Historical Tourism – Cultural Tourism – Religious Tourism – Medical Tourism – Adventure Tourism

UNIT - III

Components of Tourism: Travel Agents – Tour Operators – Tourist Information and Guiding Service – Transportation – Accommodation and Catering – Attractions

UNIT - IV

Tourism Organizations: World Tourism Organization, International Air Travelers Association, Pacific Asia Travel Association, Indian Association of Tour Operators

UNIT - V

Tourism as an Industry: Government Policies – Tourism and Economy – Social, Cultural and Environmental Impact of Tourism

Books for Reference:

1. Bhatia, A.K.: Tourism Development: Principles and Practices, Sterling Publishers Pvt., Ltd., New Delhi, 1989
2. Bhatia, A.K.: International Tourism Management, Sterling Publishers Pvt., Ltd., New Delhi, 1992
3. Burkart A.J. and Madlik: Tourism, Past, Present and Future, Heinemann, London, 1994
4. Sinha P.C.: Tourism Evolution, Scope, Nature and Organization, Anmol Publications Pvt., Ltd., New Delhi
5. Panda Tapan, K, Srikantha Mishra and Birsaj Bhusan Parida (Eds.): Tourism Development: The Socio-Economic and Ecological Perspective, Universities Press, Hyderabad, 2004
6. Karthik C. Roy, Clement A. Tisdell: Tourism in India and India's Economic Development, Nova Science Publishers, USA, 1998
7. Arun Kumar Sarkar: Action of Plan and Priorities in Tourism Development, Kanishka Publishers, New Delhi
8. Kaul R.H.: Dynamics of Tourism: A Trilogy, Sterling Publishers Pvt., Ltd., New Delhi

I SEMESTER**ALLIED PAPER II****INTELLECTUAL HISTORY OF 20TH CENTURY INDIA**

(Hrs/Week: 4, Credit: 3)

COURSE CODE: U5HIAL12

UNIT - I

India at the beginning of the 20th Century-Political Condition – Social Condition – Economic Condition- Course of Freedom Movement.

UNIT - II

Political Thought: B.G.Tilak – Mahatma Gandhi – B.R.Ambedkar – S.V. Patel – Subash Chandra Bose – Jawaharlal Nehru- Jayaprakash Narayan- Maulana Abul kalam Azad.

UNIT - III

Social Thought: Vinoba Bhave – Dr. Muthulakshmi Reddy – Periyar E.V.R – Mother Theresa.

UNIT - IV

Socialist and Communist: M.N.Roy – S.A. Dange – Ram Manohar Lohia – E.M.S. Namboodiripad.

UNIT - V

Literatures: Rabindranath Tagore – Muhammed Iqbal – Subramanya Bharathi – Thiru Vi. Ka-Sarojini Naidu-Bharathidasan

Books for Reference:

1. Naravane, V.S.: Modern Indian Thought, Orient Longman, New Delhi.
2. Grover, B.L. & Grover, S: A New Look at Modern Indian History (from 1707 to the Modern times)
3. Nanda, B.R: Jawaharlal Nehru, Rebel and statesman, Oxford University Press, Delhi 1995.
4. Gopalakrishnan, M.D.: Periyar, Father of Tamil Race, Emerald Publishers, Chennai.
5. Bharathi: Mahatma Gandhi, Man of the Millennium, S.Chand & co, New Delhi, 2000.

II SEMESTER**CORE PAPER III****HISTORY OF INDIA FROM A.D. 1206 TO A.D. 1707**

(Hrs/Week: 5, Credit: 5)

COURSE CODE: U5HI2001

UNIT - I

The Slave Dynasty: Qutbuddin Aibak – Iltutmish – Razia Sultan – Balban

The Khilji Dynasty: Alauddin Khilji – His Southern Expedition – His Market Reforms
The Tughluq Dynasty: Muhammad bin Tughluq – His Schemes – Firoz Shah Tughluq – His Reforms - Timur's Invasion – The Sayyids – The Lodis

UNIT - II

Delhi Sultanate: Administration – Art and Architecture – Downfall

UNIT - III

The Great Mughals: Babar – First Battle of Panipat – Humayun – Second Battle of Panipat – Sher Shah – His Administration – Akbar – Din-e-Ilahi – Jahangir and Noor Jahan

UNIT - IV

Shah Jahan – Golden Age of the Mughals – Aurangzeb – His Deccan Policy

UNIT - V

Mughal Administration – Art and Architecture – Rise of Shivaji – His Administration – Birth of Sikhism – Guru Nanak

Maps:

Alauddin Khilji's Empire
Malik Kafur's Southern Expedition
Muhammad bin Tughluq's Empire
Mughal Empire under Akbar
Mughal Empire under Aurangzeb

Books for Reference:

1. Majumdar, H.C. Raychaudhuri & K. Dutta: An Advance History of India, Macmillan India Limited. 2004, New Delhi
2. Charusis: Medieval History of India, Kings Books, Delhi
3. Sharam: The Crescent in India, Lakshmi Narain Agarwal, 1983
4. L.P. Sharma: History of Medieval India, Konark Publishers Pvt., Ltd., 1997, Delhi

II SEMESTER

CORE PAPER IV

HISTORY OF TAMIL NADU FROM SECOND PANDYAN EMPIRE TO A.D. 1806

(Hrs/Week: 4, Credit: 3)

COURSE CODE: U5HI2002

UNIT - I

Second Pandyan Empire – The Chola-Pandya conflict – Hoysala and Rashtrakuta interference in Tamil Nadu – Invasions of Malik Kafur and Ulugu Khan – Fall of The Pandyan Empire – Account of Marcopolo and Abdullah Wassaf – Administration and Social life – Art and Architecture

UNIT - II

The founding of the Sultanate of Madurai – Jalaluddin Hasan Sha – The Rise of Vijaya Nagar Empire – Kumarakampana – Decline of the Madurai Sultanate – Impact of Islam –

Administration – Art and Architecture – Social life and Cultural Expansion

UNIT - III

The Fall of Vijayanagar Empire – The Rise of Nayaks of Madurai – Gingee – Tanjore – Vellore – Administration – Art and Architecture – Social life and Cultural Expansion

UNIT - IV

The Mughal Invasion – Zulfiqar Khan – Nawabs of Arcot – Poligar System – The Marathas of Gingee and Tanjore – The Rise of Sultanat-e-khudadat – Hyder Ali and Tipu Sultan – Society – Literature – Art and Architecture

UNIT - V

The Coming of the Europeans – European Settlements in Tamil Nadu – British East India Company – Carnatic Wars – Mysore Wars – Virapandiya Katta Bomman – Marudhu Brothers – Poligar Rebellion – South Indian Confederacy and the Rebellion – Vellore Mutiny of 1806

Books for Reference

1. Majumder. R.C: The History and culture of Indian People. Vols.VI to X
B.V.Bhavan – Bombay – 1976
2. Rajayyan K.: History of Madurai 1736 – 1801.
3. Rajayyan K. : South Indian Rebellion, The First war of Independence
4. Rajayyan K. : Administration and Society in the Carnatic
5. Rajayyan K. : Rise and fall of the Poligars of Tamil Nadu
6. Sathiyanaithaier.R. : Tamilaham in the 17th Century Madras – 1956
7. Sathiyanaithaier.R. A History of the Nayakas of Madurai – Ananda Book Deopt.
8. Srinivasachari.C: A History of Gingee and its Rulers – Annamalai Nagar.

II SEMESTER

ALLIED PAPER III

TOURISM RESOURCES OF INDIA

(Hrs/Week: 5, Credit: 4)

COURSE CODE: U5HIAL21

UNIT - I

Historical Resources: Qutub Minar, Red Fort, India Gate, Jantar Mantar, Teen Murti Bhavan, Taj Mahal, Fatehpur Sikri. Hawa Mahal, **Religious Resources:** Char Dham Yatra, Vaishnavadevi Temple, Haridwar, Bodhgaya, Mount Abu, Jamia Masjid Delhi, Ajmer Shareef, Golden Temple

UNIT - II

National Parks and Wildlife Sanctuaries: Corbett National Park, Kanha National Park, Sanjay Gandhi National Park, Kaziranga National Park, Gir Wildlife Sanctuary, Mudumalai Wildlife Sanctuary

UNIT - III

Bird Sanctuaries: Salim Ali Bird Sanctuary, Porbandar Bird Sanctuary, Nawab Ganj Bird Sanctuary, Nalsarovar Bird Sanctuary, Vedanthangal Bird Sanctuary – **Waterfalls:** Kunchikal Waterfalls, Jog Falls, Meenmutti Waterfalls, Hogenakkal Waterfalls, Kutralam Waterfalls

UNIT – IV

Hill Stations: Shimla, Darjeeling, Nainital, Srinagar, Mussoorie, Ooty – **Seaside Resorts:** Goa Beaches, Havelock Beach, Paradise Beach, Marina Beach, Kovalam Beach

UNIT - V

Luxury Trains and Spas: Palace on Wheels, Golden Chariot, Deccan Odyssey, Fairy Queen – **Fairs and Festivals:** Id-ul-Fitr, Id-ul-Azha, Pongal, Dassehra, Holi, Durga Puja, Diwali, Christmas, Kumbh Mela, Pushkar, Baishakhi

Books for Reference:

1. Michael George: Monuments of India, Vol.1 and 2, London, 1988
2. Percy Brown: Indian Architecture: Buddhist and Hindu, Bombay, 1972
3. Percy Brown: Indian Architecture: Islamic Architecture, Bombay, 1972
4. Oki Morihiro: Fairs and Festivals, World Friendship Association, Tokyo, 1988
5. Vikram Bhat: Hill Stations of India, Grantha, U.K.
6. Bikram Grewal(Ed.): Indian Wildlife
7. Michael Coltman: Tourism Marketing, Van Nostrand Reinhold, New York, 1989
8. Sinha, P.C.: Tourism Marketing, Anmol Publishers, New Delhi, 2002

IV SEMESTER

ALLIED PAPER IV

INTELLECUAL HISTORY OF 20TH CENTURY TAMIL NADU

(Hrs/Week: 4, Credit: 3)

COURSE CODE: U5HIAL22

UNIT – I

Political: Pasumpon Muthuramalinga Thevar- Thillaiyadi Valliammai- Rettamalai Srinivasan- M.C.Raja- Rajaji- E.V.Ramaswamy Naicker-

UNIT - II

Social: Ramalinga Adigal- Vallal Alagappan- Bharathidasan- Arcot Brothers- Ida Scudder- Jamal Mohammed

UNIT - III

Religious: Joseph Constantine Beschi-Vaikuntha Swamikal- Mrs. Annie Besant- Umaru Pulavar- Kirubananda Variyar- Swami Shajananda

UNIT - IV

Cultural : Seethakadi- Ayodhya Dasa pandithar- G.Subramania Iyer- M.S. Subbulakshmi- Pattukottai Kalyana Sundaram- Kannadasan- Padma Subramaniam- Justice M.M. Ismail

UNIT – V

Scientific: G.D. Naidu – M.S. Swaminathan- Rangarajan (Sujatha)- - Dr. Abdul kalam- Mayilsamy Annadurai

Books for Reference

1. Paramarthalingam.C. Religion and Social Reform in Tamil Nadu, Rajkumari Publications, Madurai, 1997
2. Sen, S.P. (Ed.), Social and Religious Reform Movements in the 19th and 20th centuries, Calcutta Institute of Historical Studies, 1979.
3. Pillai K.K.: Tamilagavaralarum, MakkalumPanpadum (Tamil) Internationalinstitute of TamilStudies, Chennai 2004
4. Rajayyan.k. History ofTamilNadu (1585- 1982), Raj Publishers, Madurai 1982
5. Vishwanathan, E.Sa: The Political Career of E.V.R., Ravi& Vasanth Publications, Madras, 1983
6. Sivagnanam M.P. ViduthalaiPoril Tamilagam (Tamil) Vol. I&II, Poongodi Pathippagam, Chennai 2005

DEPARTMENT OF MATHEMATICS

SEMESTERS- I & II **(UNDER CBCS)**

2015-2016

B.Sc. MATHEMATICS											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5MS1001	Main	CC01	Algebra and Trigonometry	7	7	3	25	75	100
	CC	U5MS1002	Main/ Main Pract.	CC02	Computational Laboratory I	2	1	3	25	75	100
	CC	U5MSAL11	Allied	CC03	Numerical Methods I	7	6	3	25	75	100
	EC	U5MSAP11	Allied Pract.	EC03	Problem Solving Techniques I	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5MS2001	Main	CC04	Calculus & Solid Geometry	7	7	3	25	75	100
	CC	U5MS2002	Main Pract.	CC05	Computational Laboratory II	2	1	3	25	75	100
	CC	U5MSAL21	Allied	CC06	Numerical Methods II	7	6	3	25	75	100

	EC	U5MSAP21	Allied Pract.	EC06	Problem Solving Techniques II	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

SEMESTER I

Paper I	ALGEBRA AND TRIGONOMETRY	Code : U5MS1001
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Objectives: Students are exposed to topics like Theory of Equations, Summation of Series, Matrices, Expansions of trigonometric functions, hyperbolic and inverse hyperbolic functions. It develops logical and systematic computational skills.

UNIT-I: THEORY OF EQUATIONS

Polynomial Equations – Imaginary and Irrational roots – Symmetric functions of roots in terms of Coefficients – Sum of r th powers of roots – Reciprocal Equations – Transformation of Equations – Approximate Solutions of Polynomials by Newton's method and Horner's method.

UNIT-II: SUMMATION OF SERIES

Summation of series using Binomial, Exponential and Logarithmic series (Theorems without proof) – Approximations

UNIT-III: MATRICES

Symmetric, Skew Symmetric – Hermitian, Skew Hermitian – Orthogonal and Unitary Matrices – Cayley Hamilton Theorem (without proof) – Eigen Values – Eigen Vectors – Diagonalization – Simple Problems.

UNIT- IV: EXPANSIONS

Expansions of $\sin n\theta$ and $\cos n\theta$ – Expansion of $\tan n\theta$ in terms of $\tan \theta$ – Powers of Sines and Cosines of θ in terms of functions of multiples of θ – Expansions of $\sin^n \theta$, $\cos^n \theta$ in a series of ascending powers of θ

UNIT – V: HYPERBOLIC AND INVERSE HYPERBOLIC FUNCTIONS

Definition – Relations between Hyperbolic functions and Circular functions – Inverse Hyperbolic functions – Simple Problems.

RECOMMENDED TEXT:

1. ALGEBRA Vol. – I & II, *T. K. Manickavachagompillay, T. N. Natarajan and K. S. Ganapathy*, (2007), S. Viswanathan Printers & Publishers Pvt. Ltd, Chennai.
2. MATHEMATICS FOR B.SC. Vol. –I, II, III & IV, *P. Kandasamy and K. Thilagavathy*, (2004), S. Chand & Company Ltd, New Delhi.
3. TRIGONOMETRY, *S. Narayanan and T. K. Manickavachagom Pillay*, (2004), S. Viswanathan Printers & Publishers Pvt. Ltd, Chennai.

REFERENCES:

1. ALGEBRA, *S. Arumugam*, (2003), New Gamma Publishing House.
2. ALGEBRA AND TRIGONOMETRY, Vol. I & II, Meenakshi Agency.

SEMESTER I

Main Practical I	Computational Laboratory I	Code : U5MSPR11
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List of Exercises

1. Finding the roots of polynomial equations
2. Finding sum of infinite series
3. Matrix manipulations
4. Rank of a matrix
5. Evaluation of Determinant
6. Finding Eigen values
7. Finding Eigen vectors

REFERENCES:

MATLAB MANUAL

SEMESTER I

Allied Paper I	NUMERICAL METHODS – I	Code : U5MSAL11
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Objectives: This course covers the basic method for forming difference table, essence of interpolation techniques, solving algebraic equations and system of linear equations.

UNIT – I: FINITE DIFFERENCES AND OPERATORS

First and Higher order differences – Forward and Backward difference – Properties of operators – Difference of a polynomial – Factorial polynomials – Operator E–Relation between Δ , ∇ and E.

UNIT – II: INTERPOLATION FOR EQUAL INTERVALS

Newton Gregory Forward and Backward interpolation formulae – Gauss forward and backward difference formulae – Stirling's formula – Bessel's formula – Problems based on them.

UNIT – III: INTERPOLATION FOR UNEQUAL INTERVALS

Divided differences – Newton's divided differences formula and Lagrange's formula – Estimating the missing terms (with one or two missing values)

UNIT – IV: INVERSE INTERPOLATION

Lagrange's method and Reversion of series method (Using Newton's forward formula only) – Summation of series – Sum to n terms of the series whose general term is the first difference of a function

UNIT –V: SOLUTIONS OF SMULTANIOUS LINEAR EQUATIONS

Gauss Elimination method – Matrix inversion method, Gauss Jordon method – Gauss Seidal Method (upto three unknowns only)

RECOMMENDED TEXT:

NUMERICAL ANALYSIS, *B. D. Gupta*, (2001), Konark Pub. Ltd., Delhi.

REFERENCES:

1. FINITE DIFFERENCES AND NUMERICAL ANALYSIS, *H. C. Saxena*, (1991), S. Chand & Co Ltd., New Delhi.
2. CALCULUS OF FINITE DIFFERENCES AND NUMERICAL ANALYSIS, *P.Kandasamy, K. Thilagavathy*, (2003), S. Chand & Co Ltd., New Delhi.

SEMESTER I

Allied Practical I	Problem Solving Techniques I	Code : U5MSAP11
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List of Exercises

1. Computing expressions
2. Operations on Vectors
3. Operations on Sets
4. Permutation and Combinations
5. Differential Calculus

REFERENCES:

MATLAB MANUAL

SEMESTER II

Paper II	CALCULUS AND SOLID GEOMETRY	Code : U5MS2001
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Objectives: The course introduces students to the fundamental principles, concepts and knowledge in the areas of Differential, Integral Calculus and Analytical Geometry of Three Dimensions. This prepares the students to apply these fundamental concepts and working knowledge to other courses.

UNIT – I Differential Calculus

n^{th} Derivative – Leibnitz's theorem (without Proof) and its application – Jacobians – Total Differentiation – Maxima and Minima functions of two and three independent variable – Lagrange's method (without proof), problems.

UNIT – II Applications of Differential Calculus

Curvature, Radius of Curvature in Cartesian and Polar coordinates – p-r equation – Evolutes and Envelopes – Asymptotes: Methods (without proof) of finding Asymptotes of rational algebraic curves with special cases.

UNIT – III Integral Calculus – I

Integration – Definite integral – Properties of definite integrals – Method of integration – integral of functions involving $a^2 \pm X^2$ - integral of function of the form $\int \{f(x)\}^n f'(x)dx$ and $\int F[f(x)] f'(x)dx$ - Integration of rational algebraic Functions – integration of irrational functions.

UNIT – IV Integral Calculus – II

Integration by Parts – Reduction formula – Bernoulli's formula – Double and triple integrals – Transformation of coordinates – Cylindrical polar coordinates – Change of order of integration – Application of multiple integrals – Beta and Gamma functions – Relation between Gamma and Beta function.

UNIT – V Analytical Geometry

Planes and Straight lines – Symmetrical form of straight line, Coplanar lines, Skew lines, intersection of a plane and a line – Sphere: Section of a sphere by a plane – Tangent

plane– Orthogonal Spheres – Cone : Equation of cone – Cone whose vertex is at the origin – Quadratic Cone with the vertex at the origin – Right circular cone.

RECOMMENDED TEXTS:

1. CALCULUS, *S. Narayanan and T. K. Manickavachagom Pillay*, (2004), S.Viswanathan Printers & Publishers, Chennai.
2. MATHEMATICS FOR B.SC. Vol. I, II, III & IV, *P. Kandasamy and K. Thilagavathy*, (2004), S. Chand & Co., Ltd, New Delhi.
3. ANALYTICAL GEOMETRY (TWO AND THREE DIMENSIONS), *T.K.Manickavachagom Pillay & others*, (2007), S.Viswanathan Printers & Publishers, Chennai.

REFERENCES:

1. DIFFERENTIAL CALCULUS, *Shanti Narayan*, (2001), S. Chand & Co., New Delhi.
2. CALCULUS AND ANALYTICAL GEOMETRY, *G. B. Thomas and R. L. Finney*, (1998), Addison Wesley (9th Edition).
3. ANALYTICAL GEOMETRY (TWO AND THREE DIMENSIONS), *P. Duraipandiyan and Laxmi Duraipandiyan*, Asia Publishing Company.

SEMESTER II

Main Practical II	Computational Laboratory II	Code : U5MSPR21
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List of Exercises

1. Differentiation
2. Finding Maxima and minima of functions of two and three variables
3. Jacobians
4. Radius of curvature
5. Plotting Straight lines, planes, sphere and cone
6. Visualization of intersection of Plane and Line; Sphere and plane.

REFERENCES:

MATLAB MANUAL

SEMESTER II

Allied Paper II	NUMERICAL METHODS – II	Code : U5MSAL21
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Objectives: This course will cover advanced methods for numerical differentiation, numerical integration and numerical solution of ordinary differential equations.

UNIT – I: NUMERICAL DIFFERENTIATION

Newton's forward and backward differences to compute the derivatives – Derivative using divided difference formula – Maxima and Minima using the above formulae

UNIT –II: NUMERICAL INTEGRATION

General Quadrature formula – Trapeziodal rule – Simpson's 1/3 rd rule – Simpson's 3/8th rule – Weddle's rule

UNIT –III: DIFFERENCE EQUATIONS

Linear difference equations – Linear homogeneous difference equation with constants coefficient – Particular integrals of the form a^x , $x^m \sin ax$, $x^m \cos ax$.

UNIT –IV: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

Bisection method– Iteration method – Regula falsi method– Newton Raphson's method

UNIT –V: NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

Euler's method – Modified Euler's method – Picard's method – Taylor's method – Runge Kutta methods

RECOMMENDED TEXT:

NUMERICAL ANALYSIS, *B. D. Gupta*, (2001), Konark Pub. Ltd., Delhi

REFERENCES:

FINITE DIFFERENCE AND NUMERICAL ANALYSIS, *H.C. Saxena*, (1991), S. Chand & Co. Delhi.

SEMESTER II

Allied Practical II	Problem Solving Techniques II	Code : U5MSAP21
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List of Exercises

1. Matrices Manipulations
2. Testing Consistency of System of Equations
3. Integration
4. Applications of Integration to Area and volume
5. Plotting of 2D and 3D objects.

REFERENCES:

MATLAB MANUAL

DEPARTMENT OF PHYSICS

SEMESTERS- I &II

(UNDER CBCS)

2015-2016

B.Sc PHYSICS											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5PY1001	Main	CC01	Properties of Matter and Acoustics	5	5	3	25	75	100
	CC	U5PYPR11	Main Pract.	CC02	Main Practical I	4	3	3	25	75	100
	CC	U5PYAL11	Allied	CC03	Chemistry I	7	6	3	25	75	100
	EC	U5PYAP11	Allied Pract.	EC03	Chemistry Practical I	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5PY2001	Main	CC04	Thermal Physics	5	5	3	25	75	100
	CC	U5PYPR21	Main Pract.	CC05	Main Practical II	4	3	3	25	75	100
	CC	U5PYAL21	Allied	CC06	Chemistry II	7	6	3	25	75	100
	EC	U5PYAP21	Allied Pract.	EC06	Chemistry Practical II	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

CORE PAPER I
(For students admitted during the academic year 2015-16)
PROPERTIES OF MATTER AND ACOUSTICS

COURSE CODE: U5PY1001

Objective: *It is aimed at exposing the undergraduate students to study the physical properties of materials and fundamentals of acoustics*

Unit I -Elasticity

Hooke's law – Modulus of Elasticity – Relation between elastic constants – Poisson's Ratio–Expression for Poisson's ratio in terms of elastic constants – Work done in stretching and work done in twisting a wire – Torsional pendulum (with & without masses) – Bending of beams - Expression for bending moment – Cantilever – Expression for depression at the loaded end - oscillations of a Cantilever – Expression for time period- Determination of young's modulus by Koenig's method – Uniform bending

Unit II – Viscosity and Low Pressure

Newton's law- Poiseuille's flow – Stokes flow – Rotation Viscosimeter - Comparison of viscosity of two liquids using Ostwald's Viscometer – Meyer's formula for Viscosity of gas – Rankine's method – Effect of temperature and pressure on viscosity - Rotary pump – Knudsen absolute gauge – Pirani gauge – Detection of leakage.

Unit III - Surface Tension

Molecular interpretation - Surface energy – Pressure difference across curved surface – Excess of pressure in liquid drops and air bubbles – Shapes of liquid meniscus in capillary tube – Angle of contact – Variation of Surface tension with temperature – Jaegar's method – Drop weight method- Vapour pressure over flat and curved surfaces

Unit IV - Waves and oscillations

Simple harmonic motion – Free, damped, forced vibrations and resonance – Velocity of Transverse wave in a stretched string – Energy in wave motion – Superposition of waves – Interference, reflection and transmission of wave – Sound waves in gases – Organ pipes -Beats – Doppler effect.

Unit V – Ultrasonics and Acoustics

Ultrasonic waves – Piezo-electric effect - Piezoelectric generator - Magnetostriction Oscillator – Detection and applications of Ultrasonics – Acoustics – Reverberation time and its measurements - Sabine’s formula - Absorption coefficient and its determination – Conditions for good acoustical design of auditorium – Noise and its measurements - Noise reduction

Books for study

1. Properties of matter by Murugesan R, S Chand & Co. Pvt. Ltd., New Delhi
2. Properties of matter by Brij Lal & Subramaniam, N Eurasia publishing Co., New Delhi, 1989
3. Text book of sound by Brij Lal & Subramaniam, N Vikas Publishing House, New Delhi, 1982
4. Text book of sound by M N Srinivasan – Himalaya Publications (1991)
5. Science and technology of Ultrasonics by Bladevraj, Narosa (2004)

Books for Reference

1. Elements of Properties of Matter by Mathur D S, Shyamlal Charitable Trust, New Delhi, 1993
2. Fundamentals of General Properties of Matter by Gulati H R, R Chand & Co. New Delhi, 1982
3. Waves & Oscillations by Subrahmanyam N & Brij Lal, Vikas Publishing House Pvt. Ltd., New Delhi, 1994
4. A Textbook of Sound by Khanna D R & Bedi R S, atma Ram & Sons, New Delhi 1985
5. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY 2001.

SEMESTER-I
I B.Sc- Main Practical- I
COURSE CODE: U5PYPR11

Objective: It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical and thermal properties of matter.

List of Experiments (All ten experiments compulsory)

1. Young's modulus – non uniform bending – pin and microscope.
2. Young's modulus – non uniform bending – optic lever – Scale and Telescope.
3. Surface tension and interfacial surface tension – by drop weight method.
4. Sonometer – frequency of a tuning fork.
5. Sonometer – Determination of AC frequency Using steel wire (Electromagnet)
6. Specific heat capacity of a liquid – Method of mixtures.
7. Focal length of convex lens.
8. Spectrometer – Hollow prism - μ of a liquid.
9. Potentiometer – Calibration of low range voltmeter.
10. Characteristic of Junction diode

Books for Reference

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Textbook of practical Physics, Sultan Chand & Sons
2. C.C Ouseph, G. Rangarajan, R. Balakrishnan- A Textbook of practical Physics- S. Viswanathan Publisher-PartII (1996)

Allied Paper- I ALLIED PHYSICS

CLASS: I B.Sc CHEMISTRY
COURSE CODE: U5CHAL11

Objective: This paper is offered to the students of mathematics, Chemistry and Computer Science as allied Subjects. The logical reasoning behind the description of the physics problem and obtaining the solution to such problems are taught in this paper.

UNIT I - PROPERTIES OF MATTER (2 Hrs)

Elasticity: Hooke's law-Elastic constants – bending of beam – Bending moment – cantilever Depression at the loaded end of a cantilever – determination of Young's modulus by non-uniform bending.

Torsion: Torsion couple – Potential energy in a twisted wire – Torsional pendulum – Time period – Rigidity Modulus – Determination of rigidity modulus by Torsional oscillation (without masses) .

Viscosity: viscosity of a liquid – Viscous force – Co-efficient of viscosity of a liquid – comparison of viscosities of two liquids by graduated burette method.

Surface Tension: Surface Tension –interfacial tension – determination of surface tension and interfacial tension by the method of drops.

UNIT II – Heat (1 Hrs)

Specific heat – Callender’s Barne’s method to determine the specific heat of a liquid – Newton’s law of cooling – determination of specific heat of a liquid using Newton’s law of cooling – Emissivity and Emissive power- Kirchoff’s laws of radiation

UNIT – III – Electricity and Magnetism (2 Hrs)

Electricity: Potentiometer – Principle – Calibration of low range voltmeter - Measurement of internal resistance of cell – measurement of an unknown resistance- Capacitance of a conductor - Capacitance of spherical and parallel plate capacitor – energy of a charge capacitor - Loss of energy due to sharing of charges

Magnetic effect of electric current: Biot- Savart law – Magnetic flux- Magnetic Induction at a point due to a straight conductor carrying current –Moving coil ballistic galvanometer.

Magnetism –Moment and pole strength of a magnet – Deflection magnetometer – Tan C position – Vibration magnetometer – Theory – period of oscillation

UNIT IV- SOUND AND ACOUSTICS OF BUILDING (1 Hrs)

Sound: Transverse vibration of strings – Vibration of strings – Velocity and frequency of vibrations of a stretched string – laws of vibrations along a stretched string – sonometer – A.C. Frequency - Steel wire – Brass wire. Ultrasonics – Production by Piezo – electric method – properties and uses

Acoustics of buildings: Reverberation – Reverberation time – Sabine’s formula [definition only] – Sound absorption co-efficient of surface – conditions for the perfect acoustics.

UNIT V- OPTICS (1 Hrs)

Physical Optics: Interference –Air Wedge –description - Determination of diameter of a thin wire by air wedge.

Diffraction: Theory of transmission grating – Normal Incidence – Determination of Wavelength of monochromatic source and Wavelength of mercury lines using a grating by normal Incidence.

Polarisation: Optical activity –specific rotatory power – Polarimeter – Determination of specific rotatory power of a solution using the polarimeter.

Books for study:

1. Allied Physics – R. Murugesan S. Chand & Co. First Edition (2005)
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book department, Chennai.
3. Allied Physics – Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter – D.S Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound – by M. Narayanamoorthy and other National Publishing companies (1986).

Books for Reference:

1. Modern Physics –R. Murugesan S. Chand & Co.(2004)

2. Electronic Principles and applications – A. B. Bhattacharya, New Central Book Agency, Culcutta.
3. Introduction to Solid state Physics – C. Kittel, 5th Edition Wiley Eastern Ltd.
4. Renewable & sustainable energy sources – Agarwal.
5. Introduction to Fiber optics by K. Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999)

Semester I
Allied Practical Physics Paper-I
CLASS: I B.Sc CHEMISTRY
COURSE CODE: U5CHAP11

Objective: It is aimed at exposing the Allied students to the technique of handling simple measuring instruments and also makes them measure certain mechanical and thermal properties of matter.

List of Experiments (All ten experiments compulsory)

1. Young's Modulus – Non-uniform bending method using Pin and Microscope.
2. Rigidity Modulus – Torsional oscillation method (without symmetric masses)
3. Surface tension and interfacial surface tension – by drop weight method.
4. Determination of Co-efficient of viscosity – Graduated Burette.
5. Specific heat capacity of a liquid – Method of mixtures.
6. Sonometer — Determination of frequency of tuning fork (Screw Gauge is given)
7. Newton's Rings – Radius of curvature of the convex lens.
8. Spectrometer- Refractive index of a glass prism (minimum deviation)
9. Potentiometer – calibration of low range voltmeter.
10. Determination of M and B_H using Deflection magnetometer in Tan C position and vibration magnetometer.

Books for Reference

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Textbook of practical Physics, Sultan Chand & Sons
2. C.C Ouseph, G. Rangarajan, R. Balakrishnan- A Textbook of practical Physics- S. Viswanathan Publisher-PartII (1996)

SEMESTER II – CORE PAPER II
THERMAL PHYSICS
COURSE CODE: U5PY2001

Objective: This paper aims to impart the understanding of heat flow, its related Phenomenon and the distribution of particles in systems

Unit I -Thermometry and Calorimetry

Platinum resistance thermometer - Callender & Griffith's bridge - Thermistor - Specific heat capacity of solids - Dulong & Petit's law - Specific heat capacity of liquid - method

of mixtures - Barton's correction – Newton's law of cooling and verification - Specific heat of capacity of gases – Meyer's relation - C_p and C_v by Regnault's and Callender and Barne's methods

Unit II -Thermodynamics

Zeroth law of thermodynamics-First law of thermodynamics - Heat engines - petrol and diesel engines - reversible and irreversible processes - second law of thermodynamics - thermodynamic scale of temperature - entropy- change of entropy in reversible and irreversible processes - temperature - entropy diagram - third law of thermodynamics - Maxwell's thermo dynamical relations - derivation - Clausius - Clapeyron equation - Specific heat relation.

Unit III - Low temperature Physics

Joule Kelvin effect – Liquefaction of hydrogen- Liquefaction of helium – Kammerling and Onnes method – Helium I and II- Lambda point - Joule-Thomson effect - porous plug experiment: - liquefaction of gases –Production of low temperature by adiabatic demagnetisation - applications of low temperatures - refrigerating machines — Superconductors – Type I and Type II – Meissner effect – Super conducting magnets.

Unit IV -Conduction

Definition of thermal conductivity – Determination of K- Thermal diffusivity- Steady state - Forbes method- Thermal conductivity of a good conductor- Lee's disc method-thermal conductivity of bad conductor - thermal conductivity of rubber- Wiedmann Franz law.

Unit V -Radiation

Black body radiation - Wien's law, Rayleigh-Jean's law and Planck's law - Stefan's law - Determination of Stefan's constant - Newton's law of cooling from Stefan's law – Planck's quantum theory of radiations- solar constant - solar energy- Angstrom pyroheliometer –Temperature of Sun- applications

Books for Study

1. Heat and Thermodynamics - D.S.Mathur
2. Heat and Thermodynamics - Brij Lal and Subramaniam, S Chand & Co 16th Edition
3. Elementary statistics - Gupta and Kumar

Books for Reference

1. Heat and Thermodynamics - J. B. Rajam & C. L. Arora
2. Thermodynamics and statistical Physics - Sharma & Sarkar
3. Statistical Mechanics - Sathya Prakash & C.Agarwal
4. Fundamentals of Physics, 6th Edition, by D.Halliday, R.Resnick and J.Walker, Wiley, NY, 2001.
5. Thermal Physics, A.B. Gupta and H. Roy, Books and Allied (P) Ltd., (2002.)
6. Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY, 1994..
7. CRC Handbook of Physics & Chemistry, 80th Ed., CRS Press, NY, 1999.
8. The Feynman Lectures on Physics, Vols. I, II, and III, by R P. Feynman, R B Leighton and M Sands, Narosa, New Delhi, 1998.

SEMESTER-II
I B.Sc- Main Practical- II
COURSE CODE: U5PYPR21

Objective: It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical and thermal properties of matter.

List of Experiments (All ten experiments compulsory)

1. Rigidity modulus – Torsional pendulum – without masses.
2. Rigidity modulus and moment of inertia – Torsional pendulum – with identical masses
3. Coefficient of viscosity of a liquid – graduated burette - Radius of capillary tube by mercury pellet method.
4. Specific heat capacity – Joules calorimeter
5. Specific heat capacity of a liquid – Newton's law of cooling.
6. Sonometer – Determination of AC frequency Using brass wire (Barmagnet)
7. Sonometer – Comparison of radii of the given wires.
8. Spectrometer – Refractive index of a glass prism (minimum deviation)
9. Post office box – temperature coefficient of resistance of the coil.
10. Unregulated and Zener regulated power supply. (full wave)

TEXT BOOKS:-

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part I (1990)
2. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.ViswanathanPublisher-Part II (1996)

Books for Reference

1. S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 250th Edition (2002)
2. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan,A Textbook of practical Physics, Sultan Chand & Sons

Semester II
ALLIED PAPER- II
ALLIED PHYSICS
CLASS: I B.Sc CHEMISTRY

COURSE CODE: U5CHAL21

Objective: This paper is offered to the students of mathematics, Chemistry and Computer Science as allied Subjects. The logical reasoning behind the description of the physics problem and obtaining the solution to such problems are taught in this paper.

Unit I - Atomic physics (2 Hrs)

Discovery of cathode Rays- Properties – Determination of e/m by Thomson's parabola method- Positive Rays – Discovery – Properties – Dempster's mass Spectrograph
Atom model - vector Atom model- electron spin and spatial quantization - quantum numbers - Pauli's exclusion principle - excitation and ionization potentials- experimental determination-Franck and Hertz method

Unit II - Nuclear Physics (2 Hrs)

Particle Accelerator- Linear accelerator, cyclotron – Particle detectors – GM counter – Transmutation – Types – The Q value equation for a nuclear reaction – Types of nuclear reaction – Basic concepts of fission and fusion – Nuclear reactor – Harmful effects of nuclear radiation - Prevention. Discovery of cosmic rays – Latitude effect – The east west effect – Altitude effect- primary cosmic rays – secondary cosmic rays – cosmic rays showers – Discovery of Positrons – The mesons – origin of cosmic rays

Unit III –Electromagnetism and Transient current (1 Hr)

Faraday's laws of electromagnetic induction - vector form – Lenz's law – self and mutual inductance – Determination of coefficient of self inductance – Rayleigh's method – Induction coil – Growth and Decay of current in LR circuit – Growth and Decay of charge in RC circuit – Determination of High Resistance by Leakage method.

Unit IV - Crystallography and Fibre Optics (1 Hr)

Types of Solids - Crystalline - and amorphous - Crystalline matter - Periodic Array of Atoms - The crystal structure - Unit cell - Miller indices – Determination - Bragg's law. Types of bonding in crystal-Principle and propagation of light within the fiber - classification of optical fiber - fiber optic communication system block diagram.

Unit V – Electronics (1 Hr)

Basic Electronics: Junction Diode - LED - Zener diode - voltage regulator - Junction transistor - Characteristics of Transistor - common base - common emitter mode
Digital electronics: AND, OR, NOT gates - construction using diodes and transistors - NAND and NOR gates - Universal building Blocks. Boolean algebra - Demorgan's theorem – verification

Books for study:

1. Allied Physics by Dr.R.Sabesan and Dr.Mrs.Dhanalakshmi
2. Allied Physics by Mr. Kamalakkannan and Jayraman.
3. Text book of optics by Brijal and Subramanian
4. Modern Physics by R. Murugesan S.Chand & Co.

Books for Reference:

1. Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY, 1994.
2. Digital Principles and Application - Malvino & Leach.
3. Basic Electronics, 6th Edition by B. Grob, McGraw- Hill, NY, 1989.

Semester II
Allied Physics Practical -II
CLASS: I B.Sc CHEMISTRY
COURSE CODE: U5CHAP21

Objective: It is aimed at exposing the Allied students to the technique of handling simple measuring instruments and also makes them measure certain mechanical and thermal properties of matter

List of Experiments (All ten experiments compulsory)

1. Young's Modulus – Non-uniform bending method using Scale and Telescope.
2. Rigidity Modulus – Torsional oscillation method (with symmetric masses)
3. Specific heat capacity of a liquid – by Newton's law of cooling
4. Sonometer – Determination of AC frequency Using steel wire (Electromagnet)
5. Spectrometer Grating – Normal incidence – Wavelength of mercury spectral lines.
6. Potentiometer – calibration of low range ammeter.
7. Figure of merit –Current Sensitiveness and voltage sensitiveness of a galvanometer.
8. Construction of AND, OR gates using diodes and NOT by transistors.
9. Characteristics of Zener diode.
10. Verification of Demorgan's Theorem.

Books for Reference

1. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Textbook of practical Physics, Sultan Chand & Sons
2. C.C Ouseph, G. Rangarajan, R. Balakrishnan- A Textbook of practical Physics- S. Viswanathan Publisher-PartII (1996)

DEPARTMENT OF CHEMISTRY

SEMESTERS- I & II **(UNDER CBCS)**

2015-2016

B.Sc CHEMISTRY

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5CH1001	Main	CC01	General Chemistry I	7	7	3	25	75	100
	CC	U5CHPR11	Main Pract.	CC02	Volumetric Estimation I	2	1	3	25	75	100
	CC	U5CHAL11	Allied	CC03	Allied Physics I	7	6	3	25	75	100
	EC	U5CHAP11	Allied Pract.	EC03	Allied Physics Practical I	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5CH2001	Main	CC04	General Chemistry II	7	7	3	25	75	100
	CC	U5CHPR21	Main Pract.	CC05	Volumetric Estimation II	2	1	3	25	75	100
	CC	U5CHAL21	Allied	CC06	Allied Physics II	7	6	3	25	75	100
	EC	U5CHAP21	Allied Pract.	EC06	Allied Physics Practical II	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

I SEMESTER
CORE PAPER – I
General Chemistry – I
COURSE CODE: U5CH1001

OBJECTIVE:**105 Hours**

Basic concepts regarding atomic structure, periodic properties, bonding concepts, quantum chemistry, solids, liquids, gases, hydrocarbons, nomenclature, reactions, principles of volumetric analysis derivation of equations, related problems, and applications wherever necessary are to be taught for I-Semester.

UNIT – 1
Hours**21**

- 1.1 Atomic structure – Quantum number n , l , m and s – Pauli exclusion principle – Energy distribution and orbitals – Hund's rule of maximum multiplicity – Aufbau's Principle – Electronic configurations of elements – Stability of half – filled and completely filled orbitals.
- 1.2 s , p , d and f block elements – Classification and characteristic properties – Periodicity of properties – Definition and periodicity of the following properties – Atomic radii – factors affecting atomic radii – Ionic radii – factors affecting ionic radii.
- 1.3 Ionization potential – factors affecting ionization potential – Electron affinity – factors affecting electron affinity – Electronegativity – factors affecting electronegativity – Pauling scale – Mulliken electro negativity scale – Alfred and Rochow scale – Diagonal relationship with examples – Summary of horizontal, vertical and diagonal relationships in the periodic table.

UNIT – II
Hours**21**

- 2.1 Classification of organic compounds – Nomenclature of organic compounds –Functional groups – Homologous series – IUPAC recommendations for naming simple aliphatic – Alicyclic and aromatic compounds – Polyfunctional compounds – Heterocyclic compounds.

2.2 Basic concepts of bonding in organic chemistry – Hybridisation – tetravalency of carbon – geometry of molecules – methane, ethane, ethylene, acetylene and benzene – Factors affecting covalent bond. Electron displacement affects – inductive – mesomeric – electromeric – resonance – hyperconjugation and steric effects.

2.3 Alkanes – Methods of preparation of alkanes – Physical and chemical properties of alkanes – Mechanism of free radical substitution in alkanes - Alkenes – Properties of alkenes – Electrophilic and Free radical addition.

UNIT – III

21 Hours

3.1 Quantum chemistry – Quantum theory of radiation – Planck's theory – Photoelectric effect - Compton effect – Wave mechanical concept of the atom – de Broglie's relationship – wave nature of electron – Heisenberg's uncertainty principle – Schrodinger wave equation [without derivation] – Significance of wave functions, ψ and ψ^2 – probability distribution of electrons – radial probability distribution curves.

3.2 Gaseous state – Kinetic gas equation – derivation – Gas laws from the kinetic gas equation – kinds of velocities – mean, RMS and most probable velocities – calculation of molecular velocities – transport properties- viscosity – thermal conductivity – diffusion.

3.3 Maxwell's distribution of molecular velocities [no derivation] – Effect of temperature on velocity distribution – equipartition of energy – heat capacity on molecular basis - Virial equation of state - Boyle temperature – coefficient of compressibility and thermal expansion.

UNIT – IV

21 Hours

4.1 Definitions of molarity – normality – molality and mole fraction – their calculations – definition and examples for primary and secondary standards. Calculation of equivalent weights

4.2 Addition reactions of alkenes with hydrogen and halogens - Mechanism – hydrogen halide [Markownikoff's rule] and Mechanism

- hydrogen bromide [peroxide effect] and Mechanism – sulphuric acid – water and Mechanism – hydroboration – ozonolysis – hydroxylation with KMnO_4 – allylic substitution by NBS - Epoxidation and Mechanism – Oxidation – reduction – Self-addition or polymerization – Detection of C=C bond.
- 4.3 Liquid crystals – classification and molecular arrangements – liquid state – density – diffusion – Viscosity – evaporation. Surface tension – effect of temperature on surface tension – parachor – definition and applications only – Coefficient of viscosity – effect of temperature – effect of pressure

UNIT – V

21 Hours

- 5.1 Theories of acid-base – redox – complexometric, iodimetric and iodometric titrations. Theories of indicators – acid-base – redox – metal ion and adsorption indicators and choice of indicators.
- 5.2 Types of organic reactions – Cleavage of bonds - Homolytic and Heterolytic fission of carbon-carbon bond – Methods for determining reaction mechanism – Reaction intermediates – Structure and stability of Carbocations – Carbanions and Free radicals.
- 5.3 Solid State – Crystal lattices – Laws of crystallography – Elements of symmetry – crystal systems – unit cell – space lattice – Bravis's lattices – structure of NaCl - structure of CsCl – Miller's indices.

Text Books:

- ❖ Text book of Organic Chemistry by Arun Bahl & B.S. Bahl - S.Chand.
- ❖ Text book of Inorganic Chemistry by P.L. Soni – S. Chand.
- ❖ Principles of Physical Chemistry by Puri, Sharma – Vishal Publication.
- ❖ Advanced Organic Chemistry by Morrison & Boyd.
- ❖ Text book of Inorganic Chemistry by R.D. Madan

Reference Book

- ❖ Advance Organic Chemistry by I.L. Finor.
- ❖ Advance Inorganic Chemistry by J. D. Lee.
- ❖ Physical Chemistry by Rajaram Kuriakose.

Core Practical - I
SEMESTER – 1
COURSE CODE: U5CHPR11
VOLUMETRIC ESTIMATION - I

30 Hours

Objective: To learn the practical techniques of Acidimetry, Iodimetry & Iodometry.

ACIDIMETRY

1. Estimation of **B**orax – Standard Sodium Carbonate.
2. Estimation of Sodium Hydroxide – Standard Sodium Carbonate.

IODIMETRY

3. Estimation of Arsenious oxide.

IODOMETRY

4. Estimation of Copper – Standard Copper Sulphate.
5. Estimation of Potassium dichromate – Standard Potassium dichromate.

Students must write short procedure for the given estimation in ten minutes during the examinations and submit the paper for evaluation.

Reference Book:

1. Inorganic Quantitative Analysis by Vogel.

Marks 75

- | | |
|--------------------|----------|
| 1. Short procedure | 10 Marks |
| 2. Titration 1 | 15 Marks |
| 3. Titration 2 | 15 Marks |
| 4. Result | 20 Marks |
| 5. Record | 10 Marks |
| 6. Viva-voce | 05 Marks |

Error Calculation:

- | | | |
|--------|---|----------|
| < 2% | - | 20 Marks |
| 2 – 3% | - | 15 Marks |
| 3 – 4% | - | 10 Marks |
| >4% | - | 05 Marks |

I SEMESTER

ALLIED CHEMISTRY - I
(for I year B.Sc. Physics & Bio-Chemistry)
Paper – I

COURSE CODE FOR PHYSICS U5PYAL11
COURSE CODE FOR BIOCHEMISTRY U5BIAL11

105 Hours

Objective: To learn the concepts of organic inorganic and physical chemistry.

UNIT – I
Hours

21

- 1.1 Extraction of Metals. Mineral and ore difference – Minerals of Iron, Aluminum and Copper – Ore Dressing or Concentration of Ore – Types of Ore Dressing Froth Floatation and Magnetic separation.
- 1.2 Refining of Metals – Types of Refining – Electrolytic, Van Arkel and Zone Refining. Extraction of Uranium and Thorium.
- 1.3 Periodic properties – ionization potential, electron affinity and electro negativity – variation in the periodic table.

UNIT – II

21 Hours

- 2.1 Aromaticity – Conditions – Huckel's rule – aromaticity of benzene.
- 2.2 Cyclo-alkanes preparation properties of Cyclohexane – Bayers strain theory. Polarization – Inductive effect, mesomeric effect and steric effect - [Acid and Base strength]
- 2.3 Stereo isomerism – Types, Causes of optical activity of Lactic acid and tartaric acid – Racemisation – Resolution – Geometrical isomerism – maleic and fumaric acid.

UNIT – III

21 Hours

- 3.1 Chemical Kinetics – Distinction between Order and Molecularity – derivation of First order rate equation – half life period of first order reaction – determination of rate constant of hydrolysis of ester.
- 3.2 Catalysis – catalyst – auto catalyst – enzyme catalyst – Promoters – catalytic poisoning – Active center – Distinction between homogeneous and heterogeneous catalysts – Industrial application of catalysts.
- 3.3 Photochemistry – Grothus Drapers law, Stark Einsteine's law – quantum yield – Photosynthesis, phosphorescence – fluorescence – chemiluminescence – photosensitization.

UNIT – IV

21 Hours

- 4.1 VSEPR Theory – Shapes of simple Molecules BF_3 , PCl_5 SF_6 and XeF_6 .
- 4.2 Naphthalene – Preparations, Properties and uses of Naphthalene – Structure of Naphthalene.
- 4.3 Phase Rule: Phase, Component, Degree of freedom, Phase Rule – Definition. One component system – Water system Osmosis – Osmotic pressure – reverse osmosis – desalination of sea water

UNIT – V

21 Hours

- 5.1 Nuclear Chemistry – Definition of Half life period – Group displacement law – Radioactive series. Nuclear Fission and Fusion – Applications of nuclear Chemistry in Medicine, agriculture and industries – C^{14} dating
- 5.2 Crude Oil – Petroleum – Petroleum Refining - Cracking – Applications of Cracking. Fuels – Calorific value of fuels – Non-conventional fuels – need of solar energy – Applications – Bio-fuels.

5.3 Elements of symmetry – unit cell – crystal lattice – types of cubic lattice – one example for each.

Text Book:

- Allied Chemistry by Dr. S. Sundaram
- Allied Chemistry by Gopalan

Reference Book

- Advance Organic Chemistry by Bahl and Arun Bahl. 19th Edition., 2005 - Sulthan Chand company, New Delhi.
- Principles of Inorganic Chemistry by B.R. Puri and L.R. Sharma. Shoban Lal Nagin Chand and Co. New Delhi 2000.
- Principles of Physical Chemistry by B.R. Puri, L.R. Sharma and S. Pathania. Shoban Lal Nagin Chand and Co. New Delhi 2001.

SEMESTER – 1

ALLIED CHEMISTRY PRACTICAL I

(for I year B.Sc. Physics & Bio-Chemistry)

COURSE CODE FOR PHYSICS U5PYAP11

COURSE CODE FOR BIOCHEMISTRY U5BIAP11

Objective: to learn the techniques of Volumetric Analysis 30 Hours

VOLUMETRIC ANALYSIS 1

1. Estimation of hydrochloric acid using std. Sulphuric acid.
2. Estimation of Borax using std. Sodium carbonate.
3. Estimation of FeSO_4 using Std. Mohr Salt Solution.
4. Estimation of Oxalic acid using Std. KMnO_4 Solution.
5. Estimation of $\text{K}_2\text{Cr}_2\text{O}_7$ using Std. $\text{K}_2\text{Cr}_2\text{O}_7$.
6. Estimation of Copper using Std. Copper Sulphate.

Reference Book:

1. Inorganic Quantitative Analysis by Vogel.

Practical Book:

2. Practical Book by Thomas.

Marks 75

1. Short procedure	10 Marks
2. Titration 1	15 Marks
3. Titration 2	15 Marks
4. Result	20 Marks
5. Record	10 Marks
6. Viva-voce	05 Marks

Error Calculation:

< 2%	-	20 Marks
2 – 3%	-	15 Marks
3 – 4%	-	10 Marks
>4%	-	05 Marks

II SEMESTER

CORE PAPER – II

General Chemistry – II

COURSE CODE: U5CH2001

OBJECTIVES:

105 Hours

Basic concepts regarding ionic bond, covalent bond, MO theory, cyclo alkanes, dienes, thermochemistry, thermodynamics, derivation of equations, related problems, s-block elements, group study, polymerisation, mechanism and applications.

UNIT – I

21 Hours

5.3 Ionic bond – Electronic theory of valence – Conditions for the formation of ionic bond – General properties - Radius ratio rule and its limitations – Energetics of formation of NaCl from Na and Cl – Hydration energy and lattice energy and their applications – Born - Haber cycle. Fajan's rules – Characteristics of electrovalent compounds – Valence bond theory – Conditions for the formation of covalent bond – General properties – Polarity of bonds – Orbital

overlap - Bond lengths and bond energies – hybridization – sigma and pi bonds.

5.4 VSEPR theory geometries of BO_3^{3-} , NH_4^+ , ClF_3 , PCl_5 , IF_7 , and XeF_6 molecules – partial ionic character of covalent bond – percentage of ionic character.

1.3 Molecular Orbital theory – Bonding, anti-bonding orbitals – Relative order of energies of molecular orbitals – MO diagrams of H_2 , He_2 , N_2 , O_2 , O_2^+ , O_2^- and CO – Bond order – stability and magnetic property of the molecules – Comparison of VB and MO theories.

UNIT – II

21 Hours

2.1 Alkynes – Acidity of alkynes – Addition of hydrogen – Hydroboration – Hydrohalogenation – Addition of hypohalous acid - Hydration – addition of water with HgSO_4 catalyst – Addition of alcohols and carboxylic acids.

2.2 Formation of acetylides – alkylation of alkynes with mechanism – oxidation with KMnO_4 – ozonolysis – Polymerisation to benzene – Oxidative coupling – Isomerization.

2.3 Cycloalkanes – preparation using Wurtz's reaction – Dieckmann's ring closure and reduction of aromatic hydrocarbons – Substitution and ring opening reactions.

UNIT – III

21 Hours

3.1 Thermodynamics – Definition and explanation of terms – System, boundary, surroundings – Homogeneous and heterogeneous system – Isolated system – Closed system – Open system – Intensive and extensive properties – State of a system – Independent state variables – Dependent state variables - Thermodynamic functions – State and path functions.

3.2 Thermodynamic processes – types of processes – cyclic – reversible – irreversible – isothermal – adiabatic. Exact and inexact differentials –

Cyclic rule – concept of heat and work - Zeroth law of thermodynamics.

- 3.3 First law of thermodynamics – Statement and equation – relationship – Calculation of w , q , ΔE and ΔH for the expansion of ideal gases under reversible – isothermal and adiabatic conditions.

UNIT – IV

21 Hours

- 4.1 Alkali metals – Li, Na, K, Rb and Cs – Occurrence – Comparative study of elements – oxides, halides, hydroxides and carbonates – Exceptional property of Lithium – Diagonal relationship of Li with Mg.
- 4.2 1,2 and 1,4 additions with mechanism – Free radical addition – polymerization of dienes – Synthesis of dienes – 1,3 butadiene – Isoprene and chloroprene – Allenes.
- 4.2 Joule's law – Joule-Thomson effect – Joule-Thomson coefficient and its derivation – inversion temperature, its significance and its derivation.

UNIT – V

21 Hours

- 5.5 Alkaline earth metals – Be, Mg, Ca, Sr and Ba – Occurrence – comparative study of the elements with respect to oxides, hydroxides, halides, sulphates and carbonates - Exceptional property of Beryllium – Diagonal relationship of Be with Al – Comparison of alkaline earth metals with alkali metals – Magnesium resemblance with zinc.
- 5.6 Polymerisation – Types of polymerisation – mechanism of polymerisation - Distinction between addition and condensation polymerisation – free radical – Cationic and anionic polymerisations - addition polymers and condensation polymers with examples – thermoplastic and thermosetting polymers.

5.7 Thermochemistry – Heat of reaction – Exothermic and endothermic reaction – Calculation of ΔH from ΔE and vice versa – Thermochemical equations – bond dissociation energy – Calculation from thermochemical data - variation of heat of a reaction with temperature – Kirchoff's equation and its significance.

Text Book:

- ❖ Text book of Organic Chemistry by Arun Bahl & B.S. Bahl - S.Chand.
- ❖ Text book of Inorganic Chemistry by P.L. Soni – S. Chand.
- ❖ Principles of Physical Chemistry by Puri, Sharma – Vishal Publication.
- ❖ Advanced Organic Chemistry by Morrison & Boyd.
- ❖ Text book of Inorganic Chemistry by R.D. Madan

Reference Book

1. Advance Organic Chemistry by I.L. Finor.
2. Advance Inorganic Chemistry by J.D. Lee.
3. Physical Chemistry by Rajaram Kuriakose.

Core Practical – 2
SEMESTER – 2
VOLUMETRIC ESTIMATION – II
COURSE CODE: U5CHPR21

30 Hours

Objective: To learn the practical techniques of Complexometry, Dichrometry & Precipitation Titrations.

COMPLEXOMETRY:

1. Estimation of Magnesium using EDTA.
2. Estimation Zinc using EDTA.
3. Estimation of Nickel using EDTA.
4. Estimation of Calcium using EDTA.
5. Determination of total hardness.

DICHROMETRY

Estimation of ferrous iron using Diphenyl amine /N-Phenylanthranillic acid as indicator

PRECIPITATION TITRATION

6. Estimation of Chloride in neutral medium. [Demonstration – Experiment].

Students must write short procedure for the given estimation in ten minutes during the examinations and submit the paper for evaluation.

Reference Book:

1. Inorganic Quantitative Analysis by Vogel.

Marks 75

- | | |
|--------------------|----------|
| 7. Short procedure | 10 Marks |
| 8. Titration 1 | 15 Marks |
| 9. Titration 2 | 15 Marks |
| 10. Result | 20 Marks |
| 11. Record | 10 Marks |
| 12. Viva-voce | 05 Marks |

Error Calculation:

- | | | |
|--------|---|----------|
| < 2% | - | 20 Marks |
| 2 – 3% | - | 15 Marks |
| 3 – 4% | - | 10 Marks |
| >4% | - | 05 Marks |

II SEMESTER

ALLIED CHEMISTRY-II **105 Hour** **(for I year B.Sc. Physics & Bio-Chemistry)**

COURSE CODE FOR PHYSICS U5PYAL21
COURSE CODE FOR BIOCHEMISTRY U5BIAL21

Objective: To learn concepts of organic inorganic and physical chemistry.

UNIT – I

21 Hours

- 1.1 Nomenclature of coordination compounds – Werner Theory of Coordination Compound – Chelation – Functions and structure of Haemoglobin and Chlorophyll.
- 1.2 Fertilizers and manures – Bio-fertilizers – Organic Manures and their importance – Role of NPK in plants – preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.
- 1.3 Composition of Match sticks and match box – Industrial making of safety matches. Preparation and uses of chloroform, DDT, Gamhexane and Freon.

UNIT – II

21 Hours

- 2.1 Classification – Structure of glucose – Properties and uses of starch – uses of Cellulose Nitrate – Cellulose acetate.
- 2.2 Classification of Amino Acids – preparation and properties of Glycine – Classification of Protein based on physical properties and biological functions. Primary and Secondary structures of protein [Elementary Treatment only] composition of RNA and DNA and their biological role.

- 2.3 Substitution reaction – Nitration, halogenation, sulphonation and Friedel Crafts alkylation of benzene.

UNIT – III

21 Hours

- 3.1 Specific and equivalent conductance – their determination – effect of dilution.
- 3.2 Kohlrausch's law – Determination of equivalent conductance of weak electrolyte – Conductometric Titrations - HCl Vs NaOH and CH₃COOH Vs NaOH. Electrochemical corrosion and its prevention
- 3.3 P^H and its determination by indicator method – Buffer solutions – Buffer action – importance of buffer in the living system – Derivation of Henderson equation.

UNIT – IV

21 Hours

- 4.1 Paints – Pigments – Components of Paint – Requisites of a good paint. Colour and Dyes – Classification based on constitution and application
- 4.2 Biological activities and deficiency diseases of Vitamin A, B, C, D, E and K – Hormones – Functions of insulin and adrenalin
- 4.3 Chromatography – Principles and application of Column, paper and thin layer chromatography.

UNIT – V

21 Hours

- 5.1 Drugs - Sulpha Drugs – Uses and Mode of action of Sulpha Drugs – Antibiotics – Uses of Penicillin, Chloramphenicol, Streptomycin. Drug abuse and their implication
- 5.2 General and Local Anaesthetics – Antiseptics – Example and their application. Definition and one example each for analgesics

antipyretics, tranquilizers and sedatives - causes for diabetes, cancer and AIDS

5.3 Colloids - Types and classification of colloidal system, Lyophilic and Lyophobic Sols – Dialysis, Electro-dialysis, Ultrafiltration. Emulsion – types – preparation

References:

- Advance Organic Chemistry by Bahl and Arun Bahl. 19th Edition., 2005 - Sulthan and Chand company, New Delhi.
- Principles of Inorganic Chemistry by B.R. Puri and L.R. Sharma. Shoban Lal Nagin Chand and Co. New Delhi 2000.
- Principles of Physical Chemistry by B.R. Puri, L.R. Sharma and S. Pathania. Shoban Lal Nagin Chand and Co. New Delhi 2001.
- P.L. Soni – "Text book of inorganic Chemistry. S. Chand & Co., New Delhi 1999.

II SEMESTER

ALLIED CHEMISTRY PRACTICAL - II **(for I year B.Sc. Physics & Bio-Chemistry)** *(Allied Chemistry Practical)*

COURSE CODE FOR PHYSICS U5PYAP21
COURSE CODE FOR BIOCHEMISTRY U5BIAP21

30 Hours

Objective: To learn the techniques in Organic Analysis

ORGANIC ANALYSIS:

Reactions of aldehyde [aromatic], carbohydrate, carboxylic acid [mono and dicarboxylic], phenol, aromatic primary amine, amide and diamide
Systematic analysis of organic compounds containing one functional group and characterisation by confirmatory tests

Reference Book:

1. Advance Practical Chemistry by R. Mukhopadhyay.

Practical Book:

1. Practical Book by Thomas.

Marks 75

1. Procedure	20 Marks
2. Elements	10 Marks
3. Aromatic, Aliphatic	10 Marks
4. Saturation & Unsaturation	10 Marks
5. Functional Group	10 Marks
6. Record	10 Marks
7. Viva-voce	05Marks

DEPARTMENT OF BIOCHEMISTRY

SEMESTERS- I &II

(UNDER CBCS)

2015-2016

B.Sc BIOCHEMISTRY											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5BI1001	Main	CC01	Biological Macromolecules I	7	7	3	25	75	100
	CC	U5BIPR11	Main Pract.	CC02	Quantitative & Qualitative Analysis I	2	1	3	25	75	100
	CC	U5BIAL11	Allied	CC03	Allied Chemistry I	7	6	3	25	75	100
	EC	U5BIAP11	Allied Pract.	EC03	Allied Chemistry Practical I	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5BI2001	Main	CC04	Biological Macromolecules II	7	7	3	25	75	100
	CC	U5BIPR21	Main Pract.	CC05	Quantitative &	2	1	3	25	75	100

					Qualitative Analysis II						
	CC	U5BIAL21	Allied	CC06	Allied Chemistry II	7	6	3	25	75	100
	EC	U5BIAP21	Allied Pract.	EC06	Allied Chemistry Practical II	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

**I SEMESTER
CORE PAPER I
COURSE CODE: U5BI1001
Biological Macromolecules– I**

Objectives

To understand the structure, properties & functions of various biological macromolecules

UNIT –I Carbohydrates – I 22Hrs

Classifications of carbohydrates, isomerism exhibited by carbohydrates (DL, +/-, $\alpha\beta$, epimers), ring structure and mutarotation. Reactions of carbohydrates due to the presence of hydroxyl, aldehyde and ketone groups. Occurrence, Structure and Biological importance of monosaccharides, disaccharides

UNIT – II Carbohydrates – II 22Hrs

Polysaccharides - Starch, Glycogen, Cellulose, Chitin and Agar An introduction to mucopolysaccharide chondroitin sulphate, dermatan sulphate, keratin sulphate, hyaluronic acid, heparin, heparin sulphate, Proteoglycan, bacterial cell wall polysaccharides. Glycoproteins – blood group polysaccharides.

UNIT – III Amino acids 20Hrs

Standard amino acids – Classification, structure, physical and chemical properties, zwitter ions. Stereo and Optical isomerism, Essential and non-Essential & non-protein amino acids. Amino acids useful as drugs

UNIT –IV Proteins 25Hrs

Classification – IUPAC, function & nutritional. Structure of proteins-primary, secondary-, tertiary and quaternary (Peptide bond, α -helix, β -pleated sheets, collagen). Bonds responsible for protein structure. Biologically important peptides-structure and function (insulin, glutathione, vasopressin). Denaturation of proteins

UNIT –V Porphyrins 16 Hrs

Phorphyrin nucleus and classifications – important metalloporphyrins chlorophyll & heme. Bile pigments – chemical nature and physiological significance

TEXT BOOKS

1. Fundamentals of Biochemistry-J. L. Jain, S. Chand & Company, 7th edition (2014).
2. Harper's Biochemistry – Robert K. Murray, McGraw Hill, Lange Medical Books. 30th edition (2015).

REFERENCES

1. Fundamentals of Biochemistry – A.C. Deb., Jain Book Depot Publisher. 9th ed. (2009)

2. Biochemistry-Dr.Ambikashanmugam, Published by Lippincott, Williams & Wilkins.7thed.(2012)
3. Biochemistry –Dr.Amit Krishna De, S.Chand & Co., Ltd.
4. Lehninger Principles of Biochemistry- Nelson & Cox, W.H.Freeman, 6th edition (2012).
5. Harper's Biochemistry –Murray, McGraw Hill, Lange Medical Books.25th Ed (1999).

SEMESTER – I
CORE PRACTICAL - I
Quantitative & Qualitative Analysis – I
COURSE CODE: U5BIPR11

Total – 30Hrs

Objectives:

1. Student should know the principles, theory and calculation of each experiment.
2. They should know to prepare all the solutions by themselves. They should standardize their solutions individually.

I. Quantitative Analysis

- i) Estimation of amino acids by formal titration method.
- ii) Determination of Saponification value of edible oil.
- iii) Determination of Acid number of edible oil.
- iv) Iodine value of oil.

II. Qualitative Analysis

- i) Reaction of simple sugars including glucose, fructose, galactose, mannose, pentose, maltose, sucrose, lactose, starch, glycogen and dextrin.

Text Books

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

References

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam

II SEMESTER
CORE PAPER II
Biological Macromolecules – II
COURSE CODE: U5BI2001

Objectives

To understand the structure, properties & functions of various biological macromolecules

UNIT –I Lipids - I

22Hrs

Introduction, definition of fatty acids.Classification, nomenclatures, structures, properties of fatty acids [Essential &Non essential Fatty Acids].Structure and function of tri-acyl glycerol.Properties of fats - (Saponification value, iodine no, Acid no, rancidity of fats,

Reichert -Meissel No) Antioxidants. Structure and functions of phospholipids - Lecithin, Cephalin, phosphatidyl inositol and phosphatidyl serine, Sphingomyelin, plasmalogens.

UNIT – II Lipids - II

22Hrs

Structure and function of glycolipids (Cerebrosides, gangliosides), cholesterol, lipoproteins, steroids (steroid hormones, bile acids, bile salts), Structure and function of prostaglandins, leukotrienes, membrane lipids, liposomes, general formula for carotenoids & terpenes.

UNIT – III Nucleic acids

25Hrs

Structure of purine and pyrimidine bases, sugars, nucleoside, and nucleotide, purine and pyrimidine & nucleotide analogs. Structure of DNA – polymorphisms- A, B & Z Properties of DNA – denaturation, annealing, T_m, hypo & hyper chromicity Structure of RNA & Types Cellular RNA and their functions. Ribozymes

UNIT –IV Vitamins and Trace Elements

20 Hrs

Fat soluble & water soluble vitamins – structure, source, daily requirements, deficiency symptoms, biological significance, and their coenzyme structure Biological importance of copper, zinc, iron, selenium, iodine and chromium

UNIT –V Heterocyclic compounds

16Hrs

Heterocyclic rings of biological importance – pyridine, pyrrole, quinoline, pteridine, thiazole, imidazole, indole with examples.

Antibiotics – structure and functions of penicillin, streptomycin and Chloramphenicol

TEXT BOOKS

1. Fundamentals of Biochemistry-J. L. Jain, S. Chand & Company, 7th edition (2014).
2. Biochemistry-Dr.Ambikashanmugam, Published by Lippincott, Williams & Wilkins. 7th ed.(2012)

REFERENCES

1. Biochemistry –Dr. Amit Krishna De, S. Chand & Co., Ltd.
2. Lehninger Principles of Biochemistry- Nelson & Cox, W.H.Freeman, 6th edition (2012).
3. Harper's Biochemistry- Murray, McGraw Hill, Lange Medical Books. 25th ed (1999).

SEMESTER – II
CORE PRACTICAL - II
COURSE CODE: U5BIPR21

Quantitative & Qualitative Analysis – II

Total – 30Hrs

Objectives:

1. Student should know the principles, theory and calculation of each experiment.
2. They should know to prepare all the solutions by themselves. They should standardize their solutions individually.

I. Quantitative Analysis

- i. Estimation of ascorbic acid by titrimetric method using 2, 6 – Dichlorophenol indophenol.
- ii. Estimation of reducing sugar from biological fluids by Benedict's titrimetric method.
- iii. Estimation of reducing sugar by iodimetry

II. Qualitative Analysis

- i. Reaction of Proteins – Solubility, Denaturation, precipitation by acidic reagents, pH change. Biuret, Millons, Xanthoproteic test. Colour reaction of amino acids like typtophan. Tyrosine, cystine, Methonine. Arginine, Proline and histidine.
- ii. Reactions of lipids – Solublity, Saponification test for unsaturation, Liebermann Burchard test for cholesterol.

Text Books

1. Practical Clinical Biochemistry – Harold Varley, CBS, New Delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III.

References

1. Laboratory manual inBiochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam

DEPARTMENT OF BIOTECHNOLOGY

SEMESTERS- I &II

(UNDER CBCS)

2015-2016

B.Sc BIOTECHNOLOGY											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL

I	EC	U5FUR101/ U5FAR101/ U5FHD101/ U5FTA101	Language	EC01	Tami I/Urdu I/ Arabic I/Hindi I/	6	5	3	25	75	100
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5BT1001	Main	CC01	Molecular Biology	7	7	3	25	75	100
	CC	U5BT1001	Main Pract.	CC02	Molecular Biology Practical	2	1	3	25	75	100
	CC	U5BTAL11	Allied	CC03	Biochemistry and Biophysics	7	6	3	25	75	100
	EC	U5BTAP11	Allied Pract.	EC03	Biochemistry and Biophysics Practical	2	1	3	25	75	100
	TOTAL					30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC04	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC05	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5BT2001	Main	CC04	Microbiology	7	7	3	25	75	100
	CC	U5BT2001	Main Pract.	CC05	Microbiology Practical	2	1	3	25	75	100
	CC	U5BTAL21	Allied	CC06	Bio-Diversity	7	6	3	25	75	100
	EC	U5BIAP21	Allied Pract.	EC06	Bio-Diversity Practical	2	1	3	25	75	100
	TOTAL					30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

Core Paper I – Molecular Biology

Semester: 1

COURSE CODE: U5BT1001

Objective:

Unit 1: Cell – General Organization of Eukaryotic cell – Types of cell: Prokaryotes, Eukaryotes, sub-cellular organelles. Cell membrane and its architecture Cancer cell – type, Tumor and Malignant, Apoptosis / Necrosis

Unit 2: Ultra structure of cells- sub cellular organization – structure and function of cell membranes, cytosol/ Endoplasmic reticulum, nucleus, cytoskeleton, ribosome, mitochondria, lysosome. Cell Division – Cell cycle – Mitosis, Meiosis

Unit 3: Cell chemical nature and macromolecular protein structure and function; Structure of DNA and RNA. DNA replication, Genetic code – Operon concept – LAC – Protein synthesis

Unit 4: Genetic – structure of chromosome and types multiple alleles – Blood types, HLA-Chromosome aberrations- Addition, Deletion, Duplication, Translocation, Substitution, Polyploidy and Aneuploidy.

Unit 5: Microbial Genetics – Conjugation – Hfr, Transformation – Griffith effect, Transduction – Gene specialized.

Reference:

1. Molecular cell biology - Harvey Lodish, David Baltimore, 2000.
2. Molecular Biotechnology – Principles and Application of recombinant DNA – Glick, Pasternak, 2002, Panima Pub.
3. Microbial Genetics (2nd Edition) – Maloy, Cronan, Frieifelder, Jones. Bartlett Pub.
4. Concept of Genetics (4th Edition) – William S.Klug & Micheal R. Cummings.
5. Cytology. 2005 by Verma and Agarwal
6. Molecular Biology 2002 – David P.Clark.

CORE PRACTICAL I: MOLECULAR BIOLOGY

Semester 1

Course Code: U5BTPR11

1. Observation of Mitosis in Onion root tip
2. Observation of Giant chromosome in Chironomid larva
3. Types of cells – Columnar, Ciliated, Squash, ...
4. Cell measurement – micrometry
5. Buccal smear preparation
6. Observation of chromosomes – Human (Demo)
7. Bacterial Transformation – Demo.
8. Subcellular Fractionation of cellular components.

ALLIED 1: BIOCHEMISTRY AND BIOPHYSICS

Semester: 1

Course Code: U5BTAL11

Objective:

Unit 1: Structure and Biological importance of Biomolecules – Carbohydrate, Protein, Lipid and Vitamin.

Unit 2: Enzymes – classification – physico-chemical properties – Mechanism of enzyme action – factors affecting enzyme activity. Enzyme kinetics, immobilized enzymes.

Unit 3: Clinical biochemistry – Hypo and Hyper glycemia, Diabetes – Type I and II, GTT, GTT-curve, obesity, CHD, LDL, HDL, Inborn errors of Metabolism – Alkaptonuria, Phenylketonuria, albinism and Sickle cell anemia.

Unit 4: Bioenergetics – Energy and its forms – Energy rich compound – laws of thermodynamics (First, Second) – enthalpy and entropy – redox potential – redox coupling and Redox reaction.

Unit 5: Radio isotope technologies – Units of radio activity. Geiger Muller counter, Scintillation counter, Autoradiography.

Reference:

1. Biochemistry (4th Edition) – L. Stryer Freeman Co. NY
2. Biochemistry (Revised Edition) – N. Arumugam et. al. 2010. Saras Pub.
3. Elements of Biochemistry – H.S. Srivastava, Rostogi Pub.
4. Biochemistry – Satyanarayana, Books and Allied publications, 2006
5. Biophysics (Rev. Edition) – N. Arumugam et. al. 2010. Saras Pub.
6. Biochemistry and Biophysics -
7. Enzymes by Ashok.

ALLIED PRACTICAL - 1: BIOCHEMISTRY AND BIOPHYSICS**Semester 1****Course Code: U5BTPR11**

1. Estimation of pH using pH meter in various biological samples
2. Qualitative analysis of Glucose, Protein and Lipid
3. Estimation of Blood glucose level
4. Estimation of Blood Hemoglobin
5. Estimation of Blood Cholesterol
6. Enzyme activity – amylase / catalase.

CORE PAPER 2: MICROBIOLOGY

Semester 2**Course Code: U5BT2001**

Unit 1: Scope of Microbiology – classification of microbes. Five kingdom concept, Eight Kingdom concept Major features of Bacteria – Structure of Bacteria– Bacterial Cell wall, Ultra structure of E.Coli – Capsule.

Unit 2: Distinctive features of Prokaryotic and Eukaryotic micro organism. Morphology, Ultra structure, Reproduction, life cycle of Algae (Diatom) - Morphology, Ultra structure, Reproduction, life cycle of Fungi (Penicillium) - Morphology, Ultra structure, Reproduction, life cycle of Virus -TMV, HPLV.

Unit 3: Bacterial Growth- Growth Rate – Growth curve – Measurement of Bacterial Growth – Factors affecting Bacterial growth – culture medium –Culture Techniques - culture of Bacteria – Batch culture – Plate culture – Differential culture – Maintenance of Bacterial Culture.

Unit 4: Observation of Microorganisms – Simple microscope – Compound microscope – Oil immersion objective – Phase contrast microscope – Fluorescence microscope - Electron microscopes(TEM and SEM). Staining Technique – Microbiological stains – Types of staining – simple staining – Negative staining – Gram staining – Acid Fast staining

Unit 5: Microorganisms involved in food products –some characteristics of Fermented milk – Micro organisms used as food sources -Algae, Single cell protein, Bacteria, Actinomycetes and Fungi. Role of microbes in food spoilage

Reference:

1. Microbiology –concept and applications, Pelzer, Chang and Krieg 1993, McGraw Hill NY.
2. Microbiology fundamentals and applications REnald, M.Atlas 1987. Prentice Hill
3. Microbiology – U.Satyanarayana 2008. Uppala Author Pub.
4. General Microbiology, Stainer, 1995, Mc. Millan Pub. Co
5. Microbiology: General and Applied – A.Mani and N. Arumugam 2011. Saras Pub.
6. Microbiology – Dubey.
7. Microbiology – Presscott.

CORE PRACTICAL 2: MICROBIOLOGY**Semester 2****Course Code: U5BTPR21**

1. Sterilization techniques- Glassware, etc.
2. Media Preparation methods – Nutrient broth, Nutrient Agar, Plates, Slants and Butt.
3. Staining techniques – Simple and Gram.
4. Culture techniques – Spread plate, pour plate, streak plate and serial dilution
5. Enumeration of bacteria from soil and water samples.
6. Bacterial Growth curve.
7. Fungal staining.
8. MBAR test for Milk quality.

Allied Paper II: Biodiversity

Semester 2

Course Code: U5BTAL21

Unit 1: General aspects of Biodiversity, types of Biodiversity, Global Biodiversity, Biodiversity in India and State. Species Biodiversity, Hotspots in India

Unit 2: General Characters of Algae, General Characters of Fungi, General Characters of Bryophytes, General Characters of Pteridophytes, General Characters of Gymnosperms and General Characters of Angiosperms.

Unit 3: General Characters of Protozoa, General Characters of Porifera, General Characters of Coelenterata, General Characters of Helminthes, General Characters of Annalids, General Characters of Arthropods, General Characters of Molluscs and General Characters of Echinoderms.

Unit 4: General Characters of Prochordates, General Characters of Chordates, General Characters of Pisces, General Characters of Amphibia, General Characters of Reptilia, General Characters of Aves and General Characters of Mammalia.

Unit 5: Biodiversity – value of Biodiversity and conservations. Endangered species Importance of Ecosystem Economic importance of Algae, Fungi, Earthworm and Prawn

Reference:

1. Plant Diversity vol.1 – Annie and V. Kumaresan 2012. Saras Pub.
2. Environmental Biodiversity – P.R. Dadav 1995.
3. Invertebrata – Phylum – R.L.Kotpal Series, Rastragi Pub. Meerut 2000.
4. Manual of Zoology – E. Ayyar. Madras Pub.1995.
5. Comparative vertebrate Zoology. Waterman ET. Al. Mac Millan and Co. 1971.

Allied Practical II: Biodiversity

Semester II

Course Code: U5BTAP21

1. Plant diversity in campus
2. Animal diversity in campus
3. Microbial diversity in campus
4. Herbarium
5. Insect Box
6. Economically importance of plants and Animals
7. Observation of mouth parts of honey bee and Mosquito
8. Calculation of Biodiversity index – Shannon-weigher index.
9. Field visit to Hotspot.

DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS COMMON TO

**B.Sc. (COMPUTER SCIENCE)
B.Sc. (SOFTWARE COMPUTER SCIENCE)
BACHELOR OF COMPUTER APPLICATION**

SEMESTERS- I &II

(UNDER CBCS)

2015-2016

B.Sc. (COMPUTER SCIENCE), B.Sc. (SOFTWARE COMPUTER SCIENCE)& BACHELOR OF COMPUTER APPLICATION											
Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
	EC	U5FUR101/	Language	EC01	Tami l/Urdu l/	6	5	3	25	75	100

I		U5FAR101/ U5FHD101/ U5FTA101			Arabic I/Hindi I/						
	EC	U5FEN101	English	EC02	English I	4	4	3	25	75	100
	AEC	U5ENV101		AEC1	Environmental Studies	2	1	3	25	75	100
	CC	U5CC1001	Main	CC01	Digital Logic Fundamentals	7	7	3	25	75	100
	CC	U5CCPR11	Main Pract.	CC02	Office Software Lab	2	1	3	25	75	100
	EC	U5CCAL11	Allied I	EC03	Mathematical Foundations I	7	6	3	25	75	100
	EC	U5CCAP12	Allied II	EC04	Problem Solving Technique I- Lab	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

Sem	Part	Course Code	Course	Course No	Course Title	Hrs./Week	Credit	Exam. Hrs	MAX. MARKS		
									CIA	ESE	TOTAL
II	EC	U5FUR201/ U5FAR201/ U5FHD201/ U5FTA201	Language	EC05	Tami II/Urdu II/ Arabic II/Hindi II/	6	5	3	25	75	100
	EC	U5FEN201	English	EC06	English II	4	4	3	25	75	100
	AEC	U5VED201		AEC2	Value Education	2	1	3	25	75	100
	CC	U5CC2001	Main	CC03	Programming in C	7	7	3	25	75	100
	CC	U5CCPR21	Main Pract.	CC04	Programming in C Lab.	2	1	3	25	75	100
	EC	U5CCAL21	Allied III	EC07	Mathematical Foundations II	7	6	3	25	75	100
	EC	U5CCAP22	Allied IV	EC08	Problem Solving Technique II- Lab	2	1	3	25	75	100
		TOTAL				30	25	-	175	525	700

CC- Core Course, EC- Elective Course, AEC- Ability Enhancement Course

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)
I Year – First Semester
(For Candidates admitted from 2015 onwards)
DIGITAL LOGIC FUNDAMENTALS

OBJECTIVES:

To understand number systems, logic fundamentals and circuits, organization of computers, operating systems such as Windows and Linux

Unit I

10 Hours

Number Systems -Decimal, Binary, Octal, Hexadecimal and their inter conversions, - Binary Arithmetic -1's complement, 2's complement and 9's complement Binary codes - BCD, Excess-3, Gray code. (Chapter 1:1.1 to 1.9)

Unit II

10 Hours

Boolean Algebra : Boolean Laws - Simplification of Boolean Functions - Logic gates and Truth Table – Universal Gates (NAND and NOR) - The K-map method up to five variables, don't care conditions, POS & SOP forms.(Chapter 2::2.1 to 2.4,Chapter 3:3.1-3.8)

Unit III

15 Hours

Combinational Logic: Half/Full adder/subtractor, code conversion, Multiplexers, demultiplexers, encoders, decoders, Combinational design using MUX & DEMUX. BCD adder, magnitude comparator (Chapter 4:4.1 to 4.9)

Unit IV

15 Hours

Sequential logic: Flip flops (RS, Clocked RS, D, JK, JK Master Slave)-Counters & types Synchronous and Asynchronous counters- Registers, Shift registers and their types. (Chapter 6:: 6.1 to 6.4, Chapter 7:7.2-7.7)

Unit V

10 Hours

Computer Organisation : Peripheral Devices ,I/O Interfaces-Mode of Transfer -DMA-Input-Output Processor(IOP)-**Memory Organization:** Memory Hierarchy-Main Memory-Auxiliary Memory-Cache Memory-Virtual Memory (Chapter 11:11.1,11.2,11.4,11.6,11.7,Chapter 12:12.1,12.2,12.3,12.5,12.6)

Text Book:

Total Hours: 60

1. Morris Mono M., “**Digital Logic and Computer Design**”, PHI Latest Pub. Ed. (Unit I to Unit IV)
2. Morris Mano M – “Computer System Architecture – PHI Third Edition (Unit V)

Reference Books:

1. Morris Mano M, Kime .R.Charles, ”**Logic And Computer Design Fundamentals**”(2nd Edition Updated)

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)

I Year – First Semester

(For Candidates admitted from 2015 onwards)

Office Software Lab

a) Excel

1. Using formulae (Numeric, String, Date, Financial etc) to compute Simple Compound Interest, EMI, FV etc
2. Drawing various graphs Chart - Line, XY, Bar and Pie for a given set of data.
3. Conditional Formatting
4. Sorting and Import / Export features.
5. Macros and VBA

b) Access

- 6) Creation of table / primary key /
- 7) Query / Parameter Query / Relations
- 8) Filtering Records
- 9) Left / Right / Equi / Cross Joins
- 10) Design of forms / Reports / Modules

c) HTML

- 11) Creating web page with simple & advanced tags.
- 12) Drawing Tables
- 13) Web Page with Frames and Links (internal & external)
- 14) Creating Simple forms
- 15) Applying CSS to HTML

REFERENCE BOOK:

1. LAB MANUAL

DEPARTMENT OF MATHEMATICS

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)

SEMESTER I

Allied Paper I	Mathematical Foundations I	Code : U5CCAL11
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Objectives: To Explore the Fundamental Concept of Mathematics

Unit I: SYMBOLIC LOGIC

Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi – conditional operators, converse, inverse, contra positive, logically equivalent, tautology and contradiction, Arguments and validity of argument.

Unit II: SET THEORY

Set, set operations, venn diagram, Properties of sets, number of elements in a set, Cartesian product, relation & functions, Relation: Equivalence relation. Equivalence class, partially and totally ordered sets, Functions: Types of Functions, Composition of Functions.

Unit III: BINARY OPERATORS

Types of Binary operations: Commutative, Associative, Distributive and identity, Boolean algebra: properties. Permutations and combinations

Unit IV: DIFFERENTIATION

Simple problem using standard limits, $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$, $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow 0} \frac{\tan x}{x}$, $\lim_{x \rightarrow 0} e^x$, $\lim_{n \rightarrow 0} (1 + 1/n)^n$, $\lim_{n \rightarrow 0} (1 + 1/n)^{1/n}$, Differentiation, successive differentiation, Leibnitz theorem, partial differentiation Applications of differentiation, Tangent and normal, angle between two curves, Maximum and minimum values [second derivative test], curvature and radius of curvature [Cartesian coordinates], Envelops.

Unit V: TWO DIMENSIONAL ANALYTICAL GEOMETRY

Straight lines – pair of straight lines – circles – System of Circles - conics [parabola, Ellipse and Hyperbola].

RECOMMENDED TEXT:

MATHEMATICAL FOUNDATIONS Volume I, U. Rizwan, Nelliappar Publications, Chennai. 2012

REFERENCES

1. MATHEMATICAL FOUNDATIONS, P.R VITTAL, Margham Publication, Chennai.
2. DISCRETE MATHEMATICAL FOUNDATIONS, V.Sundaram & others, – A.P.Publication, Sirkali
3. ANALYTICAL GEOMETRY OF 2 AND 3 DIMENSIONS, P.Duraipandia & Others, Emerald Publication 1992 Reprint.

SEMESTER I

Allied Practical I	Problem Solving Techniques I	Code : U5CCAP11
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Common to B.Sc., (CS) / BCA / B.Sc.,(SW)

List of Exercises

1. Computing expressions
2. Operations on Vectors
3. Operations on Sets
4. Permutation and Combinations
5. Differential Calculus

REFERENCES:

MATLAB MANUAL

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)
I Year – Second Semester
(For Candidates admitted from 2015 onwards)
PROGRAMMING IN C

OBJECTIVES:

The purpose of this course is to understand simple algorithms, language constructs and to develop programming skills in C.

UNIT – I

10 Hours

Fundamental Algorithms & Factoring Methods: Algorithm characteristics, Structure of algorithm - Linear, iterative, loop, decision constructs – Flow chart – need – Illustrative examples through : Exchanging the values of two variables , Counting, Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, Reversing the digits of a number, Base conversion, Finding the square root of a number, Smallest divisor of an integer, Greatest Common Divisor of two numbers, Generating prime numbers, Computing the prime factors, Generating the pseudo random numbers, Computing the nth Fibonacci number.(Chapter 2 & 3)

UNIT – II

10 Hours

Introduction to C: C character set -Identifiers and keywords. Data types and sizes, Declarations, Expressions, statements and symbolic constants, Input/output functions – type conversions – precedence and order of evaluation Operators and expressions: Arithmetic, unary, logical, bit-wise, assignment and conditional operators, Library function, user defined functions -Control statements, comma operator.

UNIT – III

15 Hours

Arrays: Defining and processing, passing to a function, Multi dimensional arrays. **Functions:** Defining and accessing: passing arguments, Function prototypes, Recursion, Use of library functions, Storage classes, automatic, external and static and register variables. **Strings:** Operations on strings.

UNIT – IV

15 Hours

Pointers: Declarations, Passing to a function. Operations on pointers, Pointers and arrays, Arrays of pointers Structures- nested structures - defining and processing, passing to a function, Unions. Pre processors, Command line arguments.

UNIT – V

10 Hours

Files: Open, close, create, process, Unformatted data files. Text and binary files - Dynamic memory allocation – streams - error handling

Text Books:

Total Hours: 60

1. How to solve it by computer by R.G.Dromey, PHI International (Unit I)
2. E. Balagurusamy, “Programming in C”, Tata McGrawhill Publishers (Unit II to V)

Reference Books:

1. Kernighan, B.W. and Ritchie, D.M., “The C Programming Language (ANSIC)”, PHI.
2. Foster & Foster, “C by Discovery”, Penram International Publishers, Mumbai.

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)
I Year – Second Semester
(For Candidates admitted from 2015 onwards)
Programming in C – Lab

Control Statements:

1. Print n Fibonacci numbers – (using for)
2. Print n Prime numbers – (using while)
3. Simple arithmetic on two numbers – (using switch/case)

Functions:

4. Swap two values using call by value / call by reference.

Recursion:

5. To compute NcR and NpR
6. To Compute GCD and LCM

String Manipulation

7. Operations on string such as length, concatenation, reverse, counting, and copy of a string to another.

Matrices:

8. Matrix Addition, Subtraction, Multiplication, Transpose of n x m matrices.
9. Inverse of a square matrix.

Searching:

10. Binary Search.

Sorting:

11. Bubble Sort
12. Insertion Sort

Structures:

13. Students Mark statement

Pointers:

14. Arithmetic operations on pointers.

Files

15. Creating/ Reading/ Writing a text/binary file.

REFERENCE BOOK:

1. LAB MANUAL

DEPARTMENT OF MATHEMATICS

SEMESTER II

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)

Allied Paper II	Mathematical Foundations II	Code : U5CCAL21
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Objectives: To Explore the Fundamental Concept of Mathematics

Unit I: MATRICES – I

Multiplication of matrices, singular and Non singular matrices, Adjoint of a Matrix, inverse of a matrix, symmetric and skew symmetric, Hermitian and skew Hermitian, orthogonal and unitary matrices, Rank of a matrix, solution of simultaneous linear equations by [i] Cramer's rule [ii] Matrix inversion Method. (Upto Three equations and Three unknowns)

Unit II: MATRICES – II

Tests for consistency of linear equations, (Rank Method), characteristic roots and characteristic vectors, Cayley – Hamilton theorem, matrix of linear transformations: reflection about the x, y axes and the line $y=x$, rotation about the origin through an angle, expansion or compression, shears, translation.

Unit III: INTEGRAL CALCULUS – I

Integration simple problem, integration of rational function involving algebraic expressions of the form $\frac{1}{ax^2+bx+c}$, $\frac{1}{\sqrt{ax^2+bx+c}}$, $\sqrt{ax^2+bx+c}$, $\frac{px+q}{ax^2+bx+c}$, $\frac{px+q}{\sqrt{ax^2+bx+c}}$, Integrations using simple substitutions – integration involving trigonometric functions of the form $\frac{1}{a+b\cos x}$, $\frac{1}{a^2 \sin^2 x + b^2 \cos^2 x}$ – integration by parts.

Unit IV: INTEGRAL CALCULUS – II

Properties of definite integrals Reduction formulae for $\int x^n e^{ax} dx$, $\int \sin^n x dx$, $\int \cos^n x dx$, $\int x^m (1-x)^n dx$, Applications of integration for [i] Area under plane curves, [ii] Volume of solid of revolution

Unit V: ANALYTICAL GEOMETRY OF THREE DIMENSIONS

Planes, Straight Lines, Spheres and Cones (simple problems only)

RECOMMENDED TEXT:

MATHEMATICAL FOUNDATIONS Volume II, U. Rizwan, Nelliappar Publications, Chennai 2012

REFERENCES

1. MATHEMATICAL FOUNDATIONS, P.R VITTAL, Margham Publication, Chennai.
2. DISCRETE MATHEMATICAL FOUNDATIONS, V.Sundaram & others, – A.P.Publication, Sirkali
3. ANALYTICAL GEOMETRY OF 2 AND 3 DIMENSIONS, P.Duraipandia & Others, Emerald Publication 1992 Reprint.

SEMESTER II

Common to B.Sc., (CS) / BCA / B.Sc.,(SW)

Allied Practical II	Problem Solving Techniques II	Code : U5CCAP21
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List of Exercises

1. Matrices Manipulations
2. Testing Consistency of System of Equations

3. Integration
4. Applications of Integration to Area and volume
5. Plotting of 2D and 3D objects.

REFERENCES:

MATLAB MANUAL

**M.SC. MATHEMATICS [SUBJECT CODE - P5MS3001]
COMPLEX ANALYSIS – I**

Objectives: To study Cauchy integral formula, local properties of analytic functions, general form of Cauchy's theorem and evaluation of definite integral and harmonic functions.

UNIT–I : CAUCHY'S INTEGRAL FORMULA

The Index of a point with respect to a closed curve – The Integral formula – Higher derivatives.

LOCAL PROPERTIES OF ANALYTIC FUNCTIONS: The Maximum Principle.

Chapter 4 : Section 2: 2.1 to 2.3; Section 3: 3.4 (15 hours)

UNIT–II : THE GENERAL FORM OF CAUCHY'S THEOREM

Chains and Cycles – Simple Connectivity – Homology – The General Statement of Cauchy's Theorem – Proof of Cauchy's Theorem – Locally Exact Differentials – Multiply Connected Regions.

THE CALCULUS OF RESIDUES: Residue Theorem – The Argument Principle.

Chapter 4 : Section 4: 4.1 to 4.7; Section 5 : 5.1 to 5.2 (15 hours)

UNIT–III : THE CALCULUS OF RESIDUES

Evaluation of Definite Integrals. **HARMONIC FUNCTIONS:** Definition of Harmonic Function and Basic Properties – Mean Value Property – Poisson Formula.

Chapter 4 : Section 5 : 5.3 ; Chapter 4 : Section 6 : 6.1 to 6.3 (15 hours)

UNIT–IV : HARMONIC FUNCTIONS AND POWER SERIES EXPANSIONS

Schwarz's Theorem – The Reflection Principle – Weierstrass's Theorem – Taylor's Series – Laurent's Series.

Chapter 4 : Sections 6: 6.4 and 6.5; Chapter 5 : Sections 1: 1.1 to 1.3 (15 hours)

UNIT–V : PARTIAL FRACTIONS AND ENTIRE FUNCTIONS

Partial fractions – Infinite products – Canonical products – Gamma function.

ENTIRE FUNCTIONS: Jensen's formula – Hadamard's theorem.

Chapter 5 : Sections 2: 2.1 to 2.4; Chapter 5 : Sections 3: 3.1 and 3.2 (15 hours)

CONTENT AND TREATMENT AS IN:

COMPLEX ANALYSIS, (Third Edition), *Lars V. Ahlfors*, (1979), McGraw Hill Co, New York.

REFERENCES:

1. INTRODUCTION TO COMPLEX ANALYSIS, *H. A. Presfly*, (1990), Clarendon Press, Oxford.
2. FUNCTIONS OF ONE COMPLEX VARIABLES, *J. B. Conway*, (1978), Springer –Verlag, International Student Edition, Narosa Publishing Co.
3. ANALYTIC FUNCTION THEORY, *E. Hille*, (1959), (vol II), Gonm & Co.

SEMESTER III

PAPER X TOPOLOGY [SUBJECT CODE - P5MS3002]

Objectives: To study topological spaces, continuous functions, connectedness, compactness, countability and separation axioms.

UNIT-I : TOPOLOGICAL SPACES

Topological spaces – Basis of a topology – The order topology – The product topology on $X \times Y$ – The Subspace topology – Closed sets and limit points.

Chapter 2: section 12 to 17. (18 hours)

UNIT-II : CONTINUOUS FUNCTIONS

Continuous functions – The product topology – The metric topology.

Chapter 2: sections 18 to 21 [omit section 22] (18 hours)

UNIT-III : CONNECTEDNESS

Connected spaces – Connected subspaces of the real line – Components and local connectedness.

Chapter 3: section 23 to 25. (18 hours)

UNIT-IV : COMPACTNESS

Compact spaces – Compact subspaces of the real line – Limit point compactness – Local compactness.

Chapter 3: sections 26 to 29 (18 hours)

UNIT-V : COUNTABILITY AND SEPARATION AXIOMS

The countability Axioms – The separation axioms – Normal spaces – The Urysohn lemma – The Urysohn metrization theorem – The Tietz extension theorem.

Chapter 4: sections 30 to 35. (18 hours)

CONTENT AND TREATMENT AS IN:

TOPOLOGY, *James R. Munkres*, (2002), (Second Edition), Pearson Education, New Delhi. [Third Indian Reprint].

REFERENCES:

1. TOPOLOGY, *J. Dugundji*, (1975), Prentice Hall of India , New Delhi.
2. INTRODUCTIONS TO TOPOLOGY AND MODERN ANALYSIS, *George F.Simmons*, (1963), McGraw Hill.
3. GENERAL TOPOLOGY, *J. L. Kelly*, Van Nostrand, Reinhold Co, New York.
4. COUNTER EXAMPLES IN TOPOLOGY, *L. Sten and J. Subash*, Holt, Rinehart and Winston.
5. GENERAL TOPOLOGY, *S. Willard*, (1970), Addison Wesley Mass.

SEMESTER III

PAPER XI PROBABILITY THEORY [SUBJECT CODE - P5MS3003]

Objectives: To introduce axiomatic approach to probability theory, to study some statistical characteristics, discrete and continuous distribution functions and their properties, characteristic function and basic limit theorems of probability.

UNIT-I : RANDOM EVENTS AND RANDOM VARIABLES

Random events – Probability axioms – Combinatorial formulae – Conditional probability – Bayes Theorem – Independent events – Random Variables – Distribution Function – Joint Distribution – Marginal Distribution – Conditional Distribution – Independent random variables – Functions of random variables.

Chapter 1: Sections 1.1 to 1.7 ; Chapter 2: Sections 2.1 to 2.9 (15 hours)

UNIT-II : PARAMETERS OF THE DISTRIBUTION

Expectation – Moments – The Chebyshev's Inequality – Absolute moments – Order parameters – Moments of random vectors – Regression of the first and second types.

Chapter 3: Sections 3.1 to 3.8 (15 hours)

UNIT-III : CHARACTERISTIC FUNCTIONS

Properties of characteristic functions – Characteristic functions and moments – Semi invariants – Characteristic function of the sum of the independent random variables – Determination of distribution function by the Characteristic function – Characteristic function of multidimensional random vectors – Probability generating functions.

Chapter 4: Sections 4.1 to 4.7 (15 hours)

UNIT-IV : SOME PROBABILITY DISTRIBUTIONS

One point, two point, Binomial – Polya – Hypergeometric – Poisson (discrete) distributions – Uniform – Normal - Gamma – Beta – Cauchy and Laplace (continuous) distributions.

Chapter 5 : Section 5.1 to 5.10 [omit Section 5.11] (15 hours)

UNIT–V : LIMIT THEOREMS

Stochastic convergence – Bernoulli law of large numbers – Convergence of sequence of distribution functions – Levy–Cramer Theorems – de Moivre Laplace theorem – Poisson, Chebyshev, Khintchine Weak law of large numbers – Lindberg Theorem – Lyapunov theorem.

Chapter 6 : Sections 6.1 to 6.4, 6.6 to 6.8 [omit sections 6.5, 6.9 to 6.15] (15 hours)

CONTENT AND TREATMENT AS IN:

PROBABILITY THEORY AND MATHEMATICAL STATISTICS, *M. Fisz*, (1963), John Wiley and sons, New York.

REFERENCES:

1. REAL ANALYSIS AND PROBABILITY, *R. B. Ash*, (1972), Academic Press, New York.
2. A COURSE IN PROBABILITY, *K. L. Chung*, (1974), Academic press New York.
3. PROBABILITY THEORY AND EXAMPLES, (Second edition), *R. Durrett*, (1996), Duxbury press, New York.
4. AN INTRODUCTION TO PROBABILITY THEORY AND MATHEMATICAL STATISTICS, *V. K. Rohatgi*, (1988), Wiley Eastern, New Delhi.
5. A PROBABILITY PATH, *S. I. Resnick*, (1999), Birhauser, Berlin.
6. MODERN PROBABILITY THEORY, (Third edition), *B. R. Bhat*, (1999), New Age International, New Delhi.

SEMESTER III

PAPER XII

FLUID DYNAMICS

[SUBJECT CODE - P5MS3004]

Objectives: This course aims to discuss kinematics of fluids in motion, equation of motion of a fluid, three dimensional flows and viscous flows.

UNIT-I : KINEMATICS OF FLUIDS IN MOTION

Real fluids and ideal fluids – Velocity of a fluid at a point, Stream lines, path lines, steady and unsteady flows – Velocity potential – The vorticity vector – Local and particle rates of changes – Equations of continuity – Worked examples – Acceleration of a fluid – Conditions at a rigid boundary.

Chapter 2 : Sections 2.1 to 2.10 (15 hours)

UNIT-II : EQUATIONS OF MOTION OF FLUID

Pressure at a point in a fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid immiscible fluids – Euler's equation of motion – Discussion of the case of steady motion under conservative body forces.

Chapter 3 : Sections 3.1 to 3.7. (15 hours)

UNIT-III : SOME THREE DIMENSIONAL FLOWS

Introduction – Sources sinks and doublets – Images in a rigid infinite plane – Axis symmetric flows – Stokes stream function.

Chapter 4 : Sections 4.1, 4.2, 4.3, 4.5. (15 hours)

UNIT-IV : SOME TWO DIMENSIONAL FLOWS

Meaning of two dimensional flow – Use of Cylindrical polar coordinate – The stream function – The complex potential for two dimensional, irrotational incompressible flow – Complex velocity potentials for standard two dimensional flows – Some worked examples – Two dimensional image systems – The Milne Thompson circle Theorem.

Chapter 5 : Sections 5.1 to 5.8 (15 hours)

UNIT-V : VISCOUS FLOWS

Stress components in a real fluid – Relations between Cartesian components of stress Translational motion of fluid elements – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric – Stress analysis in fluid motion – Relation between stress and rate of strain – The coefficient of viscosity and Laminar flow – The Navier – Stokes equations of motion of a Viscous fluid.

Chapter 8 : Sections 8.1 to 8.9.
hours)

(15

CONTENT AND TREATMENT AS IN:

TEXT BOOK OF FLUID DYNAMICS, *F. Chorlton*, (1985), CBS Publications, NewDelhi.

REFERENCES:

1. INTRODUCTION TO FLUID MECHANICS, *R. W. Fox and A. T. McDonald*, (1985), Wiley.
2. FLUID MECHANICS WITH PROBLEMS AND SOLUTIONS, *E. Krause*, (2005), Springer.

SEMESTER III

ELECTIVE III

PAPER III A

**TENSOR ANALYSIS AND RELATIVITY
[SUBJECT CODE - P5MSE301]**

Objectives: The course aims to introduce vector algebra and vector calculus and special relativity and relativistic kinematics, dynamics and accelerated systems.

UNIT-I : TENSOR ALGEBRA

Systems of Different orders – Summation Convention –Kronecker Symbols – Transformation of Coordinates in S_n – Invariants – Covariant and Contra variant vectors – Tensors of second order – Mixed Tensors – Zero Tensor – Tensor Field – Algebra of tensors – Equality of tensors – Symmetric and Skew- symmetric tensors – Outer multiplication, contraction and Inner multiplication – Quotient law of tensors – Reciprocal tensors of tensors – Relative tensor – Crossproduct of vectors.

Chapter I: I.1 – I.3, I .7 and I.8, Chapter II: II.1 – II.19

(15

hours)

UNIT-II : TENSOR CALCULUS

Riemannian space – Christoffel symbols and their properties.

Chapter III: III.1 and III.2

(15

hours)

UNIT-III : TENSOR CALCULUS (Cont . . .)

Covariant Differentiation of Tensors – Riemann–Christoffel Curvature Tensor – Intrinsic Differentiation.

Chapter III: III.3 – III.5

(15

hours)

UNIT-IV : SPECIAL THEORY OF RELATIVITY

Galilean transformation – Maxwell's equation – The ether theory – The principle of Relativity.

RELATIVISTIC KINEMATICS: Lorentz transformation equations – Events and Simultaneity – Example – Einstein train – Time Dilation – Longitudinal Contraction – Invariant Interval – proper time and proper distance – World line – Example – Twin Paradox – Addition of Velocities – Relativistic Doppler Effect.

Chapter 7 : sections 7.1 and 7.2 (15 hours)

UNIT–V : RELATIVISTIC DYNAMICS

Momentum – Energy – Momentum energy fourvector – Force – Conservation of energy – Mass and energy – Example – Inelastic collision – Principle of Equivalence – Lagrangian and Hamiltonian Formulations.

ACCELERATED SYSTEMS: Rocket with constant acceleration – Example – Rocket with constant thrust.

Chapter 7 : sections 7.3 and 7.4 (15 hours)

CONTENT AND TREATMENT AS IN:

1. TENSOR CALCULUS, Units I, II and III *U.C. De Absos Ali Shaikh and Joydeep Sengupta*, (2004), Narosa Publishing House, New Delhi.
2. CLASSICAL DYNAMICS Units IV and V (1985), *D. Greenwood*, Prentice Hall of India, New Delhi.

REFERENCES:

1. TENSOR CALCULUS, *J. L. Synge and A. Schild*, (1949), Toronto.
2. THE MATHEMATICAL THEORY OF RELATIVITY, *A. S. Eddington*, (1930), Cambridge University Press.
3. AN INTRODUCTION TO THEORY OF RELATIVITY, *P. G. Bergman*, (1942), New York.
4. RIEMANNIANGEOMETRY AND THE TENSOR CALCULUS, *C. E. Weatherburn*, (1988), Cambridge.

SEMESTER III

ELECTIVE III

PAPER III B

FUZZY SETS AND THEIR APPLICATIONS **[SUBJECT CODE - P5MSE302]**

UNIT - I : FUZZY SETS

Fuzzy sets – Basic types – Basic concepts – Characteristics – Significance of the paradigm shift – Additional properties of α - Cuts

Chapter 1 : Sections 1.3 to 1.5

Chapter 2 : Section 2.1 (15 hours)

UNIT - II : FUZZY SETS VERSUS CRISP SETS

Representation of Fuzzy sets – Extension principle of Fuzzy sets – Operation on Fuzzy Sets – Types of Operation – Fuzzy complements.

Chapter 2 : Sections 2.2 to 2.3

Chapter 3: Sections 3.1 to 3.2 (15 hours)

UNIT - III : OPERATIONS ON FUZZY SETS

Fuzzy intersection – t-norms, Fuzzy unions – t conorms – Combinations of operations – Aggregation operations.

Chapter 3 : Sections 3.3 to 3.6

(15 hours)

UNIT - IV : FUZZY ARITHMETIC

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Lattice of Fuzzy numbers

Chapter 4 : Sections 4.1 to 4.4

(15 hours)

UNIT - V : CONSTRUCTION FUZZY SETS

Methods of construction : An overview – Direct methods with one expert – Direct method with multiple experts – Indirect method with multiple experts and one expert – Construction from sample data.

Chapter 10 : Sections 10.1 to 10.7

(15 hours)

CONTENT AND TREATMENT AS IN:

FUZZY SETS AND FUZZY LOGIC : THEORY AND APPLICATIONS, *G. J. Klir and Bo Yuan*, (2005), Prentice Hall of India Ltd, New Delhi.

REFERENCES:

1. FUZZY SET THEORY AND ITS APPLICATIONS, *H. J. Zimmermann*, (1996), Allied Publishers, Chennai.
2. INTRODUCTION TO THE THEORY OF FUZZY SUBSETS, *A. Kaufman*, (1975), Academic Press, New York.
3. FUZZY SETS AND THEIR APPLICATIONS, *V. Novak*, (1969), Adam Hilger, Bristol.

SEMESTER III

ELECTIVE IV: NONMAJOR

PAPER IV

MATHEMATICAL SOFTWARE

Objectives: This course aims to practice the students in Mathematics document preparation and utilizing the software facility available for tedious computations.

CREATING A DOCUMENT USING LATEX

- Title creation
- Page Layout
- Formatting
- Fonts
- List Structures
- Tables
- Bibliography Management.

MATLAB BASICS

- Algebra and Arithmetic
- Calculus, Graphics and Linear Algebra
- MATLAB Programming

REFERENCES:

1. LATEX MANUAL.
2. A GUIDE TO MATLAB FOR BEGINNERS AND EXPERIENCED USERS, *Brain R. Hunt, Ronald R. Lipsman and Jonathan M. Rosenberg*, (2003), Cambridge University Press.
3. INTRODUCTION TO MATLAB, *Rose L. Spencer*.

SEMESTER IV

PAPER XIII

COMPLEX ANALYSIS II **[SUBJECT CODE - P5MS4001]**

Objectives: To study Riemann Zeta function and normal families. Riemann mapping theorem, Conformal mapping of polygons, Harmonic functions, Elliptic functions and Weierstrass theory of analytic continuation.

UNIT-I : RIEMANN ZETA FUNCTION AND NORMAL FAMILIES

The Product development – Extension of $\zeta(s)$ to the whole plane – The functional equation – The zeros of zeta function – Equicontinuity – Normality and compactness – Arzela's theorem – Families of analytic functions.

Chapter 5 : Section 4: 4.1 to 4.4 Chapter 5 : Section 5: 5.1 to 5.4. (18 hours)

UNIT-II : RIEMANN MAPPING THEOREM

Statement and proof – Boundary Behaviour – Use of the Reflection Principle.

CONFORMAL MAPPING OF POLYGONS: The Behaviour at an angle – Schwarz's formula – Mapping on a rectangle.

HARMONIC FUNCTIONS: Functions with mean value property – Harnack's principle.

Chapter 6 : Section 1: 1.1 to 1.3 ; Chapter 6 : Section 2: 2.1 to 2.3;
Chapter 6 : Section 3: 3.1 and 3.2. (18 hours)

UNIT-III : ELLIPTIC FUNCTIONS

Simply periodic functions – Doubly periodic functions.

Chapter 7 : Section 1: 1.1 to 1.3; Chapter 7 : Section 2: 2.1 to 2.4 (18 hours)

UNIT-IV : WEIERSTRASS THEORY

The Weierstrass \wp -function – The functions $\zeta(z)$ and $\sigma(z)$ – The differential equation – The Modular function $\lambda(\tau)$ – The conformal mapping by $\lambda(\tau)$.

Chapter 7 : Section 3: 3.1 to 3.5 (18 hours)

UNIT-V : ANALYTIC CONTINUATIONS

The Weierstrass theory – Germs and sheaves sections and Riemann surfaces – Analytic continuation along Arcs – Harmonic curves – The Monodromy theorem – Branch points.

Chapter 8 : Section 1: 1.1 to 1.7. (18 hours)

CONTENT AND TREATMENT AS IN:

COMPLEX ANALYSIS, (Third Edition), *Lars V.Ahlfors*, (1979), McGraw Hill Book Company.

REFERENCES:

1. INTRODUCTION TO COMPLEX ANALYSIS, *H. A. Prestly*, (1990), Clarendon Press, Oxford.
2. FUNCTION OF ONE COMPLEX VARIABLE, *J. B. Corway*, Springer –Verlag, Narosa publishing co.

SEMESTER IV

PAPER XIV

FUNCTIONAL ANALYSIS [SUBJECT CODE - P5MS4002]

Objectives: To study the details of Banach and Hilbert spaces and to introduce Banach algebras.

UNIT-I : BANACH SPACES

Definition and Some examples – Continuous Linear Transformations – The Hahn Banach Theorem – The Natural embedding of N in N^{**} .

Chapter 9: sections 46 to 49. (18 hours)

UNIT-II : BANACH SPACES AND HILBERT SPACES

Open Mapping Theorem – Conjugate of an operator – Definition and some simple properties of Hilbert spaces – Orthogonal complements – Orthonormal sets.

Chapter 9 : Sections 50 and 51. Chapter 10 : Sections 52, 53 and 54. (18 hours)

UNIT-III : HILBERT SPACES

Conjugate space H^* – Adjoint of an operator – Self-adjoint operator – Normal and Unitary operators – Projections.

Chapter 10 : Sections 55, 56, 57, 58 and 59. (18 hours)

UNIT-IV : GENERAL PRELIMINARIES ON BANACH ALGEBRAS

Definition and some examples – Regular and singular elements – Topological divisors of zeros – The formula for the spectral radius.

Chapter 12 : Sections 64 to 66 and 68. (18 hours)

UNIT-V : THE STRUCTURE OF COMMUTATIVE BANACH ALGEBRAS

Gelfand Mapping – Applications of the formula $r(x) = \|x^n\|^{1/n}$ – Involutions in Banach Algebras – Gelfand – Neumark Theorem.

Chapter 13 : Section 70 to 73.

(18

hours)

CONTENT AND TREATMENT AS IN:

INTRODUCTION TO TOPOLOGY AND MODERN ANALYSIS, *G. F. Simmons*, (1963), McGraw Hill, New York.

REFERENCES:

1. FUNCTIONAL ANALYSIS, *W. Rudin*, (1973), Tata McGraw Hill, New Delhi.
2. FUNCTIONAL ANALYSIS, *G. Bauhman and L. Narici*, (1966), Academic Press, New York.
3. FIRST COURSE IN FUNCTIONAL ANALYSIS, *H. C. Goffman and G. Fedrick*, (1987), Prentice Hall of India, New Delhi.
4. INTRODUCTORY FUNCTIONAL ANALYSIS WITH APPLICATIONS, *E. Kreyszig*, (1978), John Wiley & sons, New York.

SEMESTER IV

PAPER – XV

MATHEMATICAL STATISTICS [SUBJECT CODE - P5MS4003]

Objectives: This course introduces sampling theory, significance tests, estimation, testing of hypothesis, ANOVA and sequential analysis with rigorous mathematical treatment.

UNIT-I : SAMPLE MOMENTS AND THEIR FUNCTIONS

Notion of a sample and astatistic – Distribution of the arithmetic mean of independent normally distributed random variables – the χ^2 distribution – the distribution of the statistic (X; S) – student t – distribution – Fisher's Z – distribution –Snedecor's F – distribution –Distribution of X from non-normal populations.

Chapter 9 : Section 9.1 to 9. 8.

(18

hours)

UNIT-II

The theorems of Kolmogorov and Smirnov.

SIGNIFICANCE TEST: Concept of a statistical test –Parameteric tests for smallsamples and large samples χ^2 test – The test of Kolmogorov and smirnov type– the Wald Wolfowitz and Wilcoxon–Mann– Whitney tests – Independence tests by contingency tables.

Chapter 10: Section 10.11 ; Chapter 12: Section 12.1 to 12.7
(18 hours)

UNIT–III : ESTIMATION

Preliminary notion – Consistent estimates – Unbiased estimates – Sufficiency–Efficiency–Asymptotically most efficient estimates – Methods of finding estimates – Confidence interval

Chapter 13: Sections 13.1 to 13.8
(18 hours)

UNIT–IV : ANALYSIS OF VARIANCE

One way classification and two way classification

HYPOTHESIS TESTING: Power functions and the OC function – Most powerful test – Uniformly most powerful test – unbiased test .

Chapter 15: Sections 15.1 and 15.2; Chapter 16: Sections 16.1 to 16.5.
(18 hours)

UNIT–V : SEQUENTIAL ANALYSIS

SPRT – Auxiliary theorem – Wald's fundamental identity – OC function and SPRT – $E(n)$ and determination of A and B – Testing a hypothesis concerning p on 0 – 1 distribution and m in Normal distribution.

Chapter 17: Sections 17.1 to 17.9
(18 hours)

CONTENT AND TREATMENT AS IN:

PROBABILITY THEOREM AND MATHEMATICAL STATISTICS, *M. Fisz*, (1963), John Wiley and sons , New York.

REFERENCES:

1. MODERN MATHEMATICAL STATISTICS, *E. J. Dudewicz and S. N. Mishra*, (1963), John Wiley, New York.
2. AN INTRODUCTION TO PROBABILITY THEORY AND MATHEMATICAL STATISTICS, *V. K. Rohatgi*, (1988), Wiley Eastern.

SEMESTER IV

PAPER – XVI

DIFFERENTIAL GEOMETRY [SUBJECT CODE - P5MS4004]

Objectives: This course introduces space curves and their intrinsic properties of a surface and geodesics. The non–intrinsic properties of a surface and the differential geometry of surfaces are explored.

UNIT – I : SPACE CURVES

Definition of a space curve – Arc length – Tangent – Normal and binormal – Curvature and torsion – Contact between curves and surfaces – Tangent surface – Involutives and evolutes – intrinsic equations – Fundamental existence theorem for space curve – Helices.

Chapter 1 : Sections 1 to 9 (18 hours)

UNIT – II : INTRINSIC PROPERTIES OF A SURFACE

Definition of a surface – Curves on a surface – Surface of revolution – Helicoids – Metric – Direction coefficients – Families of curves – Isometric correspondence – Intrinsic properties.

Chapter 2 : Sections 1 to 9 (18 hours)

UNIT – III : GEODESICS

Geodesics – Canonical geodesic equations – Normal properties of geodesics – Existence theorem – Geodesic parallels – Geodesic curvatures – Gauss Bonnet theorem – Gaussian curvature – Surface of constant curvature.

Chapter 2 : Sections 10 to 18 (18 hours)

UNIT – IV : NON-INTRINSIC PROPERTIES OF A SURFACE

The second fundamental form – Principal curvature – Lines of curvature – Developable – Developable associated with space curves and with curves on surface – Minimal surfaces – Ruled surfaces.

Chapter 1 : Sections 1 to 8 (18 hours)

UNIT – V : DIFFERENTIAL GEOMETRY OF SURFACES

Fundamental equations of surface theory – Fundamental existence theorem for surfaces – Compact surfaces whose points are umbilics – Hilbert's lemma – Compact surfaces of constant curvature – Complete surfaces.

Chapter 3 : Sections 9 to 10

Chapter 4 : Sections 1 to 5 (18 hours)

CONTENT AND TREATMENT AS IN:

An INTRODUCTION TO DIFFERENTIAL GEOMETRY, *T. J. Willmore*, (2002), Oxford University Press, New Delhi.

REFERENCES:

1. LECTURES ON CLASSICAL DIFFERENTIAL GEOMETRY, *D. T. Struik*, (1950), Addison Wesley, Mass.
2. FOUNDATIONS OF DIFFERENTIAL GEOMETRY, *Kobayashi and K. Nomizu*, (1963), Interscience.

SEMESTER IV

ELECTIVE V

PAPER V A

**ACTUARIAL MATHEMATICS
[SUBJECT CODE - P5MSE402]**

Objectives: To develop working knowledge of real world problems like investments, premium calculation in insurance, profit testing unit-linked policies, pension plan and future projections.

UNIT -I : BASIC FINANCIAL MATHEMATICS

Simple and compound interest – Actuarial notion for financial mathematics. (18 hours)

UNIT- II : INTRODUCTION TO LIFE CONTINGENCIES

Survival probability – Death probabilities – deterministic modeling. (18 hours)

UNIT-III : INTRODUCTION TO ACTUARIAL MATHEMATICS

Life-contingent annuity factors – Premium payable for an annuity – Assurance factors – Guaranteed endowments – Premium calculations for assurance benefits. (18 hours)

UNIT- IV : UNIT LIKED PRODUCTS

Charging structure – Benefit flexibility – Investment flexibility – Unit price – Market practice. (18 hours)

UNIT-V : BASIC PENSION MATHEMATICS

Theory and practice of pension plan funding – Concepts of normal cost – Supplemental liability – Unfunded liability – Projected benefit cost methods. (18 hours)

CONTENT AND TREATMENT AS IN:

ACTUARIAL MATHEMATICS FOR LIFE CONTINGENT RISKS, *David C. M. Dickson, Mary R. Hardy and Howard R. Waters*, (2013), International Series on Actuarial Science, Camb

SEMESTER IV

ELECTIVE V

Paper V B

NUMBER THEORY AND CRYPTOGRAPHY [SUBJECT CODE - P5MSE401]

Objectives: This course aims to give elementary ideas from number theory which will have applications in cryptography.

UNIT – I : SOME TOPICS IN ELEMENTARY NUMBER THEORY

Time Estimates for doing arithmetic – Divisibility and Euclidean Algorithm – Congruence's – Some applications to Factoring.

Chapter I (18 hours)

UNIT – II : CRYPTOGRAPHY

Some simple cryptosystems – Enciphering matrices.

CHAPTER III (18 hours)

UNIT – III : FINITE FIELDS AND QUADRATIC RESIDUES

Finite fields – Quadratics – Residues and reciprocity.

CHAPTER II (18 hours)

UNIT – IV : PUBLIC KEY

The idea of Public key Cryptography – RSA – Discrete Log – Knapsack – Zero – Knowledge.

CHAPTER IV : Sections 1 to 4; (Omit Section 5) (18 hours)

UNIT – V : PRIMALITY AND FACTORING

Pseudo-primes – The rho method – Fermat factorization and factor bases – The continued fraction method – The quadratic sieve method.

CHAPTER V (18 hours)

CONTENT AND TREATMENT AS IN:

A COURSE IN NUMBER THEORY AND CRYPTOGRAPHY, *Neal Koblitz*, (1987), Springer – Verlag, New York.

REFERENCES:

1. AN INTRODUCTION TO THEORY OF NUMBERS, *Niven and Zuckerman*, (1976), [Third Edition], Wiley Eastern Ltd, New Delhi.
2. ELEMENTARY NUMBER THEORY, *David M. Burton*, (1989), Wm. C. Brown Publishers, Dubuque, Iowa.
3. A CLASSICAL INTRODUCTION TO MODERN NUMBER THEORY, *K. Ireland and M. Rosen*, (1972), Springer–Verlag.

III SEMESTER

ORGANIC SPECTROSCOPY AND CHEMISTRY OF NATURAL PRODUCTS (90 HOURS)

PAPER CODE: P5CH3001

OBJECTIVE:

To understand the concepts of spectral techniques and to apply these techniques for the quantitative and structural analysis of organic compounds. To learn Alkaloids, Steroids, Hetrocyclic compounds, Aromoticity photochemical reactions and their importance.

UNIT I – UV, IR AND NMR SPECTROSCOPY

Ultraviolet – Visible spectroscopy – types of electronic transitions – chromophores and auxochromes – factors influencing positions and intensity of absorption bands – absorption spectra of dienes, polyenes and α , β - unsaturated carbonyl compounds – Woodward – Fiser rules.

IR Spectroscopy – vibrational frequencies and factors affecting them – identification of functional groups – intra and inter molecular hydrogen bonding – finger print region.

Nuclear spin- magnetic movement of a nucleus – nuclear energy levels in the presence of magnetic field– basic principles of NMR experiments – CW and FT NMR – ^1H NMR – chemical shift and coupling constant – factors influencing proton chemical shift and vicinal proton – proton coupling constant – ^1H NMR spectra of simple organic molecules AX and AMX spin system – spin decoupling – nuclear over Hauser effect- chemical exchange.

^{13}C NMR – proton decoupled and off – resonance ^{13}C NMR spectra – factors affecting ^{13}C chemical shift – ^{13}C NMR spectra of simple organic molecules.

UNIT II - PHYSICAL METHODS OF STRUCTURAL DETERMINATION

Mass Spectrometry – Principles – measurement techniques – (EI, CI) – presentation of spectral data – molecular ions – isotope ions – fragment ions of odd and even electron types – rearrangement ions – factors affecting cleavage pattern – simple and multicenter fragmentation – McLafferty rearrangement. Mass spectra of hydrocarbons, alcohols, phenols, aldehydes and ketones. CD and ORD Octant rule, cotton effect, axial halo ketone rule, and its applications.

Problems solving using all spectral data (limited to 10 carbon atoms).

UNIT III – ALKALOIDS AND STEROIDS

Total synthesis of quinine, morphine, reserpine and cocaine.

Synthesis of cholesterol, oestrone, carotenes, conversion of cholesterol to progesterone Oestrone and testosterone. Structural Elucidation of cholesterol.

UNIT IV – HETERO CYCLIC COMPOUNDS

Synthesis and reactions of Imidazole, oxazole, thiazole, flavones, isoflavones, anthocyanins, pyrimidines (cytosine, thymine and uracil only) and purines (adenine, guanine only).

UNIT V – ORGANIC PHOTOCHEMISTRY AND AROMATICITY

Photochemical excitation – fate of the excited molecules – Jablonski diagram – study of photochemical reactions of ketone – Photoreduction – photocyclo addition – Paterno – Buchi reaction – di pi-methane rearrangement – Pericyclic reactions – classification – orbital symmetry – Woodward Hoffman rules – Analysis of electrocyclic, cyclo addition and sigmatropic reactions – correlation diagrams for butadiene – cyclobutene system. Inter conversion of hexatrienes to cyclohexadienes, Structure of bulvalene, a fluxional molecule – Cope and Claisen rearrangement.

Aromaticity of benzenoid, heterocyclic, and non-benzenoid compounds, Huckel's rule – Aromatic systems with pi electron numbers other than six – non-aromatic (cyclooctatetraene etc.) and anti-aromatic system (cyclobutadiene etc.) – system with more than 10 pi electrons – Annulenes up to C₁₈ (synthesis of all these compounds is not expected).

RECOMMENDED BOOKS

1. Application of absorption spectroscopy of organic compounds by J. Dyer, Prentice – Hall of India, Pvt., New Delhi.,
2. Spectrometric identification of organic compounds by R.M. Silverstein, G.d. Bassler and Monsu. John Wiley and Sons, New York.
3. Introduction to the spectroscopic methods for the identification organic compounds – 2 volumes, Schiemann Pergamman Press.
4. Organic Chemistry, Vol. II, I.L. Finar, 5th edition ELBS publication.
5. Spectroscopy of Organic compounds by P.S. Kalsi, Wiley Eastern Ltd., Chennai.
6. Molecular reaction and photochemistry by Charles H. Depuy and Orville, L. Chapman, Prentice Hall of India Pvt., Ltd., New Delhi.
7. Introduction to Chemistry of heterocyclic compounds by R.M. Acheson, Interscience Publishers.
8. Principles of Modern heterocyclic chemistry by L.A. Pacquette, Benjamin Cummings Publishing Co., London 1978.
9. Advanced organic chemistry III Edition by J. March.
10. Advanced organic Chemistry by Francis A. Carey and Richard J. Sundberg, 3rd Edition (1990).
11. Physical organic chemistry by Neil S. Issac, ELBS publication 1987.
12. Organic reaction mechanism, Macmillan India, 1999.
13. Spectroscopy W. Kemp, Macmillan Ltd.,

14. Structural identification of organic compounds Y.R. Sharma, S. Chand & Co.
15. Chemistry of Organic Natural products Vol. 1 & 2 by OP Agarwal.
16. Organic Reaction & Mechanism by OP Agarwal.

III SEMESTER

MODERN PHYSICAL CHEMISTRY (90 HOURS)

PAPER CODE: P5CHE301

OBJECTIVE:

To study the application of Quantum Chemistry to chemical bonding. To study the ionic conductance, Electrode – Electrolytic interface. To study the kinetics of polymerization and to study NMR spectroscopy and its applications.

UNIT I – QUANTUM CHEMISTRY

Approximation methods – perturbation and variation methods – application to hydrogen and helium atoms – R.S. Coupling and term symbols for atoms in the ground state.

Born – Oppenheimer approximation – Valence bond theory for hydrogen molecule – LCAO – MO theory for di- and polyatomic molecules. Concept of hybridization – Huckel theory for conjugated molecules (Ethylene, butadiene and benzene) – semi – empirical methods – Slater orbital and HF – SCF methods.

UNIT II – ELECTROCHEMISTRY - I

Mean ionic activity and mean ionic activity coefficient – concept of ionic strength, Debye – Huckel theory of strong electrolytes – activity coefficient of strong electrolytes – determination of activity coefficient by electrochemical method. Debye Huckel limiting law – qualitative and quantitative verification – limitation of Debye Huckel limiting law at appreciable concentrations of electrolytes – Huckel equation – Debye –Huckel – Onsager equation .

UNIT III – ELECTROCHEMISTRY- II

Electrode – electrolyte interface – adsorption at electrical interface – electrical double layer – electro capillary phenomenon – Lippmann equation – Structure of double layers – Helmholtz – Perrin, Guoy –Chappmann and Stern model of electrical double layers.

Diffusion – Fick's law of diffusion – Effect of ionic association on conductance-electrokinetic phenomena-membrane potential.

UNIT IV – MACROMOLECULES

Polymerization in homogeneous and heterogeneous phases- Kinetics of polymerization (Ionic and Addition)-kinetics of copolymerization- Mechanism of Polymerization- Chain Initiation- Propagation – Termination-Transfer –Inhibition and Retardation.

Properties of polymers : Molecular weight of polymers- M_w , M_n determination- Osmometry, Light Scattering, Viscosity, Ultracentrifuge – Gel Permeation Chromatography.

UNIT V – SPECTROSCOPY

Resonance spectroscopy – Zeeman effect – equation of motion of spin in magnetic fields – chemical shift – spin spin coupling - NMR of simple AX and AMX type molecules – calculation of coupling constants – ^{13}C , ^{19}F , ^{31}P NMR spectra – applications – a brief discussion of Fourier transformation resonance spectroscopy.

Text Books

1. R.K.Prasad, Quantum Chemistry, Wiley Eastern, New Delhi, 1992.
2. M.W.Hanna, Quantum Mechanics In Chemistry, W.A.Benjamin Inc. London, 1965.
3. S.Glasstone, Introduction To Electrochemistry, Affiliated East West Press, New Delhi, 1960.
4. D.R.Crow, Principles And Applications To Electrochemistry, Chapman And Hall, 1991.
5. J.Rajaram And J.C.Kuriacose, Thermodynamics For Students Of Chemistry, LalNaginChand, New Delhi, 1986.
6. F.W.Billmeyer, Text Book Of Polymer Science, Wiley Interscience, 1984.
7. A.Rudin, The Elements Of Polymer Science And Engineering, An Introductory Text For Engineers And Chemists, Academic Press, New York, 1973.
8. G.Odian Principles Of Polymerization, McGraw Hill Book Company, New York, 1973.
9. Carington and Ad.Mclachlan, Introduction To Magnetic Resonance Harper And Row, New York, 1967.

Suggested Reference For Books

1. R.L.De Koch And H.B.Gray, Chemical Structure and Bonding, Benjamin/Cumming, Menlo Park, California.
2. A.K.Chandra, Introductory Quantum Chemistry, Tata Mcgraw Hill.
3. J.M.Murrell, S.F.A.Kettle and J.M.Tedder, The Chemical Bond, Wiley, 1985.
4. D.A.McQuarrie, Quantum Chemistry, University Science Books, Mill Valley, California, 1983.
5. P.W.Atkins, Molecular Quantum Mechanics, Oxford University Press, Oxford, 1983.
6. J.O.M.Bokris and A. K. N Reddy, Electrochemistry, Vols 1 and 2 Plenum, New York, 1977.
7. P.Dalahay, Electrode Kinetics And Structure Of Double Layer, InterScience, New York, 1965.
8. J.Robbins, Ions In Solution-An Introduction In Electrochemistry, Clarendon Press, Oxford, 1993.

9. H.Reiger,Electrochemistry,Chapman And Hall,New York,1994.
10. I.C.E.H.Brawn,The Chemistry Of High Polymers,Butterworth And Co.,London,1948.
11. E.A.Coolins,J.Bares And E.W.Billmeyer,Experiments In Polymer Science,WileyInterscience,New York,1973.
12. G.S.Krishenbaum,Polymer Science Study Guide,Gordon Breach Science Publishing,New York,1973.

ORGANIC ESTIMATIONS
III SEMESTER – CORE PRACTICAL (30 HOURS)

PAPER CODE: P5CHPR31

ESTIMATIONS

1. Estimation of Aniline
2. Estimation of Phenol
3. Estimation of Glucose
4. Estimation of Amino group
5. Estimation of Amide group
6. Saponification of fat or an oil
7. Iodine value of an oil
8. Estimation of sulphur in an organic compound
9. Estimation of Ethyl Methyl Ketone

***CHROMATOGRAPHIC SEPARATIONS (Demonstration only)**

Column chromatography - separation of anthracene and picric acid from anthracene picrate.

Thin layer chromatography separation of green leaf pigments.

Paper chromatography-Identification of amino acid.

* (Demonstration only)

Marks distribution

Procedure	: 10 marks
Titration	: 15 marks
Manipulation	: 10 marks
Result	: 20 marks
Record	: 10 marks
Viva	: <u>10 marks</u>
Total	: <u>75 Marks</u>

Note:

External	75 Marks
Internal	25 Marks
Total	100 Marks

RECOMMENDED BOOKS

1. A text book of Practical Organic Chemistry by Arthur I. Vogel
2. Laboratory Manual of Organic Chemistry Raj K. Bansal, Wiley Eastern limited.
3. Laboratory manual of Organic Chemistry by Mann and Saunders.

QUANTITATIVE ANALYSIS OF METAL ION – I AND COMPLEX PREPARATION

III SEMESTER – CORE PRACTICAL (30 HOURS)

PAPER CODE: P5CHPR32

I QUANTITATIVE ANALYSIS

Quantitative analysis of mixtures of (i) Copper and Nickel
(ii) Copper and Zinc.

II PREPARATIONS

- 1) Tetrammine copper (II) sulphate
- 2) Potassium tetrachlorocuprate(II)
- 3) Tris (ethylenediamine) Cobalt (III) chloride
- 4) Hexammine Cobalt (III) chloride

SCHEME

PREPARATION	10 Marks
VOLUMETRIC	20 Marks
GRAVIMETRIC	20 Marks
PROCEDURE	05 Marks
RECORD	10 Marks
VIVA VOCE	<u>10 Marks</u>
Total	<u>75 Marks</u>

RECOMMENDED BOOKS

1. Vogel's Text book of Quantitative Inorganic Analysis.

SEMESTER-III

CONDUCTOMETRIC TITRATIONS AND SPECTRAL INTERPRETATION

PAPER CODE:P5CHPR33

List of Experiments

1. Determination of strength of an unknown strong acid by using a standard base.
2. Determination of strength of the individual concentrations of the two acids in the mixture (Strong and weak) by using a standard strong base.
3. Determination of strength of an unknown weak acid by using a standard base.
4. Analysis of an unknown KI using a standard silver nitrate by precipitation method.
5. Determination of strength of KCl by using a standard silver nitrate solution by precipitation method.
6. Analysis of a mixture of KCl and KI (individual concentrations) by using standard silver nitrate solution.
7. Determination of strength of barium chloride by using a standard magnesium sulphate by precipitation method.
8. Determination of strength of barium hydroxide by using a standard magnesium sulphate by double precipitation method.
9. Verification of Ostwald's dilution law using not less than five different dilute solutions of weak acid and determination of dissociation constant of weak acid.
10. Determination of Equivalent conductance (λ_{α}) at infinite dilution of strong electrolyte using five different dilutions using Debye –Huckel Onsager's equation.
11. Determination of solubility of a sparingly soluble salt by conductance method.

SPECTROSCOPY:

Interpretation of simple IR and Raman spectra of simple molecules for the calculation of molecular data and identification of functional groups.

Total Marks: 100 (External 75 + Internal 25)

External marks distribution

Spectra (5+5)	=	10
Practical	=	40
Procedure	=	05
Record	=	10
Viva-voce	=	10

SEMESTER III

ORGANOMETALLICS & COMPUTATIONAL CHEMISTRY (90 HOURS) NON MAJOR -1

PAPER CODE: P5CHNM31

OBJECTIVES:

To apprise the students about the latest trend in Theoretical chemistry and make them computer literate with expertise in subjects such as quantum chemistry and also make them learn about the organometallics which are highly used as catalysts in the industry.

UNIT I

ORGANOMETALLIC CHEMISTRY I

Synthesis, structure and bonding: Anionic sigma donors – alkyls and aryls; neutral sigma donors – carbonyls and nitrosyls; chain pi donors – olefins, acetylenes and allyls; cyclic pi donors – metallocenes. Reactions: Association – ligand protonation; Substitution – electrophilic and nucleophilic attack on ligands; Addition and elimination – carbonylation and decarbonylation; Rearrangements – oxidative addition and reductive elimination.

UNIT II

ORGANOMETALLIC CHEMISTRY II

Catalysis: Hydrogenation of olefins [Wilkinson's catalyst], hydroformylation of olefins using cobalt and rhodium catalysts [Oxo process], oxidation of olefins to aldehydes and ketones [Wacker's process] Polymerization of olefins [Ziegler-Natta catalyst], cyclooligomerisation of olefins and acetylenes [Reppel's and Wilke's catalyst], polymer bound catalysts.

UNIT III

PHOTOCHEMISTRY AND OCTAHEDRAL COMPLEXES

Inorganic Photochemistry: Photosubstitution, Photoredox and isomerization process, application of metal complexes in solar energy conversions.

Substitution of Octahedral complexes of Cobalt and Chromium, replacement of coordinated water, solvolysis (acids and bases) reaction applications in synthesis.

UNIT IV

COMPUTATIONAL CHEMISTRY –I

Basics about Computers: Hardware and Software definitions. Languages – Higher level and lower level. Basics on Internet: DNS, ISP, DSL, http, www, URL, LAN and WAN, repeater, Modem. Open Source software resources on web.

Fundamentals of Computational Chemistry: Semi-empirical and Ab-initio methods, Molecular Mechanics and Density Functional Theory (Basic Definitions) and Examples of Software related to these such as MOPAC and Gaussian (Or GAMESS). Visualization of results, properties predictable and Significance with few examples (MESP, HOMO, LUMO, Mulliken and Lowden Charges). Quantitative Structure Activity Relationship - basics.

UNIT V

COMPUTATIONAL CHEMISTRY –II

Drawing of structure using free softwares (Chemdraw, Chems sketch and their scope), saving them in formats and conversions (OpenBabel). Construction of zmatrix of some simple molecules such as water, formaldehyde, methane and ethane.

Predicting Molecular Geometry and optimization. Input formats to include, Cartesian coordinates and unique coordinates, Smiles, mol, pdb, mop, arc, out, dat, gjf, inp and punch files. Quantum Chemical Descriptors, Fukui Function, Calculation of Chemical Potential, Electron Affinity, Hardness and Softness, and other properties- FMO Approach.

Text books and References:

1. Computational Chemistry – A practical guide for applying techniques to real world problems – David Young, Wiley Interscience, ISBN-0-471-33368-9.
2. Essentials of Computational Chemistry, Theories and Models – Christopher J Cramer, Wiley, ISBN: 0-470-09182-7.
3. Computational Chemistry – Introduction to the Theory and Applications of Molecular and Quantum Mechanics, Springer, ISBN: 978-81-8128-476-1.
4. Computational Organic Chemistry, Steven M Bachrach, Wiley Interscience, ISBN: 978-0-471-71342-5.
5. Inorganic Chemistry, Gary Wulfsberg, Viva books pvt. Ltd. ISBN: 81-7649-288-4.
6. Molecular Modelling – Principles and Applications, Andrew R Leach, Pearson Education Ltd. ISBN:978-0-582-38210-7.
7. Bio-informatics, S C Rastogi, N Mendiratta and P Rastogi, Prentice Hall India, ISBN:978-81-203-3595-0.
8. Computational Medicinal Chemistry for Drug Discovery, Edited by P Bultinck, H De Winter, W langenaeker and J P Tollenaere, Marcell Dekker, ISBN: 0-8247-4774-7.
9. Physical Chemistry- A molecular Approach, Donald A MQuarrie and John D Simon, Viva books pvt ltd. ISBN: 81-7649-001-6.
10. Computers in Chemistry, AV Raman,Tata McGraw Hill, ISBN: 0-07-460123-7.

SEMESTER IV

SPECTROSCOPY & APPLIED INORGANIC CHEMISTRY (90 HOURS)

PAPER CODE: P5CH4001

OBJECTIVES

To make the students learn about the applications of Spectroscopy of Inorganic compounds that are now a days used for characterization of materials and compounds. This unit also would make them learn about the latest subjects such as nano science.

UNIT I

UV VISIBLE AND X-RAY SPECTROSCOPY

Applications to inorganic systems of the following: ultra violet, visible. Term symbols, energies of atomic and Molecular transitions, Selection rule, Morse potential energy diagram, charge transfer spectra, Photoelectron spectroscopy [UV and X ray]-Koopman's theorem, time structure in PES, chemical shift and correlation with electronic charges, Auger Effect.

UNIT II

IR AND RAMAN SPECTROSCOPY

Infra red and Raman spectra: Selection Rules, use of Symmetry considerations (point groups) to determine the number of lines in IR and Raman Spectra. Applications to metal complexes, Organometallic compounds, Metal carbonyls and simple inorganic compounds with special reference to coordination site, isomerism. Metal-Ligand stretching vibrations for metal carbonyls, sulphates, cyanides, isocyanides nitro and nitrito complexes

UNIT III

NMR, NQR, MOSSBAUER AND ESR SPECTROSCOPY

NMR, NQR and Mossbauer spectra – NMR of P^{31} , F^{19} , N^{15} ; shift reagents, NQR – principle and applications; Mossbauer spectra – principles and applications to iron and tin systems.

ESR – Introduction- Zeeman equation, g-value, nuclear hyperfine splitting, interpretation of the spectrum, simple carbon centered free radicals. Anisotropy – McConnell's equation. Kramer's theorem, ESR of transition metal complexes of copper, manganese and vanadyl complex

UNIT IV

LANTHANIDES AND ACTINIDES – NANOTECHNOLOGY

The chemistry of lanthanides and actinides- oxidation states, spectral and magnetic characteristics, coordination numbers, stereochemistry, nuclear and non-nuclear applications.

Nanotechnology - introduction, preparatory methods, characterization, application as sensors, biomedical applications, application in optics and electronics.

UNIT V

BIOINORGANIC CHEMISTRY

Biological importance of Iron, Magnesium, Zinc, Cobalt, Copper, Sodium, Potassium and Calcium. Iron; heme and non-heme proteins – haemoglobin, myoglobin, iron-sulphur proteins, catalase and peroxidase, transport mechanism. Magnesium: chlorophyll, salient features of the photosynthesis. Zinc: metalloenzymes – carbonic anhydrase and carboxypeptidase. Cobalt: cobalamines, coenzymatic actions; Copper proteins; biological functions of Na, K and Ca. Nitrogen fixation – nitrogen cycle.

TEXT BOOKS AND REFERENCES:

1. F.A. Cotton and G. Wilkinson - Advanced Inorganic Chemistry, John Wiley and Sons (1988) V Edition.
2. K.F. Purcell and J.C. Kotz - Inorganic Chemistry, WB Saunders Co., 1977.
3. R. Drago - Physical methods in inorganic Chemistry, Reindhold, NY, 1968.
4. C.N.R. Rao, I.R. Fellalo - Spectroscopy in Inorganic Chemistry, Vol. I and Vol. II, Academic Press, 1970.
5. K. Burger - Coordination Chemistry, Experimental methods, Butterworths, 1973.
6. G. Aruldas - Molecular Structure and Spectroscopy - Prantice Hall.
7. N. Greenwood and A. Earnshaw - Chemistry of Elements pergamon, NY, 1984.
8. G.T. Seaborg, J. J. Katz - The Chemistry of Actinide Elements, Metheun, 1957.
9. G.T. Seaborg - Transuranium elements, Dowden Hitchinson and Ross, 1978.
10. K. Hussain Reddy - Bioinorganic Chemistry, , New Age International Publishers, Delhi , 1978.
11. Manasi Karkare - Nanotechnology, Fundamentals and Applications, I.K international, Royal Society of Chemistry, 2nd edition, 2005.
12. Geoffry. A. Ozin, Andre C Arsenault- Nanochemistry, A chemical approach a nano materials, 2005.
13. Stephen. J. Lippard, Jeremy. M. Berg – Principles of BioInorganic Chemistry, University Science books, 2008.

IV SEMESTER

ELECTRO, THERMAL AND PHOTO DYNAMICS (90 HOURS)

PAPER CODE: P5CH4002

OBJECTIVE:

To study the electrochemical kinetics, over potential, corrosions and fuel cells. To study statistical thermodynamics, Quantum statistics and reversible thermodynamics. To study the principle of photochemical reactions, kinetics – Stern-Volmer Analysis.

UNIT I – ELECTROCHEMISTRY

Mechanism of electrode reactions – polarization and overpotential – the Butler-Volmer equation for one step and multistep electron transfer reactions – significance of electron exchange current density and symmetry factor – transfer coefficient and its significance – mechanism of the hydrogen and oxygen evolution reactions.

Corrosion and passivation of metals – Pourbaix diagram – Evans' diagram – fuel cells – electrodeposition- principle and applications- electrochemical inorganic reactions of technological interest.

UNIT II – STATISTICAL THERMODYNAMICS - I

Objectives of statistical thermodynamics – concept of thermodynamics and mathematical probabilities – distribution of distinguishable and non-distinguishable particles.

Maxwell-Boltzmann distribution law – Partition function – evaluation of translational, vibrational and rotational partition functions for mono, diatomic and polyatomic ideal gases – thermodynamic functions in terms of partition functions-application of partition function to heat capacity of ideal gases- nuclear partition function –Heat capacity of solids(Einstein's and Debye's) ortho and para hydrogen.

UNIT III – STATISTICAL THERMODYNAMICS - II

Fermi - Dirac and Bose - Einstein statistics - comparison with Maxwell-Boltzmann distribution law and their applications – radiation laws .(Planck's, Wien's and Stefan Boltzmann's)

Irreversible Thermodynamics – Forces and fluxes – linear force, flux relation – phenomenological equations.

UNIT IV – PHOTOCHEMISTRY – I

Absorption and emission of radiation – Franck – Condon Principles – decay of electronically excited states – Jablonski diagram - radiative and non radiative processes – fluorescence and phosphorescence – spin forbidden radiative transition – internal conversion and intersection crossing – energy transfer process – kinetics of unimolecular and bimolecular photophysical processes-excimers and exciplexes – static and

dynamic

quenching

–

Stern-Volmerequation.

UNIT V – PHOTOCHEMISTRY - II

Experimental methods – quantum yield and life time measurements – steady state principle – quantum yield and chemical actinometry. kinetics of photochemical reactions : hydrogen and halogen reactions, photoredox , photosubstitution, photoisomerization and photosensitized reactions– photovoltaic and photogalvanic cells, photoelectrochemical cells, photo assisted electrolysis of water, aspects of solar energy conversion.

TEXT BOOKS

1. S.Glasstone, Introduction To Electrochemistry, Affiliated East West Press ,New Delhi, 1960.
2. R.Crow, Principles and Applications to Electrochemistry, Chapman And Hall, 1991.
3. P.H.Rieger , Electrochemistry, Chapman And Hall, New York, 1994.
4. M.C.Gupta, Statistical thermodynamics, Wiley Eastern, New Delhi, 1990.
5. R.Hasee, Thermodynamics Of Irreversible Process, Addison Wesley, Reading, Mass, 1969.
6. N.J.Turro, Modern Molecular Photochemistry, Benjamin, Cumming, Menlo Park, California, 1978.
7. K.K.Rohatgi Mukherjee, Fundamentals Of Photochemistry, Wiley Eastern Ltd., 1978.
8. S.Glasston, Text Book Of Physical Chemistry.

SUGGESTED REFERENCE FOR BOOKS

1. J.O.M.Bokris And Ak.N.Reddy, Electrochemistry, Vols 1 and 2 Plenum, New York, 1977.
2. P.Dalahay, Electrode Kinetics And Structure Of Double Layer, InterScience, New York, 1965.
3. J.Robbins, Ions In Solution-An Introduction In Electrochemistry, Clarendon Press, Oxford, 1972.
4. C.M.A.Brett And As.MsO.Brett, Electrochemistry Principles, Methods And Applications, Oup, Oxford, 1993.
5. Dole, Thermodynamics, Prentice Hall, New York, 1954.
6. B.J.McClenlland, Statistical Thermodynamics, Chapman And Hall, London, 1973.
7. I.Prigogine, Introduction To Thermodynamics Of Irreversible Process, Interscience, New York, 1961.
8. N.O.Smith, Elementary Statistical Thermodynamics, A Problem Approach, Plenum Press, New York, 1961.
9. Cleyde, Physical Chemistry, Schaum Series, McGraw Hill, 1976.
10. Seans, Statistical Thermodynamics, Salinyar And Tangodie.
11. J.G.Clavert and J.N.Pitts, Photochemistry, Wiley, London, 1966.
12. R.P.Wayne, Photochemistry, Butterworths, London, 1970.
13. R.Cundell and A.Gilbert, Photochemist Thomas Nelson, 10

IV SEMESTER

MODERN SYNTHETIC ORGANIC CHEMISTRY, VITAMINES & FREE RADICALS ELECTIVE PAPER - (90 HOURS)

PAPER CODE: P5CHE401

OBJECTIVE:

To know modern synthetic methods and synthetic strategies. This help in planning the synthesis of any types of organic compounds.

To learn the importance of proteins, vitamins and free radicals

UNIT I – MODERN SYNTHETIC METHODS, REACTIONS AND REAGENTS

Principles and synthetic processes involving phase transfer catalysis, (Nitriles from Alkyl halides, Alcohol from Alkyl halides) polymer supported reagents (synthesis of oligo saccharides), micro wave assisted reaction, esterification, deacetylation and hydrolysis.

Synthesis of simple organic molecules using standard reaction like acetylation alkylation of enamines and active methylene compounds, Grignard reactions, Phosphorus and sulphurylides Robinson annulation, Diels Alder reactions, protection and deprotection of functional groups (R-OH, R-CHO, RCO-R, R-NH₂ and R-COOH). Uses of the following reagents: DCC, Trimethylsilyliodide, 1, 3-Dithiane (umpolung), diisobutylaluminumhydride (DIBAL), 9BBN, Trimethylsilylchloride.

UNIT II –RETROSYNTHETICANALYSIS

An introduction to retrosynthesis – Synthon, Synthetic equivalent, Target molecule, Functional group interconversion – Disconnection approach – One group disconnection – Disconnection of alcohols, olefins and ketones – Logical and illogical disconnections, Two group disconnection – 1,2 – 1,3 – 1,4 – 1,5 – and 1,6 – deoxygenated skeletons and dicarbonyls. Retro Diels Alder reaction – pericyclic reactions – Retrosynthesis of some heterocyclescontaining nitrogen atoms. (not exceeding two nitrogen atoms as examples)

UNIT III - SYNTHESIS OF ORGANIC COMPOUNDS

Synthesis of longifolene, cubane, 5 hexenoic acid, trans-9-methyl-1- decalone, bicycle[4:1:0] – hept-2-one and α onocerin.

UNIT IV - PROTEINS, VITAMINS AND TERPENES.

PROTEINS: Peptides and their synthesis - synthesis of tripeptide. Merrifield synthesis, Determination of tertiary structure of proteins.

VITAMINS: Synthesis of vitamin AI (Reformatsky and Wittig reaction methods only).

TERPENES: Introduction, classification, isoprene rule, structural determination of Geraniol, α -pinene and camphor.

UNIT V – FREE RADICALS

Long and short-lived free radicals, methods of generation of free radicals. Addition of free radicals to olefinic double bonds. The following aromatic radical substitutions are to be studied: decomposition of diazocompounds, phenol - coupling - Sandmeyer reaction Gomberg reaction, Pschorr reaction, Ulmann reaction, mechanism of Hunsdiecker reaction.

RECOMMENDED BOOKS

1. Guide book to Organic synthesis by Ramond K. Mackie and David M. Smith, ELBS Publication.
2. Organic Chemistry V Edition, 1986, Vol II by I.L. Finar, ELBS Publication
3. Outlines of Biochemistry V Edition by Eric E. Conn, Paul. R. Stumpf, George Bruening and Roy H. Dole, John Wiley and Sons.
4. Principles of Biochemistry General aspects by L. Smith, Robert L. Hill I. Robert Lehman, Robert J. Let Rowitz, Philip Handlar and Abraham white. McGraw Hill Int. (7th Edition)
5. Biochemistry by Lubert Stryer, WH. Freeman and Co., New York
6. Chemistry of organic natural products by Agarwal, Geol Publishing House.
7. Organic synthesis by R.E. Ireland, Prentice Hall of India, Geol Publishing House.
8. Principles of Organic synthesis by R.O.C. Norman, Champan and Hall, NY, 1980.
9. Advanced Organic Chemistry by Francis. A. Carey Richard J. Sundberg, 3rd Edition, Plenum, Press, New York, 1990.
10. Advanced Organic Chemistry by Jerry March, IV edition Wiley Eastern Ltd., New Delhi.
11. Organic Chemistry, 6th Edition, 1992. RT. Morrison, R.S. Boy, Prentice Hall of India Pvt. Ltd., New Delhi.
12. Organic synthesis by Michael Smith
13. Organic Chemistry by House.
14. Micheal B. Smith, Organic Synthesis, McGraw Hill, International Editor, 1994.
15. Stuart Warren, Work book for organic synthesis, The Disconnection Approach John Wiley & Sons (Asia) Pvt. Ltd.,
16. W. Carruther, Jain Coldham, Modern Methods of organic synthesis, 4th Edition.

IV SEMESTER – CORE PRACTICALS

ORGANIC PREPARATIONS & SPECTRAL INTERPRETATION (30 HOURS)

PAPER CODE: P5CHPR41

OBJECTIVE:

To learn the preparative techniques of Organic compounds and interpretation of spectras.

ORGANIC PREPARATIONS

1. sym-Tribromo benzene from aniline.
2. Benzanilide from benzophenone
3. m-Nitro benzoic acid from methyl benzoate
4. 2,4.- Dinitrobenzoic acid from p-nitrotoluene
5. m-Nitro benzoic acid from benzaldehyde
6. Benzil form benzaldehyde
7. Anthraquinone from phthalic anhydride
8. Phthalide from phthaic anhydride
9. 2-Phenyl indole from phenyl hydrazine
10. 2, 4 dinitrophenyl hydrazine from p-nitrochlorobenzene

SPECTRAL INTERPRETATION OF ORGANIC COMPOUNDS UV, IR, PMR AND MASS SPECTRA OF COMPOUNDS

1. 1,3,5- Trimethyl benzene
2. Pinacolane
3. n-Propylamine
4. p-Methoxy benzyl alcohol
5. Benzyl bromide
6. Phenylacetone
7. 2-Methoxyethyl acetate
8. Acetone
9. Isopropyl alcohol
10. Acetaldehyde diacetate
11. 2-N,N-Dimethylamino ethanol
12. Pyridine
13. 4-Picoline
14. 1,3-dibromo - 1, 1- dichloropropene
15. Cinnamaldehyde

Spectra	: 15 marks
Preparation	: 30 marks
Recrystallization	: 10 marks
Viva Voce	: 10 marks
Record	: <u>10 marks</u>
Total	: <u>75 marks</u>

Note:

External 75 Marks

Internal	25 Marks
Total	100 Marks

RECOMMENDED BOOKS

1. A text book of Practical Organic Chemistry by Arthur I. Vogel
2. Laboratory Manual of Organic Chemistry Raj K. Bansal, Wiley Eastern limited.
3. Laboratory manual of Organic Chemistry by Mann and Saunders.

IV SEMESTER

QUANTITATIVE ANALYSIS OF METAL ION -II AND SPECTRAL INTERPRETATION (30 HRS)

PAPER CODE: P5CHPR42

I QUANTITATIVE ANALYSIS

Quantitative analysis of mixtures of (i) Iron and Magnesium
(ii) Iron and Nickel

II LIST OF SPECTRA TO BE GIVEN FOR INTERPRETATION.

P^{31} NMR Spectra of methylphosphate
 P^{31} NMR Spectra of HPF_2
 F^{19} NMR Spectra of ClF_3
 H^1 NMR Spectra of Tris (ethythioacctoacetanato) cobalt (III)
ESR Spectra of the aqueous $ON(SO_3)^{2-}$ ion.
ESR Spectra of the H atoms in CaF_2 .
ESR Spectra of the $[Mn(H_2O)_6]^{2+}$.
ESR Spectra of the bis (salicyladiminato) copper (II)
IR Spectra of the sulphato ligand.
IR Spectra of the dimethylglyoxime ligand and its Nickel (II) complex.
IR Spectra of carbonyls
Mossbauer spectra of $FeSO_4 \cdot 7H_2O$
Mossbauer spectra of $FeCl_3$.
Mossbauer spectra of $[Fe(CN)_6]^{3-}$
Mossbauer spectra of $[Fe(CN)_6]^{4-}$

SCHEME

SPECTRA	10 Marks
VOLUMETRIC	20 Marks
GRAVIMETRIC	20 Marks
PROCEDURE	05 Marks
RECORD	10 Marks
VIVA VOCE	<u>10 Marks</u>
Total	<u>75 Marks</u>

RECOMMENDED BOOKS

1. Vogel's Text book of Quantitative Inorganic Analysis

SEMESTER-IV

POTENTIOMETRIC TITRATIONS AND SPECTRAL INTERPRETATION (90 HOURS)

PAPER CODE: P5CHPR43

List of Experiments

1. Determination of strength of an unknown strong acid by using a standard base.
2. Determination of strength of an unknown weak acid by using a standard base.
3. Determination of strength of the individual concentrations of the two acids in the mixture (Strong and weak) by using a standard strong base.
4. Determination of strength of FAS by using a standard potassium dichromate (redox titration).
5. Determination of strength of KI by using a standard potassium permanganate.
6. Determination of strength of ferrous sulphate by using a standard potassium dichromate (redox titration).
7. Determination of strength of sodium chloride by using a standard silver nitrate solution.
8. Determination of strength of KI by using a standard silver nitrate solution.
9. Determination of strength of individual concentrations of mixture of halides (KCl+KI) using standard silver nitrate solution.
10. Determination of P^H of different buffer solutions by emf method.
11. Determination of strength of weak acid by using a standard base and from the titration curve, the emf at $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$ and $\frac{3}{4}$ neutralization and hence the dissociation constant of a given weak acid is calculated.

SPECTROSCOPY:

Interpretation of simple UV – Visible, NMR and ESR spectra of simple molecules for the calculation of molecular data and identification of functional groups.

Total Marks: 100 (External 75 + Internal 25)

External marks distribution

Spectra (5+5)	10
Practical	40
Procedure	05
Record	10
Viva-voce	10

ADVANCED ACCOUNTING – I
(Subject Code: P5CO3001)
(5 Hours)

UNIT – I: Accounting Standards

Accounting Standards: Meaning – Objectives – Significance – Need for Accounting Standards – International Accounting Standards: IAS-1, IAS-27 and IAS-30 – Company Final Accounts – Divisible Profits – Form of Balance Sheet – Preparation of Balance Sheet.

UNIT – II: Valuation of Goodwill and Shares

Valuation of Goodwill – Need – Factors affecting the valuation – Methods of valuation - Average Profit, Super Profit, Annuity and Capitalization Methods. Valuation of Shares – Need – Factors affecting the valuation – Methods – Net Assets, Yield and Fair Value Methods.

UNIT – III: Amalgamation, Absorption and External Reconstruction

Amalgamation – Absorption and External Reconstruction of a Company (Inter Company Investment excluded)

UNIT – IV: Internal Reconstruction

Alteration of Share Capital – Internal Reconstruction and Revaluation of Share Capital

UNIT – V: Accounting for Price Level Changes

Accounting for Price Level Changes: Need and Objectives – Current Purchasing Power Method – Current Cost Accounting Method.

Note: Weightage of Marks - Problem 80% Theory 20%

Reference Books:

1. M.C. Shukla and T.S Grewal – Advanced Accounts – S.Chand & Co. New Delhi.
2. R.L Gupta and Radhasamy – Advanced Accounts – Sultan Chand & Sons, New Delhi.
3. Jain and Narang – Advanced Corporate Accounting – Kalyani Publishers, New Delhi.
4. T.S Reddy and Murthy – Corporate Accounting – Margham Publication, Chennai
5. S.N Maheshwari – Advanced Corporate Accounting – Vikas Publication.

ADVANCED COST ACCOUNTING – I
(Subject Code: P5CO3002)
(5 Hours)

UNIT – I: Introduction

Meaning of Cost Accounting – Functions of Cost Accounting – Objectives of Cost Accounting – Advantages and Limitation of Cost Accounting – Installation of Costing System - Costing an Aid to Management – Cost Accounting Vs. Financial Accounting – Cost Unit – Cost Centre and Profit Centre – Methods of Costing – Types of Costing – Cost Sheet, Tenders and Quotations.

UNIT – II Material Costing

Materials: Meaning of Material Control – Objectives of Material Control – Stock Control through ABC Analysis – Standard Price – Base Stock Method – Stock Levels – EOQ – Periodic & Perpetual Inventory System - Methods of Valuing Material Issues – FIFO – LIFO – Simple Average – Weighted Average Method.

UNIT – III: Labour Costing

Labour Cost: Control over Labour Cost – Labour Turnover Rate – Causes of Labour Turnover – System of Wage Payment – Time Wage System, Piece Rate System, Premium and Bonus Plan – Taylor's Differential Piece Rate System – Halsey Premium Plan – Merrick's Multiple Piece Rate System – Rowan Plan.

UNIT – IV: Overheads

Overheads: Definition – Classification – Basis of Apportionment – Methods of Reapportionments – Direct Redistribution Method – Step Distribution Method – Reciprocal Distribution Method – Simultaneous Equation Method – Repeated Distribution Method.

UNIT – V: Reconciliation of Cost and Financial Profits

Reconciliation of Cost and Financial Profits – Need for Reconciliation – Reasons for Disagreement in Profit.

Reference Books:

1. S.P Jain & K.L Narang – Cost Accounting, Kalayani Publishers.
2. R.S.N Pillai & V. Bagavathi – Cost Accounting, S.Chand & Co., New Delhi.
3. Nigam & Sharma – Cost Accounting –Principles and Application, Himalaya Publishers
4. Dr. Reddy & Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai.
5. Dr. A. Murthy & Dr. S. Gurusamy, Cost Accounting, Vijay Nicole Publications, Chennai.

ORGANISATIONAL BEHAVIOUR

(Subject Code: P5CO3003)

(5 hours)

Unit I: Introduction

Organisational Behaviour – Definition – Nature – Need - Scope – Elements – Process – Models – Theories – Foundations of Individual Behaviour – Personality – Perception – Attitude – Learning – Values

Unit II: Motivation

Motivation – Theories by Maslow, Herzberg, McGregor, McClelland & Vroom – Motivational tools – Incentives – Job Design – MBO – Motivation and Morale - Organisational Citizenship Behaviour

Unit III: Group Dynamics and Stress Management

Group Dynamics – Group Behaviour – Characteristics and Types of Groups – Group Decision making – Inter Group Behaviour – Quality Circles – Work Stress – Stress Management.

Unit IV: Leadership and Organisational Conflicts

Leadership – Functions – Styles – Theories – Transactional and Transformational Leadership – Emotional Intelligence as a managerial tool – Organisational Conflicts – Sources – Types – Conflict Management

Unit V: Organisational Structure and Design

Organisational Structure and Design – Organisational Culture and Climate – Power and Politics – Organisational Change – Resistance to Change Organisational Development – Organisational Effectiveness – Organisational Ethics

Reference Books:

1. S.S. Khanka, Organisational Behaviour, S.Chand & Co. Ltd., New Delhi.
2. Stephen P. Robbins, Organizational Behavior, Pearson Education, New Delhi.
3. Margie Parikh and Rajen Gupta, Organisational Behaviour, Tata McGraw Hill Education.
4. K. Aswathapa, Organisational Behaviour, Himalaya Publishing House.
5. L.M. Prasad, Organisational Behaviour, Sultan Chand and Sons, New Delhi.

RESEARCH METHODOLOGY
(Subject Code: P5CO3004)
(5 Hours)

UNIT I: Introduction

(Theory Only)

Research-Definition- Scope of Research--Significance of research in Social Science-Types of Research-Formulation of Research Problem-Research Design

UNIT II: Sampling and Data Collection

(Theory Only)

Sampling - Meaning, Definition, Need & Types - Sampling Errors. Data collection: sources of data - Primary and Secondary Data-Procedure for Data Collection-Tools of Data Collection-Questionnaire and Interview Schedule

UNIT III: Data Processing

(Theory Only)

Processing of Data- Editing, Coding and Tabulation- Uses of Computer in Social Research- Diagrammatic and Graphic Representation-Interpretation of Results.

UNIT IV: Data Analysis

(Both Theory & Problems)

Data Analysis - Analysis of Quantitative Data - Descriptive statistics - Tests of Significance - Parametric Tests and Non-Parametric Tests - Chi-square Test –ANOVA - Application of SPSS for Data Analyses.

UNIT V: Report Writing

(Theory only)

Report Writing - Significance of Report Writing - Different steps in writing Report - Layout of Research Report – Types - Technical Report - Popular Report -Mechanics of writing a report.

Note: One Problem in Section B only

Reference Books:

1. C.R.Kothari, Research Methodology: Methods and Techniques, Wiley Eastern.Ltd, New Delhi.
2. D. Amarchand, Research Methods in Commerce, Emerald Publishers, Chennai.
3. Anderson,R.L., Berry H.D., Poole,M, Thesis and Assignmnet Writing, Wiley Eastern Ltd, New Delhi.
4. Ravilochanan, Research Methodology, Margham Publications, Chennai.
5. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi.

INDIRECT TAXES
(Subject Code: P5COE501)
(6 Hours)

UNIT – I: Introduction

Indirect Taxes – Meaning – Features –Types of Indirect Taxes – Canons of Taxation – Advantages and Dis Advantages – Levy and Collection - Bases of Excise Duty - Highlights of Latest Finance Act 2011 - Excisability of Manufacturer – Concept of Goods – Excisable Goods – Concept of Manufacturer – Definition of Manufacturer under

Excise Act – Valuation of Excisable Goods – Rate of Duty – Transaction Rule – Clearance of Excisable Goods.

UNIT – II: Excise Duty

Excise Duty – Types of Excise Duty – Methods of Levy – Bases of Duty – Clearance of Goods, Warehousing – CENVAT – Features of CENVAT – Conditions for availing CENVAT Credit – Excise and Small Industries – Excise and Exports.

UNIT –III: Customs Duty

Customs Duty – Historical Background – Levy and Collection - Provision relating to Detection and Prevention of Illegal Exports and Imports – Valuation of Goods Under Customs Act – Exemption – Clearance of Imports/Export goods – Warehousing – Duty Drawback – Green Channel and Red Channel – Customs Duty on Baggage Goods, Postal articles and Stores – Search, Seizure and Confiscation of Goods – Approach – Prosecutions.

UNIT – IV: Value Added Tax

TN Value Added Tax (VAT) – Introduction – Meaning – Objectives – Types – Computation of TN VAT – Pros and Cons of VAT.

UNIT – V: Service Tax

Service Tax – Introduction – Meaning – Salient features – Objectives – Scope – Administrative Machinery – Services covered under Services Tax – Service Tax Exemptions – Filing of returns - Assessment Procedure – Self Assessment, Provisional Assessment and Best Judgement Assessment.

Reference Books:

1. Dr. V. Balachandran, Indirect Taxation , Sulthan Chand , New Delhi.
2. Dr. H.C. Mehrotra & Prof. V.C. Agarwall, Indirect Taxes, Bawan Publications
3. T.S. Reddy & Y. Hari Prasad Reddy, Business Taxation, Margham Publications, Chennai.
4. S. Gopalan, Indirect Taxes made easy, Seetharam Publications, Chennai
5. Gupta SS, Service Tax – How to meet your obligations? Taxmann, New Delhi

COMPUTER APPLICATIONS IN BUSINESS

(Subject Code: P5CONM31)

(4 Hours)

UNIT I: Introduction

Computers – Meaning - Characteristics of Computer – Computer Generations – Classification of Computers – Areas of Computer Applications – Computer Peripherals – Input Devices, Output Devices and Auxiliary Storage Devices

UNIT II: Word Processing

Meaning – Basic Word Processing Features – Microsoft Word – Features of MS Word – Working with Documents – Editing Documents – Formatting Documents – Language Tools – Working with Tables – Mail Merge – Printing a Document.

UNIT III: Spreadsheet and Presentation Tools

Spreadsheet: Meaning – Features – Application Areas – Microsoft Excel – Basic Features – Screen Elements – Moving Around Worksheet – Working with a Spread Sheet.

Presentation Tool: MS Powerpoint – Basic Features and Enhanced Features – Starting Powerpoint – Creating a Presentation Slide – Editing and Formatting Text in a Slide – Printing of Presentation.

UNIT IV: Internet

Meaning – Objectives – Uses – Working of Internet – Internet vs. Intranet – Electronic Mail – World Wide Web – Meaning, Features and Functions.

UNIT V: E-Commerce

Definition, Benefits and Limitations – E-Commerce Applications – Telecommunicating – Teleconferencing – Teleworking – E-Marketing – E-Banking.

Reference Books:

1. Alexis Leon & Mathews Leon, Computer Applications in Business, Vijay Nicole Imprints Pvt.Ltd., Chennai.
2. Peter Norton, Introduction to Computers, Tata McGraw Hill, Publishing Co., Ltd., New Delhi.
3. Srinivas Vallabhan SV, Computer Applications in Business, Sultan Chand & Sons, New Delhi.
4. Kapoor VK, Computers and Information Technology, Sultan Chand & Sons, New Delhi.
5. Ananthi Sheshasaayee & Sheshasaayee, Computer Applications in Business and Management, Margham Publications, Chennai.

ADVANCED ACCOUNTING – II
(Subject Code: P5CO4001)
(6 Hours)

UNIT – I: Liquidation Accounting

Liquidation Accounting – Statement of Affairs and Deficiency Accounts. - Order of Payment – Preferential Payments – Liquidator's Final Statement of Account.

UNIT – II: Holding Company Accounts

Holding Company Accounts: Legal Definition and Requirements – Consolidation of Profit and Loss Accounts – Consolidation of Balance Sheet.

UNIT – III: Accounts of Banking Companies

Accounts of Banking Companies: Legal Provisions – Rebate on Bills Discounted – NPA – Preparation of Profit and Loss Account and Balance Sheet.

UNIT – IV: Insurance Company Accounts

Insurance Company Accounts: Accounts of Life Insurance Business – Accounts of General Insurance Business – IRDA Regulations – Preparation of Final Accounts

UNIT – V: Human Resource Accounting and Social Responsibility Accounting

Human Resource Accounting – Need and Development – Importance – Objections against Human Resource Accounting. Social Responsibility Accounting – Meaning and Definition – Objectives – Approaches and Methods – Social Income statement and social Balance sheet

Note: Weightage of Marks - Problem 80% Theory 20%

Reference Books:

1. M.C. Shukla and T.S Grewal – Advanced Accounts – S.Chand & Co. New Delhi.
2. R.L Gupta and Radhasamy – Advanced Accounts – Sultan Chand & Sons, New Delhi.
3. Jain and Narang – Advanced Corporate Accounting – Kalyani Publishers, New Delhi.
4. T.S Reddy and Murthy – Corporate Accounting – Margham Publication, Chennai
5. S.N Maheshwari – Advanced Corporate Accounting – Vikas Publication.

ADVANCED COST ACCOUNTING – II
(Subject Code: P5CO4002)
(6 Hours)

UNIT – I: Job, Batch and Contract Costing

Job Costing – Batch Costing – Contract Costing – Preparation of Contract Account – Work Certified – Work Uncertified – WIP Valuation – Cost Plus Contract and Escalation Clause

UNIT – II: Process Costing

Process Costing - Meaning and Utility – Distinction between Process Costing and Job Costing - Normal Loss – Abnormal Loss – Abnormal Gain – Process Accounts

UNIT – III: Process Costing, Joint and By Products

Equivalent Production – FIFO Method only - Inter Process Profit - Joint Products and By Products

UNIT – IV: Service Costing

Operating Costing in Service Industries – Meaning – Operating Cost Units – Transport Costing – Power House Costing – Hotel Industry Costing

UNIT –V: Standard Costing and Variance Analysis

Standard Costing and Variance Analysis: Standard Cost & Standard Costing – Meaning – Advantages and Disadvantages – Variance Analysis - Material Cost Variance – Labour Variance – Overheads Cost Variance.

Reference Books:

1. S.P Iyengar – Management Accounting, Sultan Chand & Sons, New Delhi.
2. S.P Jain and K.L Narang – Cost Accounting, Kalyani Publishers, New Delhi.
3. S.N.Maheshwari – Principles of Cost Accounting, Sultan Chand & Sons, New Delhi.
4. Dr. Reddy & Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai.
5. Dr. A. Murthy & Dr. S. Gurusamy, Cost Accounting, Vijay Nicole Publications, Chennai.

DIRECT TAXES
(Subject Code: P5CO4003)
(6 Hours)

UNIT – I: Introduction

Basic Concepts – Residential Status and Incidence of Tax – Income Exempt from Tax.

UNIT – II: Income from Salary and House Property

Computation of Income from Salary – Allowances – Perquisites – Valuation of Perquisites – Deductions – Income from House Property – Annual Value – Let out House – Self Occupied House – Deductions.

UNIT – III: Income from Business & Profession and Capital Gains

Profits and Gains of Business or Profession – Admissible Deductions – Expenses Expressly Disallowed – Deemed Incomes – Depreciation – Block of Assets – Normal Depreciation – Additional Depreciation – Capital Gains - Short term and Long term Capital Gains – Exemptions.

UNIT – IV: Income from Other Sources and Computation of Total Income

Income from Other Sources – Aggregation of Income – Set-off and Carry forward of Losses – Deductions available from Gross Total Income

UNIT – V: Assessment Procedure

Assessment Procedure – Methods - Assessment of Individuals – Assessment of Firms and AOP – Wealth Tax – Meaning of Assets – Deemed Assets – Exempted Assets – Computation of Net Wealth.

Reference Books:

1. Gaur and Narang, Income Tax Law and Practice, Kalyani Publishers, New Delhi.
2. Vinod K Singhania and Monica Singhania, Students' Guide of Income Tax, Taxmann, New Delhi.
3. H.C. Mehrothra, Income Tax Law and Practice, Sahithya Bhavan, Agra.
4. Reddy TS and Hari Prasad Reddy Y, Income Tax Law & Practice, Margham Publications, Chennai.
5. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt.Ltd., Chennai.

SECURITY ANALYSIS
(Subject Code: P5CO4004)
(6 Hours)

UNIT – I: Introduction

Investment – Types – Speculation – Gambling – Importance of Investments – Features of an Investment Program – Kinds of risks associated with an investment – Investment related terminology - Market Indexes – BSE Index (BSE 100, BSE 200, BSE 500, Mid cap, Small Cap & BSE Bankex) – CNX Indexes – Users and uses of Market Index.

UNIT – II: Security Analysis

Meaning and Scope of Security Analysis – Significance – Approaches to Security Analysis - Fundamental Security analysis – Types – Economic Analysis - Industry Analysis – Company Analysis.

UNIT – III: Technical Analysis

Technical Analysis – Technical vs. Fundamental Analysis – The Dow Theory – Elliot Wave Principles – Kondratiev Wave Theory - Charting as a Technical Tool – Types of Charts – Limitations of charts. Efficient Market Theory – Forms of Efficient market Hypothesis – Random Walk Theory.

UNIT – IV: Valuation of Securities

Valuation of Securities – Equity Shares – Preference Shares – Debentures – Bonds – Dividends – Government Securities

UNIT – V: Portfolio Analysis

Portfolio Analysis – Portfolio Choice – Markowitz Portfolio Selection Model – Sharpe's Single Index Model – Capital Asset Pricing Model – Security Market Line – Capital Market Line – Estimating Beta – Beta Basics.

Reference Books:

1. V.K. Bhalla – Investment Management, S Chand & Co. Ltd., New Delhi.
2. R.P. Rustogi – Investment Analysis and Portfolio Management, Sultan Chand & Sons, New Delhi.
3. Dr. Ranganathan and Madhumathi R. – Investment Analysis and Portfolio Management, Pearson Education, New Delhi.
4. S.Kevin – Portfolio Management, Prentices Hall of India (Pvt. Ltd) New Delhi.
5. Dr. L. Natarajan, Investment Management, Margham Publications, Chennai.

EXPORT MANAGEMENT
(Subject Code: P5COE401)
(6 Hours)

UNIT-I: Introduction to Export & Export Management

Meaning of Export – Role of export in Economic Development - Planning for Export – Market Analysis – Market Intelligence and Market Research – Market Selection and Entry Strategies for Export – Export Management – Meaning – Need – Features – Process - Functions of an Export Manager

UNIT-II: Legal Aspects of Export Trade

Legal aspects of Export Trade: International Law – Transport Contracts – Settlement of Disputes – Indian Laws: Highlights of EXIM Policy

UNIT-III: Export Financing and Pricing

Methods and Sources of Export Finance – Terms of payment for Export – Letter of Credit - Institutional Aid for Export Financing: RBI, EXIM Bank and ECGC. Export Pricing: Factors influencing export price - Forms of pricing - International price quotations.

UNIT-IV: Export Procedures and Incentives

Stages in Export procedure: Export order execution – Product preparation – Quality Control and Pre-shipment inspection – Packaging – Freight Forwarders – Cargo Insurance – Customs Clearances – Documentation procedure and Clearing Export bills.

Export incentives available to Indian Exporters.

UNIT-V: India's Export Trade

Performance of India's Export Trade – Problems in Export Trade – Need for Export Promotion in India – Institutional Support for Export Promotion.

Reference Books:

1. TAS Balagopal, Export Management, Himalaya Publishing House, Mumbai.
 2. Varshney & Battacharya, International Marketing, Sultan Chand & Sons, New Delhi.
 3. B.S.Rathor, Export Management, Himalaya Publishing House, Mumbai.
 4. Francis Cherunilam, Export Management, Himalaya Publishing House, Mumbai.
- D.C.Kapoor, Export Management, Vikas Publishing

CONDENSED MATTER PHYSICS – I

Paper Code: P5PY3001

Credits; 4

Hrs/week: 5

Objective: This paper aims to give an understanding of the basic theoretical models to study the properties of matter from a microscopic point of view

UNIT- I: Diffraction and Reciprocal lattice

Types of lattices- symmetry elements- Space Groups- Bravais Lattices- Simple crystal structure- Atomic packing Factor (SC, BCC, FCC,HCP) – Crystal diffraction – Bragg's law – Scattered Wave Amplitude – Reciprocal Lattice (SC, BCC, FCC) – diffraction Condition – Laue equation – Types of crystal bonding

UNIT- II: Lattice vibration and Phonons

Vibrations of crystal lattices –mono atomic and diatomic one dimensional lattice, phonon momentum – Inelastic scattering by phonons- Debye theory of specific heats, thermal expansion and thermal conductivity –Umklapp Process

UNIT- III: Free electron theory of metals

Free electron in solids-Drude Lorentz free electron theory – Wiedemann-Franz law- Free electron gas in three dimension-fermi dirac distribution function - Density of states – Fermi surface, Fermi gas at $T=0K$, Specific heat capacity of electrons in metals.

UNIT- IV: Band theory of solids

Band structure of solids- Electron in periodic potentials-Bloch's theorem –Kronig-Penny model- Brillouin zones- Semiconductors-concept of hole and concept of effective mass- Intrinsic carrier concentration-Temperature dependence- Mobility-Impurity conductivity- Hall effect– Experimental method in Fermi surface studies-de Hass-van alphen effect

UNIT- V: Super conductivity

Superconductivity: Occurrence – Effect of magnetic fields-Meissner effect – Entropy and heat capacity- Energy gap – Type I and II superconductors.

Thermodynamics of super conducting transition – London equation – Coherence length – Cooper pairs – BCS Theory – Single particle tunneling- Josephson tunneling – DC and AC Josephson effect – flux quantization – SQUIDS – high temperature superconductors.

Books for Study

1. Solid State Physics- S.O.Pillai
2. Solid State Physics-K.Ilangovan
3. Introduction to Solid State Physics- Charles Kittel
4. Solid State Physics-Gupta kumar

BOOKS FOR REFERENCE:

1. **G.K. Narula, K.S.Narula and V.K.Gupta**, 1988, *Materials Science*, Tata McGraw-Hill.
2. **Lawrence H. Van Vlack**, 1998, *Elements of Materials Science and Engineering*, 6th Edition, second ISE reprint, Addison-Wesley
3. **H. Ibach and H.Luth**, 2001, *Solid state Physics – An introduction to principles of Material Science*, 2nd Edition, Springer
4. **S.L Kakani and Amit Kakani**, 2006, *Material Science*, New Age International Publishers

NUCLEAR AND PARTICLE PHYSICS

Paper Code: P5PY3002

Credits; 4

Hrs/week: 4

Objective: This paper aims to explore the understanding of the nuclear models and various physical properties of nucleus.

UNIT- I: Nuclear Forces

Central and non central forces- Meson theory of nuclear force- Yukawa potential- Spin dependence of nuclear forces-Charge independence of nuclear forces-Isospin formalism-Ground state of deuteron.

UNIT- II: Nuclear Models

Liquid drop model-Bohr Wheeler theory of nuclear fission-Shell model-Spin orbit coupling-Magic number-Application of shell model-Angular momentum-Magnetic moment-parity-Collective model of Bohr and Mottleson.

UNIT- III: Nuclear Reaction

Types of nuclear reactions-Conservation laws-Q value equation-scattering and partial wave analysis of cross section-Compound nucleus-Energy level of nuclei-level width and de-excitation- Reciprocity theorem-Briet Wigner dispersion formula.

UNIT- IV: Beta and Gamma Decays

Beta decay-Fermi theory of beta decay-Shape of the beta spectrum-Total decay rate-Mass of neutrino-Angular momentum and parity - selection rules - Non conservation of parity. Gamma decay –Multi pole transition in nuclei-Angular momentum and parity - selection rules- Internal conversion-Pair production-Nuclear isomerism.

UNIT- V: Elementary Particle Physics

Classification of elementary particles- Types of interaction between elementary particle-Hadrons and Leptons-Symmetry and conservation laws –CPT Theorem-SU(2)-SU(3) multiplets- Quark model-Gell-Mann –Okubo mass formula for octet and decuplet of hadrons.

Books for Study

- 1 .Nuclear Physics-R.R.Roy and B.P.Nigam, Wily Eastern Ltd, New York
2. Nuclear Physics-D.C.Tayal, Himalya Publications, Bombay
3. .Nuclear Physics vol II- S.N.Ghosal ,S.chand & co New Delhi

Books for reference:

1. **H. A. Enge**, 1983, *Introduction to Nuclear Physics*, Addison-Wesley, Tokyo
2. **Y. R. Waghmare**, 1981, *Introductory Nuclear, Physics*, Oxford-IBH, New Delhi.
3. **Ghoshal**, *Atomic and Nuclear Physics*, Vol. 2
4. **J. M. Longo**, 1971, *Elementary particles*, McGraw-Hill, New York.
5. **R. D. Evans**, 1955, *Atomic Nucleus*, McGraw-Hill, New York.
6. **I. Kaplan**, 1989, *Nuclear Physics*, Narosa, New Delhi
7. **B. L. Cohen**, 1971, *Concepts of Nuclear Physics*, TMH, New Delhi

WEB SITES

1. <http://ocw.mit.edu/OcwWeb/Physics/8-701Spring 2004/Lecture notes>
2. <http://faraday.physics.utoronto.ca/General Interest/D.Bailey/SubAtomic/ Lectures/ Lect.html>

MICROPROCESSOR AND ITS APPLICATIONS**Paper Code: P5PY3003****Credits; 4****Hrs/week: 5**

Objective: The students are exposed to the wide applications of microprocessors like 8085, 8086

and so on., and interfacing them.

UNIT-I: 8085 Microprocessor

8085 Architecture and flags, pin out configurations of 8085 Bus organization and timings: buses – buffer – address bus, data bus, multiplexing address/data bus, timing diagrams- instructions cycle, machine cycle –flags- Interrupts of the 8085 Microprocessor – maskable and nonmaskable interrupts.

8-bit code conversion: Binary to BCD, BCD to binary, binary to ASCII, ASCII to binary, BCD to ASCII and ASCII to BCD.

UNIT- II: Programming Model of 8085 and Interfacing

Classification of instructions and format – 8-bit data transfer, arithmetic, logical and branch instructions – Addressing modes- stack and subroutine instructions - Logical rotate and compare instructions – RIM and SIM interrupt instructions.

Memory interface: 2K X 8, 4K x 6 ROM and RAM interface - programmable peripheral interfacing device 8255 - interfacing 8-bit D/A and successive approximation A/D converters.

UNIT- III: 8086/8088 Microprocessor – Architecture and Programming

Introduction – Architecture – Pin configuration – Minimum mode and maximum-mode system — Internal Architecture of the 8086/8088.

INTERRUPTS OF THE 8086/8088 MICROPROCESSOR: Introduction – Types of interrupts – Interrupt Address Pointer Table – Interrupt instructions – Masking of interrupts – External hardware interrupt interface — Software interrupt – Non-Maskable interrupt – Reset interrupt – Internal interrupt functions.

UNIT- IV: Programming – Software Model of the 8086/8088 and Interfacing

Instruction set – Data transfer instructions – arithmetic, logic, shift, rotate instructions – compare, jump instructions – Subroutines – handling instructions – loop and string instructions – Addressing modes - Procedures – Assembler Macros – Assembler Directives – MASM Programs.

Minimum system mode interface – Maximum system mode interface -Interfacing 4K word/8K word/16K word RAM interface-Dynamic RAM.

UNIT- V: Advance Microprocessors

Introduction–Multitasking Concepts –Multiprogramming – Virtual memory, Memory Management Unit (MMU) –Introduction to Intel 80286, 80386 and 80486 microprocessors - Difference between 8086 and 80386/80486 microprocessors and also Introduction of Pentium processor.

Books for study

1. Ramesh Goanker: Microprocessor Architecture, Programming & Applications with the 8085/8080A – Wiley Eastern Ltd.
2. V.Vijayendran, Fundamentals of Microprocessor – 8086 Architecture, Programming and Interfacing, Chennai.
3. Douglas V. Hall: Microprocessors Interfacing, Programming & Hardware – Tata McGraw-Hill.
4. B.Brey – Intel Microprocessors: 8086/8088, 80186, 80286, 80386, 80486: Architecture, Programming and Interfacing, 3rd Ed, EEE, 1995.
5. Mohamed Rafiquizzman: Microprocessors and Microcomputer Based System Design UBS, 1990.

Books for reference

1. Glenn A. Gibson & Yu-Cheng Liu: Microcomputers for engineers and Scientists – Presentic-Hall Inc.
2. Douglas V. Hall: Microprocessors & Digital Systems –McGraw- Hill Book Company.
3. Stewart M.Asner: Microcomputer servicing – Practical systems and trouble shooting – All India Traveller Book Company.
4. Yu – Chang Liu & Glenn A. Gibson: Microcomputer systems: The 8086/8088 family Architecture programming & design – Printice-Hall of India.

ELECTIVE PAPER III
SYNTHESIS AND CHARACTERIZATION OF NANOMATERIALS

Paper Code: P5PY3004

Credits; 5

Hrs/week: 5

UNIT- I: Synthesis of nanomaterials

Fundamentals of sol-gel process – sol-gel synthetic methods for oxides – other inorganic and nano composites – Introduction – fundamentals of film deposition –molecular beam epitaxy – pulsed laser deposition – Metal Organic chemical vapour deposition.

UNIT- II: Synthesis of nanostructures

Surface Chemistry and its role to prepare quantum dots – Polymer as quantum dot size stabilizer – One-dimensional (1D) by Spontaneous Growth – Template Assisted Growth – Electrochemical growth of 1D structure- Types of nano tubes – formation of nano tubes.

UNIT- III: Structural Analysis

Working of Atomic Force Microscopy – Mode of operations (qualitative) and its application – Basics of X-Ray diffraction, STM and its application to Size Analysis of nano materials – NMR Basics and application to nano materials

UNIT- IV: Characterization

SEM and TEM: Theory- Instrumental setup and its application- working of electron probe micro analysis and its application in elemental analysis – EDX spectra for important material systems.

UNIT- V: Optical studies

Optical properties of nano semiconductors – optical process in quantum wells – semiconducting optoelectronic devices – organic optoelectronic devices (qualitative) – Determination of band gaps from UV-vis and PL studies.

References:

1. Nanotechnology: basic science and emerging technologies – Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, Overseas Press (2005)

2. Amorphous and Nanocrystalline Materials: Preparation, Properties, and Applications, A.Inoue, K.Hashimoto (Eds.,) (2000)
3. Introduction to Nanotechnology, Charles P. Poole, Frank J. Owens, Wiley-Interscience (2003)
4. Fundamentals of Surface and Thin Film Analysis, Leonard C.Feldman and James W. Mayer
5. Nanoelectronics and Information technology: Advanced electronic materials and novel devices (2nd edition), Rainer Waser (Ed.), Wiley – VCH Verlag, Weiheim (2005)
6. Nanocomposite science and technology, Pulickel M. Ajayan, Linda S. Schadler, Paul V. Braun, Wiley – VCH Verlag, Weiheim (2003)
7. Amorphous and Nanocrystalline Materials: Preparation, Properties, and Applications, A.Inoue, K.Hashimoto (Eds.,) (2000)
8. Quantum Heterostructures: Microelectronics and Optoelectronics, Vladimir Mitin
9. Theory of Modern electronic semiconductor devices, K.F. Brennan and A.S. Brown
10. Semiconductor Nanostructures for Optoelectronic applications, Todd D. Steiner
11. Optical properties and Spectroscopy of nanomaterials – Jin Zhong Zhang, World Scientific (2009).
12. Core concept of nanotechnology with application spectrum – Rakesh Rathi, SBS Publishers (2007).

CORE PRACTICAL III
GENERAL EXPERIMENTS [SUBJECT CODE - P5PYPR31]
(Any 10 out of the given 15)

Credits; 4
Hrs/week: 6

1. GM counter – Characteristics, inverse square law.
2. G.M. Counter - absorption coefficient.
3. Michelson Interferometer – Wavelength, separation of wavelengths
4. Michelson Interferometer - thickness of mica sheet.
5. F.P.Etalon – using Michelson set up.
6. Hall effect.
7. Molecular spectra – ALO band.
8. Molecular spectra – CN Band.
9. Susceptibility by Quinke’s method.
10. Susceptibility by Guoy’s method.
11. Ultrasonic Interferometer – Velocity and Compressibility of a liquid.
12. Ultrasonic Diffraction - Velocity and Compressibility of a liquid.
13. Dielectric measurements in Microwave test bench.
14. B-H curve using CRO.
15. Spectral analysis of a salt.

NON MAJOR

BIO-MEDICAL INSTRUMENTATION

Credits; 4
Hrs/week: 5

Objective: This paper aims at introducing the learner to understand the various Instruments used in medical field to analyses the data.

UNIT- I: Transducers and Sensors

Classification of Transducers - Principle, construction and working of Thermistors, LVDT, Electrical strain gauges and capacitive transducers – Optical fibre sensors –

Photometric sensors – Physical sensors – Chemical sensors – Biosensors – Sources of biomedical signals

UNIT- II: Digital Instrumentation

Principle, block diagram and working of Digital frequency counter, digital multimeter digital pH meter, digital conductivity meter and digital storage oscilloscope

UNIT- III: Analytical Instrumentation

Principle, block diagram, description, working and applications of UV- VIS spectrometer, FT-IR Spectrometer – AES spectrometer – Basic concepts of Gas and Liquid Chromatography.

UNIT- IV: Bio – Medical Instrumentation

Sources of biomedical signals – Physiological transducers to measure blood pressure, body temperature - Sources of Bio – electric potentials - resting potential, action potential, bio potentials electrodes - Principle, block diagram and operation of ECG and EEG Recorders.

UNIT- V: X-ray machine and Digital Radiography

Basis of Diagnostic Radiology – Block diagram and operation of X-ray machine – X-ray film – fluorescent Screen – X-ray image Intensifier television System – Digital X-ray imaging system – Basic principle and operation of X-ray computed tomography

Books for Study

1. Dr. Rajendra Prasad, Electronic Measurements and Instrumentation, Khanna Publications.
2. S. Ramambhadran, Electronic Measurements and Instrumentation Khanna Publications.
3. R S Khandpur, Hand book of Biomedical Instrumentation IInd Edition, Tata Mc Graw-Hill Publishing Company Limited, New Delhi
4. Bio medical Instrumentation by Arumugam.

Books for Reference

1. S.M .Dhir , Electronics and Instrumentation, Khanna Publisher,
2. Saifullah Khalid, Mukesh Jain, Neetu Agrawal, Basic Electronics and Instrumentation, University Science Press, Laxmi publications, New Delhi.

CRYSTAL PHYSICS AND CRYSTALLOGRAPHY
[SUBJECT CODE - P5PY4001]

Credits; 3
Hrs/week: 5

Objective: This paper aims to give an understanding of the Crystal Structure, Properties and Refinement Techniques.

UNIT- I: Symmetry and lattices

Crystal-Crystal lattice-Primitive cell –Non primitive cell – Cubic structure and packing factor for sc, fcc, bcc, hcp, and diamond structure – Miller indices –determination – symmetry element- operation – space group – plane group – equivalent position – reciprocal lattice –construction – reciprocal of bravais lattice.

UNIT- II: X-ray Diffraction

X-ray – generation – Ewald`s sphere – X- ray diffractometer – four circle diffractometer – X-ray detector – image plate - data collection – X- ray diffraction of crystal lattice – Coherent scattering of X-ray by electron – Scattering by one atom - diffraction from a one dimension crystal – Laue formulae of X- ray diffraction.

UNIT- III: X-ray Diffraction Methods

Laue diffraction – orientation – calculating Laue angles –method – rotating crystal method – X- ray powder diffraction- principle- methods of powder diffraction pattern – interpretation of powder photographs – applications and limitation of X- ray powder diffraction

UNIT- IV: Determination of Crystal Structure

Scattering factor –structure factor- determination of structure factor –amplitude from intensities- data reduction – crystallization – crystal mounting – collection of Bragg`s intensities – phase problem – need for phase – Patterson method –heavy atom technique – anomalous dispersion – direct method procedure –Fourier map.

UNIT- V: Refinement of Crystal Structure

Weighting scheme – residual indices – least square refinement – thermal parameters – Wilsons plot – space group determination – structure refinement - structural analysis – bond length - bond angle - torsion angle - confirmation of rings

Book for study:

1. D. Velmurugan , Elementary Crystallography ,MJP publisher, Chennai

Books For Reference:

1. N. W. Aschroft and N. D. Mermin, *Solid State Physics*, Rhinehart and Winton, New York.
2. A. J. Dekker, *Solid State Physics*, Macmillan India, New Delhi.
3. S. O. Pillai, 1997, *Solid State Physics*, New Age International, New Delhi.
4. S. O. Pillai, 1994, *Problems and Solutions in Solid State Physics*, New Age International, New Delhi.
5. J. P. Srivastava, 2001, *Elements of Solid State Physics*, Prentice-Hall of India, New Delhi.
6. A.Wahab, 2009, *Solid State Physics*, Narosa Publishing House, New Delhi.
7. Saxena, Gupta, Saxena, 2003, *Solid State Physics*, Pragati Prakashan, Meerut.

CONDENSED MATTER PHYSICS – II
[SUBJECT CODE - P5PY4002]

Credits; 3
Hrs/week: 5

Objective: This paper aims to give an understanding of the advance theoretical models to study

the properties of matter from a microscopic point of view.

UNIT- I: Dielectrics

Dielectric solids- Different types of polarization, frequency and temperature effects on polarization-Dielectric loss and Dielectric Breakdown - Local or internal field-Clausius Mosotti equation-determination of dielectric constant- Classification and applications of dielectric materials – piezoelectric and ferroelectric materials.

UNIT- II: Magnetism I:

Definitions of Magnetism-Classification – Langevin theory of Dia magnetism(classical theory)-Quantum theory of Dia Magnetism-classical theory of paramagnetism - Quantum theory of paramagnetism- Rare earth ion - Quenching of orbital angular momentum – Adiabatic demagnetization

UNIT- III: Magnetism II:

Quantum theory of ferromagnetism – Curie point- Heisenberg’s interpretation of Weiss field – Ferromagnetic spin waves- Quantization of spin wave-Thermal excitation of magnons- Ferromagnetic domain-Origin of domains– Bloch wall (Domain wall energy)- Theory of antiferromagnetism – Neel temperature- Susceptibility below Neel temperature-

UNIT- IV: Optical Properties

Optical reflectance - Kramers- kronig relation-Electronic interband transitions-Drude relation for optical conductivity – optical absorption in metals, insulator and semiconductor - Excitons -Frenkel and Mott-Wannier Excitons – luminescence- photoluminescence- electroluminescence.

UNIT- V: Surface Physics

Surface structure-simple super lattice-Incoherent Lattice- low energy electron diffraction-Lattice dynamics at surfaces- Surface Polarization-Localized modes-surface electronic states-Richardson-Dushman equation

Books for Study

1. Solid State Physics- S.O.Pillai
2. Solid State Physics-K.Ilangovan
3. .Introduction to Solid State Physics- Charles Kittel
- 4 .Solid State Physics-Gupta kumar

BOOKS FOR REFERENCE:

1. **N. W. Aschroft** and **N. D. Mermin**, *Solid State Physics*, Rhinehart and Winton, New York.
2. **A. J. Dekker**, *Solid State Physics*, Macmillan India, New Delhi.
3. **S. O. Pillai**, 1997, *Solid State Physics*, New Age International, New Delhi.
4. **S. O. Pillai**, 1994, *Problems and Solutions in Solid State Physics*, New Age International, New Delhi.
5. **J. P. Srivastava**, 2001, *Elements of Solid State Physics*, Prentice-Hall of India, New Delhi.
6. **A.Wahab**, 2009, *Solid State Physics*, Narosa Publishing House, New Delhi.
7. **Saxena, Gupta, Saxena**, 2003, *Solid State Physics*, Pragati Prakashan, Meerut.

ELECTIVE PAPER - IV

EMBEDDED SYSTEM **[SUBJECT CODE - P5PY4003]**

Credits; 5
Hrs/week: 5

Objective: This paper aims at introducing the learner to the very popular Intel 8051, the PIC24

family and the widely used ARM embedded processor

UNIT- I: 8051 Architecture and Microcontroller

Microprocessor Vs Microcontroller – Types of Microcontroller - 8051 Architecture – 8051 Microcontroller hardware - input/output pins – Memory Organization – Ports & Circuits – Counters – Timers – Serial data input/output – Interrupts, Operand types and Operand addressing.

UNIT- II: 8051 Family Microcontrollers Instruction Set

Addressing modes – Data transfer instructions Data and Bit manipulation instructions – arithmetic instructions – Instruction for logical operations, Internal RAM, and SFRs – program flow control instructions – Interrupt control flow

UNIT- III: 8051 Interfacing and Applications

Interfacing external memory – Keyboard and display devices – LED -7-segment LED display – 2- phase 6-wire stepper motor – interfacing Programmable Peripheral Interface (PPI) device 8255 – Interfacing analog to digital converter 0801 with 8051.

UNIT- IV: PIC18/24 Architecture

Architecture – memory organization – addressing modes – instruction set –PIC programming in Assembly & C – input/output port, data conversion, RAM &ROM allocation timer programming, MP – LAB

UNIT-V: ARM Architecture

Arm architecture – ARM core signal description – ARM core families – Registers - Pipeline – Thumb instruction set – ARM instruction set – internal memories - Peripherals

Book for Study:

1. Programming and customizing the 8051 microcontroller by Michael Predko, McGraw – Hill (1999)
2. PIC microcontroller and embedded system: using assembly and C for PIC18 by Muhammad Ali Mazidi, Rolin D, McKinlay, Danny Pearson Prentice Hall (2008)
3. Real Time Embedded System, Cranes Software International Ltd. Bangalore
4. Introduction to Embedded systems Shibu K V , Tata McGraw Hill, New Delhi

Book for References:

1. Embedded System by Raj Kamal, TMH, 2006

2. The 8051 Microcontroller By K Ayala 3rd Ed., Thomson Delmer Learning 2007
3. PIC Microcontroller by H.W Huang, Delmar CENGAGE Learning, 2007

**CORE PRACTICAL IV
MICROPROCESSOR EXPERIMENTS &
COMPUTER PROGRAMMING (C Programme)
[SUBJECT CODE - P5PYPR41]**

(Any 15 out of the given 20)

**Credits; 4
Hrs/week: 6**

MICROPROCESSOR

1. Number conversion - 8 bit and 16 bit: BCD to binary, Binary to BCD, Hex to ASCII using 8085.
2. Square and square root of BCD and HEX numbers 8 bit and 16 bit using 8085.
3. Addition and subtraction using 8086.
4. Multiplication and division using 8086.
5. Sum of a simple series.
6. Time delay subroutine and a clock programme.
7. Double and Triple precision addition and subtraction using 8085/8086.
8. Switching an array of LED's by programming.
9. Op-Amp 8-bit DAC.
10. ADC interfacing 0809 with MPU.
11. Interfacing and programming 0800 with MPU.
12. Analog to digital conversion using DAC comparator and MPU system.
13. Wave form generation – Asymmetrical square wave and ramp.
14. Interfacing a stepper motor to the MPU system – clockwise and anticlockwise – full stepping and half stepping.
15. Ascending order / descending order using 8085.

COMPUTER PROGRAMMING (C Programme)

16. Newton's interpolation with algorithm, flowchart and output.
17. Lagrange's interpolation with algorithm, flow chart and output.
18. Numerical integration by Trapezoidal / Simpson's rule with algorithm, flow chart and output.
19. Solution of a polynomial equation and determination of roots by Newton Raphson method with algorithm, flow chart and output.
20. Curve fitting – Least square fitting with algorithm, flow chart and output.

PROJECT
Course Work
[SUBJECT CODE - P5PYPJ42]

Credits; 3
Hrs/week: 4

1. Projects would be allotted to III Semester students which have to be carried out and completed in Semester IV.
2. A list of projects will be finalized and announced by the Department. The students will have an option to select the project in their field of interest.
4. The project will comprise of the following:
 - a. Study of background material
 - b. Collection of data, procurement and fabrication of experimental set up and writing of computer programs if needed.
 - b. Giving a preliminary seminar in the III semester for the purpose of internal assessment.
 - d. Writing a dissertation or project report. This will be submitted by the students at the end of IV semester.

Reserch methodology theory paper -75 marks

PROJECT

Viva-Voce

The Final evaluation of the project work completed will be done by external and internal examiners appointed by the Board on the basis of an oral presentation and the submitted Project-Report.

SEMESTER- III
PAPER – XI MOLECULAR ENDOCRINOLOGY
[SUBJECT CODE - P5BI3001]

Paper Code:

Hrs: 5

Hrs/Week

Credits: 4

Total Hours:

75 hrs

Objectives: To understand endocrine function, biological actions of hormones, their synthesis,

secretion, regulation and their related pathological conditions.

UNIT – I CLASSIFICATION AND MECHANISM

15 hrs

Hormones – definition, classification based on receptors, signal transduction and second messengers – adenylate cyclase system, cAMP. G-protein as cellular transducer, inositol triphosphate and calcium release. Glycogen phosphorylase kinase, DAG and protein kinase C pathway, Atrial natriuretic factor, protein kinase cascade. Hormone receptor's interaction.

UNIT – II HORMONES RECEPTORS AND REGULATION

15 hrs

Steroid hormone receptors, intracellular protein receptors, structural organization of receptor protein, hormone binding domain, antigenic domain and DNA binding domain, organization of functional elements – hormone response elements. Structure of insulin receptor, internalization of receptors.

UNIT – III PITUITARY AND HYPOTHALAMIC HORMONES

15 hrs

Hormonal cascade system involving Hypothalamus. Structure, physiologic and biochemical actions of polypeptide hormones – growth hormone, prolactin and chorionic somatomammotropin. Glycoprotein hormones and POMC peptides – ACTH, LPH, MSH and Endorphins. Vasopressin and Oxytocin.

UNIT – IV THYROID, PARATHYROID AND PANCREATIC HORMONES

15 hrs

Structure, synthesis, biochemical and physiologic actions of thyroxine, Pathophysiology – Hypo and hyperthyroidism. Structure, synthesis, biochemical and Physiologic actions of parathyroid hormone, pathophysiology – Hypo and hyper parathyroidism. Regulation of synthesis and secretion of thyroxine and PTH.

Structure, synthesis and biological role of insulin, glucagon and somatostatin. Adrenal medullary hormones, Adrenal cortex hormones, Epinephrine and Nor-epinephrine.

UNIT – V STEROID HORMONES

15 hrs

Structure, biosynthesis, transport of steroid hormones in blood and metabolic inactivation of steroid hormones, control of synthesis and release of steroid hormones, steroid receptors. cortisol, aldosterone, testosterone, estrogens, progesterone and calcitriol, ovarian cycle and role of hormones.

TEXT BOOKS:

1. Text book of Endocrinology by Wilson and Foster, W.B. Saunders Co.
2. Review of Medical Physiology by William.F. Ganong. McGraw-Hill 2005
3. Human Physiology and Mechanisms of Disease by Guyton. Saunders 6th edition 1996

REFERENCES:

1. Essential Endocrinology – Charles G.D Brook – New Age International – 4th edition.
2. Endocrinology – Hormones and Human health – Prakash S. Lohar – MJB publications.
3. Endocrinology basic and Clinical Principles – Shlomo Melmed P. Michael conn Humana press – 2nd edition.
4. Molecular Endocrinology – Franklin F. Bolander – Academic publishers – 3rd edition.
5. Basic medical endocrinology – Good man – Academic publishers – 3rd edition.
6. Text book of Biochemistry (with clinical correlation) by Devlin, Wiley 6th edition (2005).
7. Harper's Biochemistry by R.K.Murray *et al.*, Mc Graw – Hill Medical, 27th edition (2006).

PAPER-XII; MOLECULAR BIOLOGY **[SUBJECT CODE - P5BI3002]**

Paper Code:

Hrs: 5

Hrs/Week

Credits: 4

Total Hours:

75 hrs

OBJECTIVES :

- ✓ To understand the basis of molecular biology
- ✓ To understand the genetic mutation and repair processes
- ✓ To understand the current trends in molecular and genetic research

UNIT – I DNA REPLICATION

15 hrs

Prokaryotic and Eukaryotic replication – experimental evidence for semiconservative replication – Messelson and Stahl experiment, replications in circular chromosomes. Inhibitors of replication, replication bubble, bidirectional replication, replicon, action of SSB, Primer, primase, Primosome, DNA gyrase, DNA helicases, DNA ligase, Topoisomerase, DNA polymerase (Prokaryotic and Eukaryotic), lagging and leading strand synthesis, endonucleases, exonucleases, telomerase, retroviral replication, temporal control of replication.

UNIT – II TRANSCRIPTION

15 hrs

Transcription – definition, structure of RNAs, prokaryotic and eukaryotic transcription RNA polymerase, promoter, enhancers, repressors, regulatory elements, initiation, elongation, termination, inhibitors of transcription. Post transcriptional modification - RNA splicing.

UNIT – III GENETIC CODE AND TRANSLATION

15

hrs

Genetic code – definition, deciphering of the genetic code, codon, anticodon, salient features of genetic code. Activation and attachment of amino acids to tRNA, A, P, and E sites of ribosomes, Wobble mechanism and its significance, Shine – Dalgarno sequence, prokaryotic and eukaryotic protein biosynthesis – initiation, elongation, termination, regulation, post-translational modification in prokaryotes and eukaryotes, role of endoplasmic reticulum, role of signal peptide, signal hypothesis, chaperons, inhibitors of protein synthesis.

UNIT – IV PROTEIN TRANSPORT AND GENE EXPRESSION

15

hrs

Protein targeting, translocation, heat shock proteins, glycosylation, SNAPs and SNAREs, bacterial signal sequences, mitochondrial, chloroplast and nuclear protein transport, endocytosis-viral entry, ubiquitin TAG protein destruction.

Gene expression and regulations, molecular mechanism of regulation, prokaryotes – operon model, lac, trp operons, repression and attenuation, eukaryotes – C value paradox, repetitive DNA, gene dosage and gene amplifications.

UNIT – V MUTAGENESIS, DNA DAMAGE AND REPAIR

15

hrs

Mutagenesis and replication fidelity, numerical mutations involving full chromosomes set-causes, structural chromosome mutations – balanced and unbalanced – causes, karyotype mixing, misincorporation of nucleotides during DNA synthesis, transient and spontaneous chemical changes in DNA, frame shift mutagenesis, DNA damage – different types, DNA repair – direct reversal repair, direct repair of nicks, excision repair, nucleotide excision repair, mismatch repair, long and short patch mismatch repair, recombination error, SOS response and mutagenic repair.

TEXT BOOKS

1. Instant notes in molecular Biology 2nd edition – P.C. Turner, A.G. McLennan.
2. Principle of Biochemistry and molecular biology – Wilson and walker
3. Molecular biology by David Friedfilter
4. Cell Biology, Genetics, Molecular Biology: Evolution and Ecology - P.S. Verma
5. Cell and Molecular Biology P.K. Gupta

REFERENCES

1. Molecular biology by Robert F. Weaver McGraw – Hill 4 edition (2007)
2. Genes VII by B. Lewin Oxford University Press, Cell Press, London (2000)

3. Cell and Molecular Biology by G.Karp, John Wiley and Sons Inc (2002)
4. Molecular Biology of genes 5th edition James Watson, Tania A. Baker – Pearson publication.
5. Darnell - Molecular Cell Biology 5th Edition
6. Lewin, sGene VIII, IX, X, XI – Kerbs, Goldstein, kilpatrick
7. Principles of genetics - symmons
8. Principles of Biochemistry by Leninger and Cox

PAPER XIII
PRACTICAL V-CHEMICAL ANALYSIS OF BLOOD
[SUBJECT CODE - P5BIPR31]

Paper Code:
5Hrs/Week
Credits: 3
Practical :15

Hrs:
Total

1. Estimation of blood glucose by GOD-POD method
2. Estimation of serum proteins by Bradford's method
3. Estimation of plasma fibrinogen
4. Estimation of A:G ratio in serum
5. Estimation of Lipid peroxidation
6. Estimation of SOD
7. Estimation of Catalase
8. Estimation of Vitamin E and Vitamin C
9. Estimation of serum triglycerides
10. Estimation of serum cholesterol by Zlatkis, Zak and Boyle method
11. Estimation of serum phospholipids
12. Estimation of serum calcium
13. Estimation of serum bilirubin by Jendrassik and Crof method
14. Estimation of glycosylated hemoglobin
15. Estimation of blood constituents using auto analyzer

REFERENCE BOOKS:

1. Text book of Medical Biochemistry – 4th Edition, MN.Chatterjee, Rana Shine, Jaypee Publications.
2. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.
3. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd., Vol.I,II,III.

4. Experimental procedures in Life Sciences by Dr.S.Rajan & Mrs.R.Selvi Christy. Anjaana Book House.

PAPER - XIV
PRACTICAL- VI - CHEMICAL AND MICROSCOPIC ANALYSIS OF URINE
[SUBJECT CODE - P5BIPR32]

Paper Code:
5Hrs/Week
Credits: 3
Practical: 15

Hrs:

Total

1. Qualitative analysis of urine for normal and abnormal constituents
2. Microscopic analysis of urine
3. Estimation of titrable acidity of urine
4. Estimation of true acidity
5. Estimation of protein in urine by Biuret method
6. Analysis of urinary calculi
7. Estimation of albumin in urine
8. Antibiotic sensitivity test in urine
9. Analysis of urine using urine analyzer
10. Urea clearance test
11. Creatinine clearance test

REFERENCES:

1. Text book of Medical Biochemistry – 4th Edition, MN.Chatterjee, Rana Shine, Jaypee Publications.
2. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.
3. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd., Vol.I,II,III.
4. Experimental procedures in Life Sciences by Dr.S.Rajan & Mrs.R.Selvi Christy. Anjaana Book House.
5. Text book of Clinical chemistry –Teitz.
6. Medical Laboratory Science, Theory and Practice J. Ochei & A. Kolhatkar, Tata Mc Graw - Hill.

ELECTIVE – III
IMMUNOLOGY AND IMMUNO TECHNOLOGY
[SUBJECT CODE - P5BIE301]

Paper Code:

Hrs: 5

Hrs/Week

Credits: 4

Total Hours:

75hrs

Objectives:

- ✓ To know the basic concepts of the immune system.
- ✓ To understand the mechanism of immune action.

UNIT I: CLASSIFICATION and COMPONENTS OF IMMUNOLOGY

15 hrs

History and scope of immunology. Organs of the immune system- primary and secondary lymphoid organs – structure, maturation and functions. Infection, inflammation – types – mode of transmission, Immunity – types- mechanisms. Haematopoiesis

UNIT II: ANTIGENS AND ANTIBODIES

15 hrs

Antigen –structure and types. Immunoglobulin- structure, types and its function. Immunoglobulin gene organization. Immune responses- humoral and cell mediated immune response (Immunogenicity)

UNIT III- ANTIGEN – ANTIBODY INTERACTIONS

15 hrs

Antigen – Antibody reactions. Complement- components, properties, activation and its pathways. Cytokines – properties and functions. Major histocompatibility complex – general organization and inheritance of MHC, structure – function- role in antigen processing and presentation. Immunological tolerance.

UNIT IV- IMMUNO PATHOLOGY

15 hrs

Hypersensitivity – types, mechanisms, manifestations. Transplantation – classification, transplantation antigens, graft acceptance, rejection, process of graft rejection, immunosuppressive therapy. Autoimmunity– Aetiology, types and its treatment. Tumor immunology, immune response to tumour, immunotherapy.

UNIT V: IMMUNO TECHNOLOGY

15 hrs

Hybridoma technology, isolation of antigen and antibody, isolation of immune cells, detection of molecular markers, primary and secondary antibody, FACS, IHC, IF, IE.

TEXT BOOKS

1. Rajasekara Pandian M and Senthilkumar B (2007) *Immunology and Immunotechnology*. Panima Publishing Corporation, New Delhi.
2. Kuby J (1997) *Immunology* 3rd Edn. W.H Freeman and Co. New York.

References:

1. Goldsby RA, Kindt TJ, Osborne BA, Kuby J (2003) *Immunology* 6th Edn. WH Freeman and Co. New York.
2. Benjamini E, Coico R and Sunshine G (2000). *Immunology* .4th Edn. A John Wiley and sons, Inc. Publication.
3. Roitt I, Brostoff J and Male D (1993). *Immunology* 3rd Edn. Mosby.
4. Weir DM (1979). *Handbook of Experimental Immunology*. Black Well Scientific Publications. Oxford.
5. Pelczar MJ, Chan ECS and Krieg NR. *Microbiology* (2006) 5th Edn. Tata McGraw-Hill Publishing Company Ltd. New Delhi.
6. Tizard IR (1995). *Immunology* 4th Edn. Saunders College Publishing Harcourt Brace College Publishers.
7. Talwar GP and Gupta (2004). *A hand book of practical immunology* .2nd Edn. Vol II .CBS Publications.
8. A text of immunology and immunotechnology by B. Annadurai, S. Chand publications
9. Immunology by I. Kannan,
10. P. M. Lydyard, A. Whelan- Instant notes in Immunology, Viva Books Pvt. Ltd.

**PAPER XVII -
ANIMAL CELL SCIENCE AND TECHNOLOGY
[SUBJECT CODE - P5BI4003]**

Paper Code:

Hrs: 5

Hrs/Week

Credits: 4

Total hours:

75 hrs

Objectives:

- ✓ To understand the basics of animal cell culture and maintenance

UNIT I ANIMAL CELL

15 Hrs

Structure and organization of animal cell, cell physiology. Equipments and materials for animal cell culture technology. Aseptic Technique for cell cultures. Cryopreservation.

UNIT II STERILIZATION AND PREPARATION OF MEDIA

15 Hrs

Preparation and Sterilization of cell culture media and reagents. Introduction to the balance salt solutions and simple growth medium. Chemical, physical and metabolic functions of different constituents of culture media. Role of carbon dioxide in animal cell culture.

UNIT III CHARACTERIZATION OF CULTURED CELLS

15 Hrs

Role of serum and supplements, Serum & protein free defined media and their applications. Measurement of viability and cytotoxicity. Biology and characterization of cultured cells, measuring parameters of growth.

UNIT IV MAMMALIAN CELL CULTURE**15 Hrs**

Basic techniques of mammalian cell culture in vitro; disaggregation of tissue and primary culture; maintenance of cell culture; cell separation. Scaling – up of animal cell culture, Cell synchronization. Cell cloning, micromanipulation and types of cloning. Cell transformation. Application of animal cell culture.

UNIT V STEM CELL CULTURE**15 Hrs**

Stem cell culture, embryonic stem cells and their applications. Cell culture based vaccines. Somatic cell genetics. Organ and histotypic cultures. Measurement of cell death. Apoptosis. Three dimensional culture and tissue engineering.

TEXT BOOKS:

1. Animal Cell Culture Techniques. Ed. Martin Clynes, Springer.
2. Animal Biotechnology, M. M. Ranga, III Revised edition, Agrobios (India), Jodhpur.

REFERENCES:

1. Culture of Animal cells, 3rd Edition, R. Ian Freshney. A John Wiley & Sons, Inc., publications.
2. Animal Cell Culture- Practical Approach, R.W. Masters, Oxford.
3. Animal Cell Biotechnology, Methods and protocols, Nigel Jenkins, Humana Press.
4. Biotechnology of Animal Tissue. P.R. Yadav & Rajiv Tyagi. 2006. Discovery Publishing House. New Delhi.
5. Animal Cell Culture- Practical Approach. John, R.W. Masters. 2000. 3rd Edi.

NON MAJOR - NANOBIOCHEMISTRY
[SUBJECT CODE - P5BIE402]

Paper Code:

Credits: 4

75 hrs

Hrs: 5Hrs/Week

Total Hours:

OBJECTIVES:

- ✓ To study the therapeutic applications of nanomedicine.
- ✓ To know the social implications of nanotechnology.

UNIT-I: BASIC CONCEPTS OF NANO-BIOLOGY

15 hrs

Nano-definitions, biosystems, biological networks, biological neurons, neurotransmitters. Protein interactions modulated by chemical energy:- actin, myosin and molecular motors. Bionanoparticles – nanocomposites.

UNIT II: BIOMATERIALS SCIENCE

15 hrs

Introduction - Types of biomaterials. Biodegradable polymers. Biodegradation of solid polymers. Modes of erosion (surface & bulk). Synthesis of nanoparticle (top down, bottom up and green synthesis) Molecular effects on hydrolytic breakdown.

UNIT III: CHARACTERIZATION OF NANOSTRUCTURES

15 hrs

Techniques to construct nanostructures –scanning probe instruments, nanoscale lithography UV spectrophotometry. Techniques to predict nanostructures –TEM, SEM, AFM. Characterization techniques – NMR, Mass (MALDI-TOF) spectroscopy, X-ray diffraction.

UNIT IV: NANO-BIOSENSORS

15 hrs

Biomedical sensors and biosensors-. Biosensors – definition and classification – potential based sensors; electrochemical sensors; acoustic/mechanical sensors; thermal and phase transition sensors; sensors in modern medicine- Biomembrane based sensors. Diagnostic imaging techniques (digital imaging; molecular imaging).

UNIT V: PROSPECTS OF NANOMEDICINE AND NOVEL DRUG DELIVERY SYSTEMS

Drug delivery systems – polymer therapeutics:- polymer drug conjugates; polymeric micelles; liposomes. Mechanical testing; elasticity; toughness; effect of fabrication on strength. Application of nano materials in medicine: cardiovascular medical devices; tissue regeneration (tissue engineering). Dendrimers as nanoparticulate drug carriers.

15 hrs

TEXT BOOKS:

1. Pradeep T, 2007, NANO: The Essentials – Understanding Nanoscience and Nanotechnology, TATA McGraw – Hill Education.
2. Nano biology Veenita Singh
3. A Hand Book of Nano biotechnology Rita Khare.
4. Nano Biotechnology Subbiah Balaji.

REFERENCES:

1. Molecular Design and Synthesis of Biomaterials Biological Engineering Division, MIT Open Course Ware, 27th May 2005.
2. Biomaterials Sciences: An Introduction to Materials in Medicine 2nd Edition, Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen and Jack E. Lemons
3. Nanotechnology: A General Introduction to the Next Big Idea Mark Ratner and Daniel Ratner. Pearson Education Publishers, 2002.
4. Encyclopedia of Nanoscience & Nanotechnology, H.S. Nalwa (Ed.), American Scientific Publishers, California, 2004.
6. Nano biotechnology: concepts, applications and perspectives. Christofer M. Niemayer, Chad A. Mirkin, Wiley VCH publishers 2004.
7. Bionanotechnology: Lessons from Nature, David S. Goodsell, John Wiley 2006.
8. Nano-biotechnology, Subbiah Balaji, M. J. Publishers (2010).
9. Nano-biotechnology Concepts, Application & Perspectives, Edited By C. M. Niemeyer, C. A. Mirkin, Wiley-VCH India Pvt. Ltd.

SEMESTER - IV
PAPER XV - BIOTECHNOLOGY
[SUBJECT CODE - P5BI4001]

Paper Code:

Hrs: 5Hrs/Week

Credits: 5

Total Hours:

75 hrs

Objectives

- ✓ To apply the genetic concepts into manipulating living things.
- ✓ To exploit living things for human benefit.

Unit – I GENETIC ENGINEERING

15

hrs

Steps involved in gene cloning–tools -Restriction endo nucleases, DNA ligase, Cloning vectors - Plasmid PBR³²², PUC18/19, Phage - Phage λ , M13, Cosmid, high capacity cloning vectors - Yeast artificial chromosome vector, construction of genomic and cDNA library, Shuttle vector and Expression vectors.

Unit – II METHODS IN rDNA TECHNOLOGY

15

hrs

Construction of rDNA, linkers and adapters. Methods of gene transfer – transformation, transfection, transduction, electroporation, micro injection, Biolistics, Episome fusion. Method for screening of recombinant organisms.

Unit – III TECHNIQUES OF GENETIC ENGINEERING

15

hrs

Agarose electrophoresis, SDS PAGE, Southern, Northern and Western blotting techniques, Autoradiography, DNA sequencing – Maxam-Gilbert's and Sanger dideoxy

method. RNA sequencing. Mutagenesis - site directed mutagenesis, PCR, types and its applications. DNA chips and micro arrays – Applications.

Unit – IV PLANT AND ANIMAL BIOTECHNOLOGY **15 hrs**

Production of transgenic plants and its applications -virus resistance, pest resistance, stress resistance, disease resistant plant, delayed fruit ripening. Production of transgenic animals and its applications -transgenic sheep, fish, cattle.

Unit – V GENETIC ENGINEERING FOR HUMAN WELFARE **15 hrs**

Genetic engineering for human welfare – production of insulin, somatotropin, somatostatin, endorphin, human interferon, DNA vaccine, Hepatitis Vaccine, Tissue plasminogen activator (TPA), plantibodies, nutraceuticals. Gene therapy - the principle and approaches.

Industrial biotechnology – fermentation, principle, types product recovery and purification of ethanol, citric acid, vitamin B12, streptomycin.

TEXT BOOKS

1. Biotechnology – U. Satyanarayanan
2. A text book of Biotechnology – R.C. Dubey – S. Chand publications

BOOKS RECOMMENDED:

1. Primrose, S.B (1994) Molecular biotechnology (2nd Edi). Blackwell Scientific Publishers,
2. Benjamin Lewin. Genes-VIII. Oxford University Press.
3. Concept in biotechnology - D. Balasubramanian et al., Universal press India 1996.
4. Plant tissue culture - Razdan, Oxford IBH Publisher.
5. Animal cell culture – Freshney, IRL Press.
6. Animal Biotechnology – 2005. A.K. Srivastava, R.K. Singh and M.P. Yadav Oxford and IBH.
7. Molecular biotechnology 2006 – Channarayappa Univ. Press
8. Molecular Biology and Biotechnology - H.D. Kumar(1997), Vivas publishing house Pvt .Ltd
9. Molecular biotechnology – principle and application of recombinant DNA 3rd edition
10. Biotechnology – Prakash, S. Lohar, MJP publisher, Chennai -5.
11. Biotechnology – Glick and Pastunack

PAPER – XVI ADVANCED CLINICAL BIOCHEMISTRY
[SUBJECT CODE - P5BI4002]

Paper Code:

Hrs: 5Hrs/Week

Credits: 5

Total Hours: 75 hrs

Objectives:

- ✓ To understand the basic of metabolic disorders/diseases and their manifestation, diagnosis and treatment.

UNIT – I SPECIMEN COLLECTION AND ANALYSIS

1

5 hrs

Concepts of accuracy, sensitivity, precision, reproducibility, reliability, and other factors in quality control. Normal values. Specimen collection and Processing, Collection of blood – Venipuncture, skin puncture, arterial puncture. Anticoagulants. Collection and analysis of normal and abnormal urine – timed urine specimens, preservatives Clinical significance of sugars, proteins, ketone bodies, bilirubin and porphyrins. CSF – collection, composition and analysis. Amniotic fluid - collection, composition. Preservations of biological samples.

UNIT – II DISORDERS OF CARBOHYDRATES AND LIPID METABOLISM 15 hrs

Disorders of carbohydrate metabolism – blood sugar levels, hyper and hypoglycemia, regulation of blood glucose, renal threshold, diabetes mellitus-etiological classification and diagnostic criteria, glucose tolerance test, Hb A_{1c}, fructosamine, and microalbuminuria, metabolic complications-acute and late complications. Hypoglycemic agents, Glycogen storage diseases, galactosemia, fructose intolerance and Fructosuria. Plasma lipids, lipoproteins and apolipoproteins abnormalities and role in diseases. Hypercholesterolemia, Hypocholesteremic agents, lipidosis and hypolipoproteinemias, Tay-Sachs's disease, Niemann-Pick disease, Xanthomatosis, Gaucher's disease, Fatty liver, Obesity, Atherosclerosis, Risk factors.

UNIT – III DISORDERS OF PROTEIN METABOLISM

15 hrs

Disorders of protein metabolism – non-protein nitrogenous constituents in blood – urea, uric acid and creatinine. Plasma protein abnormalities – deficiency, agammaglobulinemia, multiple myeloma, proteinuria, glomerulonephritis, nephritic syndrome. Hemoglobinopathies – Sickle cell anemia, thalassemia and erythrocyte enzyme disorders. Phenylketonuria, Tyrosinosis, Alkaptonuria, Maple syrup urine disease, Hartnup disease, Homocystinuria, Albinism, Disorders of Urea Cycle. Bence Jones protein.

UNIT – IV HEPATIC, RENAL AND GASTRIC FUNCTION TESTS

15 hrs

Normal structure and functions of liver, diseases of liver, hepatitis, cirrhosis, alcoholic liver disease, hepatic tumor and biliary tract diseases, disorders of bilirubin metabolism.

Acute and chronic renal failure, urinary tract obstruction and analysis of urinary calculi.
Liver, Renal, pancreatic and gastric function tests.

UNIT – V FREE RADICALS CANCER AND DISORDERS OF NUCLEIC ACID METABOLISM

15 hrs

Free radicals in health and disease – Endogenous and exogenous free radicals. ROS, Oxidative damage to lipids, proteins and DNA. Role of enzymatic and non-enzymatic antioxidants. Cancer, characteristic features, types. Tumor markers – AFP, CEA, hCG. Carcinogenic agents. Inborn errors of Nucleic Acid metabolism. Lesch nyhan syndrome, Immuno deficiency diseases associated with defects in Purine nucleotide metabolism, Gout, Oratic aciduria and Xanthinuria.

TEXT BOOKS:

5. Text book of Medical Biochemistry – 4th Edition, MN.Chatterjee, Rana Shine, Jaypee publishers
6. Clinical chemistry in diagnosis and treatment – P.D. Mayne, ELBS/Arnold, N.Delhi.
7. Text book of Biochemistry with Clinical correlation by T.M.Devlin (1994) John Wiley and Sons.

BOOKS RECOMMENDED:

1. Clinical chemistry in diagnosis and treatment, Joan F.Zilva, PR Pannall, Liyods – Luke (medical books ltd., Lon)
2. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd., Vol.I,II,III.
3. Medical Laboratory Science, Theory and Practice J. Ochei and A. Kolhatkar, Tata Mc Graw - Hill.
4. Principles of internal medicine (1998) – Harrison, T.R. Fauci, Branuwalad and Isselbaeher, McGraw Hills.
5. Clinical chemistry – W.J. Marshall and S.K.Bangert (1995)
6. Text books of medicine – K.V. Krishnedas (1996), Jaypee Brothers.
7. Text book of Clinical chemistry –Teitz.
8. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.

PAPER- XVIII
CORE PRACTICAL VII
HEMATOLOGY AND MOLECULAR BIOLOGY
[SUBJECT CODE - P5BIPR41]

Paper Code:

Credits: 3

Hrs: 5Hrs/Week

Total Practical: 15

HAEMATOLOGICAL METHODS

1. Collection and storage of Blood
2. Total RBC count
3. Total WBC count
4. Differential WBC count
5. Total Platelet count
6. Absolute Eosinophil count
7. Determination of Hemoglobin content
8. Determination of Clotting time and Bleeding time
9. Determination of Prothrombin time
10. Determination of ESR
11. PCV
12. Preparation of Blood smear
13. Pathological examination of Blood film
14. Blood grouping & Rh typing, Du- factor
15. Cross matching
16. CBC using cell counter

Molecular Biology

1. SDS – PAGE determination of molecular weight of protein
2. Native gel electrophoresis – SOD, CAT (Activity Staining)
3. Molecular weight determination of DNA
4. ELISA – Demonstration
5. Extraction of genomic DNA and Electrophoresis in agarose gel. (Demonstration)
6. Agarose gel electrophoresis
7. Ligation teaching kit
8. Restriction enzyme digestion and electrophoresis (Demonstration)
9. Plasmid DNA isolation
10. PCR
11. Semidry blotting

REFERENCE BOOKS:

8. Sambrook, J. et al., 2001, Molecular Cloning – A Laboratory Manual. Spring Harbor Laboratory Press, New York.
9. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd., Vol.I,II,III.
10. Text book of Medical Biochemistry – 4th Edition, MN.Chatterjee, Rana Shine, Jaypee Publications.
11. Practical Clinical Biochemistry- Harold Varley, CBS, New Delhi.
12. Text book of Clinical chemistry – Teitz.

13. Experimental procedures in Life Sciences by Dr.S.Rajan & Mrs.R.Selvi Christy. Anjaana Book House.
14. Medical Laboratory Science, Theory and Practice J. Ochei & A. Kolhatkar, Tata Mc Graw - Hill.

SEMESTER -III
PROJECT COURSE WORK - RESEARCH METHODOLOGY
[SUBJECT CODE - P5BIPJ42]

Paper Code:	5
Hrs/Week-	
Credits : 4	Total-
75Hrs	

Objectives: to have knowledge about collection of data, thesis & paper writings and use of various tools in research.

UNIT – I: SCIENTIFIC WRITING

15Hrs

Importance and need for scientific research. Ethics and scientific research. Formulation of hypothesis. Types and characteristics designing a research work. Scientific writing characteristics – logical format for writing thesis and papers. Essential features of abstract. Effective illustration – tables and figures. Reference styles – Harvard and Vancouver systems.

UNIT – II: RESEARCH ETHICS

15Hr

s

Declaration of Bologna. Ethics in animal experimentation. CPSEA guidelines – Animal care and technical personnel environmental, animal husbandary, feed, bedding, water, sanitation and cleanliness, waste disposal, anesthesia and euthanasia. Environment, health and safety.

UNIT – III: RESEARCH PRACTICES

15Hrs

Good laboratory practices, Good clinical practice, (GCP), schedule and phases of clinical trials, composition of (Human) institutional Ethical Committee (IEC) – General ethical issues. Specific principles for chemical evaluation of drugs, herbal remedies and human genetics research, Ethics in food and drug safety. Environmental release of micro organisms and genetically engineered organisms. Ethical issues in human gene therapy and human cloning. FDA and EMA.

UNIT – IV: STATISTICAL METHODS

15

Hrs

Collection and classification of data – Diagrammatic and graphic representation of data – measurement of central tendency – standard deviation – normal distribution – test of significance based on large samples – small samples – student's test – correlation and regression – Chi square test for independence of attributes – ANOVA. Use of SPSS software.

UNIT – V : BIOINFORMATICS

15

Hrs

Introduction to Bioinformatics – database concepts, data base management system, database security, biological databases – types. Sequences and structures. Genome and organism specific database. Data submission and data retrieval. Searching sequence data base sequence similarity searches, Aminoacids substitution matrices. Data base search – FASTA and BLAST and CLUSTAL.

TEXT BOOKS:

1. Research Methodology – Gurumani, MJP publishers
2. Research Methodology – Methods & Techniques.. Kothari, CR, Wishwa Prakashan
3. Research Methodology a hand Book, Misra, RP, Concept Publishing Company, New]
4. Statistical Methods, Sultan Chand & Sons, Gupta, S.P., 1990,
5. How to write a scientific paper R.A. Day.. Cambridge University Press.

BOOKS RECOMMENDED:

1. Krane *et al.*, Fundamental concepts of Bioinformatics, Benjamin Cummings.
2. Sundar rao, Jesudian Richard – An introduction to Biostatistics
3. S.P.Gupta – Fundamentals of Statistics, Sultan Chand
4. Ethics and use of alternatives to animals in research and education, Shiranee Pereira, PCSEA.
5. Ethical guidance for Biomedical Research on Human Subjects, ICMR, NewDelhi, 2000.
6. Cooray P.G. Guide to scientific and technical writing.
7. Carter V. Good and Douglas E. Seats method of research.
8. Alley, Michael. The craft of scientific writing. Angle woods Cliffs. N.N.Prentice (1987).

Core VII – PLANT AND ANIMAL BIOTECHNOLOGY

Semester: III
week: 6

Sub code: P5BT3001 Hrs/
Credits: 4

Unit I

Different culture methods and regeneration protocols for plants; production of haploids, plant hormones and their role in development; embryo culture and embryo rescue technique; Artificial seeds; Protoplast culture and fusion; regeneration of hybrid plants, cybrids.

Unit II

cryopreservation, slow growth and DNA banks for germplasm conservation. Role of DNA markers with special emphasis on RFLPs, linkage analysis, RAPD markers, STS, EST, microsatellites, SCAR, SSCP, AFLP, map based cloning.

Unit III

Transgenic organisms- vector and transformation in plants, transgene stability and gene silencing, chloroplast transformation; Applications of plant transformation for productivity and performance : abiotic stress, use of ACC synthase, polygalacturanase, ACC oxidase, male sterile lines. Applications of plant transformation for productivity, performance and resistance to insects, nematodes, virus, RIP, coat protein mediated, disease resistance, PR proteins.

Unit IV

Basic techniques of scale up of animal cell culture: roller bottles modification of roller bottles, multiunit system and concept of bioreactors including hollow fiber system & their application. Preservation and maintenance of animal cell lines, cryopreservation and transport of animal germplasm (i.e. semen, ova and embryos).

Unit V

Transgenic animals, in vitro fertilization and embryo transfer. Molecular biological techniques for rapid diagnosis of genetic diseases and gene therapy. Ethical issues in animal biotechnology

Reference Books

1. Plant Biotechnology: J. Hammond, P. McGarvey and V Yusibov (Eds):, Springer Verlag, 2000
2. Plant Cell and Tissue Culture for the Production of Food Ingredients: T-J, Fu, G. Singh, and W R Curtis (Eds.), Kluwer Academic/Plenum Press. 1999.
3. Elements of Biotechnology: P K Gupta, Rastogi and Co. Meerut, 2007.
4. An Introduction to Plant Tissue Culture: M K Razdan. Tata Mc Graw Hill Publishing Co. Ltd. 2004
5. The Animal Cell Culture and Technology - Butler M
6. Culture of Animal Cells -Freshney RT

CORE 8 – ENZYMES AND FERMENTATION TECHNOLOGY

Semester: III

Hours : 6

Sub. Code : P5BT3002

Credits : 4

Unit - 1 Introduction of Enzymes - Classification and nomenclature of Enzymes, General properties of enzymes, Lock and Key and induced fit hypothesis, factors influencing Enzyme activity, effect of pH- Temperature - Ions etc. Extraction - assay and purification of enzymes. Steady state kinetics - Michaelis – Menten equation, different types of inhibitors.

Unit – 2 Enzymes structure, function and mechanism: Lysozyme, DNA polymerase and RNase. Mechanism of enzyme catalysis, Role of coenzymes and metals. Regulation of enzyme activity. Allosterism, positive and negative modulations, zymogens, covalent modifications. Clinical and Industrial applications of Enzymes. Immobilizations of Enzymes and their applications. Enzyme engineering. Biosensors and their industrial applications.

Unit – 3 Introduction to Fermentation – Major types of organisms used in fermentation. Microbial growth kinetics, Batch culture, Continuous Culture, Fed – Batch; Types and applications, fermentation kinetics. Media for industrial fermentations – media formulation.

Unit-4 Fermentation process types and control system: Analysis of batch fed batch and continuous fermentation, stability of microbial reactors, analysis of mixed microbial populations, specialized Bioreactors (pulsed, fluidized, Photobioreactors etc). Control of fermentation – design of fermentation control systems, sensors and controllers. Control of incubation, aeration and agitation. Computer application in fermentation technology - off-line / online measurements – PID.

Unit-5 Downstream processing and application of fermentation: Removal of microbial mass and solid matter. Foam separation, filtration, precipitation, centrifugation, cell disruption, liquid – liquid extraction, chromatography, membrane process, drying and crystallization. Fermented foods, industrial production of solvent (glycerol), Alcohol (ethanol), Acid (citric acid), Antibiotic (penicillin) and Amino acids (lysine).

Reference Books:

1. Lehninger, A.L., Nelson, D.L. and Cox, M.M. **Principles of Biochemistry** CBS Publishers and Distributors.

2. Alan Fersht W (1995) **Enzyme structure and Mechanisms**, H. Freeman and Company New York.
3. Nicolas Price & Lewis Stevens (2005) **Fundamentals of Enzymology**, 2nd edition, Oxford Univ. Press, New York, NY.
4. Trevor Palmer **Understanding Enzymes**, Second Edition, J. Wiley & Sons, New York.
5. Voet D & Voet J. D. **Biochemistry**, J. Wiley & Sons, New York.
6. Stryer's **Biochemistry**, H. Freeman and Company, NY.
7. Prescott LM, Harley JP, Klein DA. (1996) **Microbiology**, Wm.C. Brown Publishers.
8. Alba. S, Humphrey, A.E and Millis N.F. (1973) **Biochemical engineering**, Academic press, NY.
9. Atkinson B, (1974) **Biochemical Reactors**, Pion Ltd, London.
10. Stanbury P. F Whittaker A, and Hall S. J. (1995) **Principles of Fermentation Technology**, 2nd Edition, pergamon press, Oxford.
11. Jackson A.T, Prentice Hall and Engelwood Cliffs (1991) **Process engineering in Biotechnology**.
12. Nielson J, Villadsen J (1994) **Bioreactor Engineering Principles**, Plenum Press.
13. Patel **Industrial Biotechnology**.

Practical V – PLANT AND ANIMAL BIOTECHNOLOGY

Semester: III

Sub code: P5BTPR31

Hrs/ week: 3

Credits: 3

1. Sterilization techniques in Plant tissue culture.
2. Preparation of Plant tissue culture media.
3. Callus culture.
4. Isolation of Protoplast
5. Protoplast viability test
6. Immobilization of Plant enzymes.
7. Preparation of Animal tissue culture media.
8. Primary cell culture.
9. MTT Assay.
10. Silver staining of protein.
11. Isolation of DNA from animal source.
12. Isolation of RNA from animal source.
13. Southern Blotting.

PRACTICAL 6 – ENZYMES AND FERMENTATION TECHNOLOGY

Semester: III

Sub. Code: P5BTPR32

Hrs / week : 3

Credits : 3

1. Effect of Substrate concentration on Activity of salivary Amylase.
2. Effect of Substrate concentration on Activity of Invertase.
3. Specific activity of Amylase.
4. Immobilization of enzyme Catalase.
5. Enzymatic Assay of Catalase.
6. Activity of Invertase from Baker's yeast.
7. Effect of NaCl on Amylase activity.
8. Inhibition of Alkaline Phosphatase activity by EDTA.
9. Anatomy of fermenter, cleaning and assembling.
10. Anatomy & calibration of Fermenter electrodes / probes.
11. Production of Biomass, batch, fed – batch and continuous fermentation. - demo
12. Laboratory scale fermentation of Antibiotics.

Reference Books:

1. An Introduction to Practical Biochemistry by Rodney Bayer (2003).
2. Practical Biochemistry by Wilson & Walker (1994) Cambridge University Press.
3. Laboratory Manual of Biochemistry by J. Jayaraman (1988) Wiley Eastern.

4. Molecular cloning by J. Sambrook and D. W Russell (2001)
5. Applied Plant Biotechnology by S. Ignacimuthu (1996) McGraw Hill, New Delhi.
6. Microbiology – A laboratory Manual by J. G Cappuccino and N. Sherman (2004).

Elective 3 –AQUACULTURE BIOTECHNOLOGY

Semester : III

Hrs/ week : 6

Sub. Code : P5BTE301

Credits : 4

Unit 1. Principles of aquaculture and Aqua farm engineering

Definition, history and scope of aquaculture, constraints and recent advances in aquaculture, criteria for selection of species. Design and construction of aqua – hatcheries, aeration in aquaculture types and design, equipments, automatic feeders Heaters ,Thermostats,Filters-Under gravel, power filter.

Unit 2. Fish breeding

Induced breeding, hypophysation, different ovulating agents, hatchery and bundh breeding, multiple breeding, natural collection of seed, live transportation of brood fish and seed.

Unit 3. Feed formulation and Live food culture technology

Types of feeds, feed ingredients and their selection, formulation and preparation of feed, , feed attractants and preservatives. Natural food and their importance. Methods of collection, maintenance and rearing of fish food organisms

Unit 4. Disease diagnosis and Parasitic diseases

Principles of disease diagnosis in fish .Clinical diagnosis, histopathological and haematological methods. Diseases caused by bacteria, fungi and viruses, their prophylactic and therapeutic measures.

Unit 5. Ornamental fish

Aquarium ornamental fishes, their breeding and culture,-Guppy Molly,Gold fish Fighter, Angel and Morph. Common aquarium plants and their multiplication.

Reference Books:

1. Encyclopedia of Ornamental fishes. Herbert Axel rod – T.F.H. pub. NewJercy. (1992)
2. Hand Book of aquarium fishes. Dr.Schultz and H.Axel rod. (1980)
3. Fish and fisheries of India by Jhingran (2000).

Non Major – BIOPHYSICS, BIOSTATISTICS AND BIOINFORMATICS

Semester: III

Sub code: P5BTNM31

Hrs/ week: 6

Credits: 4

Unit I

Thermodynamics - basic concept. Laws of thermodynamics, Enthalpy and Entropy Free Energy- standard free energy. Exothermic and endothermic reactions. Heat dissipation and heat conservation. Primary events in Photosynthesis. Strategies of light reception in microbes, plants and animals. Electrical properties of biological components.

Unit II

Physical methods applied to find out molecular structure: X-ray crystallography and NMR. General Spectroscopy, Lambert-Beer Law, Spectrophotometry & Colorimetry, UV-VIS, Fluorescence, AAS, IR, Raman Spectra.

. Unit III

Collection, classification, Tabulation and diagrammatic and graphical Representation of statistical data: Histogram, pie chart, bar diagram, frequency Polygon and frequency curve.

Measurement of central tendency: Mean, Median, Mode. Measurement of dispersion: Standard Deviation and standard curve.

Unit IV

Introduction to internet use and search engines: www, HTML, URLs, browsers: Netscape (opera) Explorer, Search engines: Google, PubMed, Sequence information sources (Structure and use on web): EMBL, GENBANK, Entrez, Unigene. Protein information sources (Structure and use on web): PDB, Swissprot, TrEMBL

Unit V

Molecular modeling: introduction, dynamic simulation, conformational search, molecular modeling packages (Chem3D, Hyperchem), protein modeling, structure prediction and molecular docking.

Reference Books

1. Practical Biochemistry by K. Wilson and I. Walker 5th edition, Cambridge university press (2000)
2. Biostatistics by P.N. Arora and P. K. Malhan, Himalaya Publishing House.
3. Lesk, A. M. Introduction to Bioinformatics oxford 2002.
4. Krane et al Fundamental concept of Bioinformatics Benjamin cummings.

CORE 9 – ENVIRONMENTAL BIOTECHNOLOGY

Semester: IV
Hours : 6

Sub. Code: P5BT4001
Credits : 4

Unit – 1 Concepts of Ecosystems, Management of Ecosystems, biogeochemical cycling in ecological systems. Response of microbes, plants and animals to environmental stress. Environmental problems – ozone depletion, global warming, green house effects. Soil, Water, Air, Thermal and Nuclear pollution – causes, effects and control measures.

Unit – 2 Microbiology of waste water treatment – Physical, Chemical and Biological waste water treatment methods. Aerobic treatment – Activated sludge process, oxidation ponds, oxidation ditches, trickling filters. Anaerobic treatment – Anaerobic digestion, anaerobic distillery UASB reactor. Role of microphyte and macrophyte in water treatment. Recent approaches to waste water treatment (Reverse Osmosis).

Unit – 3 Solid waste management – sources, types of solid wastes, strategies for solid waste management (composting and methane production), treatment of hazardous wastes. Bioremediation – in-situ and ex-situ bioremediation, phytoremediation of soil metals, bioremediation of contaminated ground water, bioremediation of xenobiotics (hydrocarbons, polychlorinated biphenyls, oil spillage). Use of GMO's in bioremediation (super bug).

Unit – 4 Pesticides and its effects on environment. Bio-pesticides in integrated pest management. Bioplastics – PHA, PHB, Biopol – A. Biofuel – Production of Alcohol, Methane, Hydrogen from Biomass, the future application.

Unit – 5 Scope of Biotechnology in Environmental protection. Non conventional energy resources. Environmental protection Act – Environmental laws, Environmental policies, Environmental ethics and UN declaration. Environment protection and conservation, Environment impact assessment, Eco-planning and sustainable development.

Reference Books:

1. Metcalf and Eddy, (1991) **Wastewater Engineering – Treatment, Disposal and Reuse**, Tata McGraw Hill, New Delhi.
2. Allsopp D and Seal K. J., **Introduction to Biodeterioration**, ELBS / Edward Arnold Cambridge University Press.
3. Cunningham W. P., and Saigo B. W., (1999) **Environmental Science**, 5th Edition, McGraw Hill.
4. Odum E. P., and Barrett G. W., (2005) **Fundamentals of Ecology**, 5th Edition, Thomson Books / Cole.
5. Milton Wain Wright (1999) **An Introduction to Environmental Biotechnology**, Kluwer Acad. Publ. Group, Springer.

6. Nicholas Cheremisinoff P., (2001) **Biotechnology for Wastewater Treatment**, Prentice Hall of India.
7. Gray N. F., (2004) **Biology for Wastewater Treatment**, McGraw Hill.
8. Abbasi S. A and Ramaswami E., (1999) **Biotechnological Methods for Pollution Control**, University Press.

CORE 10 – INDUSTRIAL BIOTECHNOLOGY

Semester: IV

Sub. Code: P5BT4002

Hours : 6

Credits : 4

Unit – 1 General information on microbes based industries – Major classes of commercial products using microbes – Enzymes, Amino acids, Vitamins, Antibiotics, Food and Beverages.

Unit – 2 Industrial use of microorganisms – isolation, preservation and maintenance of microorganisms. Selection of natural variants – important characteristics, screening methods. Strain improvement – Random mutagenesis and site directed mutagenesis. Isolation of induced mutants synthesizing improved levels of primary and secondary metabolites. Microbes exploited commercially – *Saccharomyces*, *Lactobacillus*, *penicillium*, *Acetobacter*, *Bifidobacterium*, *lactococcus*, *streptococcus*.

Unit – 3 Medium requirement for fermentation process – Carbon, Nitrogen, Minerals, Vitamins and other nutrients. Addition of precursors and metabolic regulators to media and medium optimization. Fermenter – Design, Functions and Types. Quorum sensing in Bioprocess.

Unit – 4 Microbial enzymes in food processing – Industrial production of enzymes – proteases, amylas, invertase, pectinase and cellulases. High Fructose Corn Syrup (HFCS). Food products – Cheese, yoghurt, jelly. Beverages – Alcoholic and Non – alcoholic beverages. Food additives and supplements – probiotics, Healthcare products, Nutraceuticals, Vitamins and Antibiotics.

Unit – 5 Mass cultivation of *Spirulina*, Single Cell Proteins (SCP), Petrocrops. Improvement of nutritional value of seed storage proteins. Biofertilizers – *Azospirillum*, *Azolla*, *Rhizobium*, *Frankia*, VAM. Mass production of phosphate solubilizing bacteria. Natural Biopreservatives. Biopolymers. Biopesticides – genetic engineering of plants for pest and herbicide resistance. Current status of industrial biotechnology in India.

Reference Books:

1. Stanbury P. F and Whittaker H., (1997) **Principles of Fermentation Technology**, Aditya Books (Pvt) Ltd, New Delhi.
2. Purohit and Mathur (1993) **Basic and Agricultural Biotechnology**.
3. Prescott and Dunn., **Industrial Microbiology**.
4. Gutierrez Lopez G. f., et. al., (2003) **Food Science and Food Biotechnology**, CRC Publishers, Washington.
5. Waites M. J., et. al., (2007) **Industrial Biotechnology – An Introduction**, Blackwell Publishers, UK.
6. Casida L. E., (2007) **Industrial Microbiology**, Wiley Publishers.

7. Cruegar F and Anne Liese Cruegar (2001) **Industrial Microbiology**.

Core 12 :: Course Work – RESEARCH METHODOLOGY

Semester : IV

Sub. Code : P5BT4003

Hrs/ week : 5

Credits : 4

UNIT-I : Research: Basic and applied research – objectives of research – types of research – criteria of good research – hypothesisation – parameters of research - stages in the execution of research

UNIT II : Journal: Standard research **journals** – impact factor – citation index – information retrieval –databases – search engines – google, pubmed NIC – network services – online data book library - format of journal – proof reading – sources of information – journals, reviews, short communication, books, monograph & bibliography.

UNIT III : Mechanics of writing: Spelling – punctuation – italics – names of persons – numbers – quotations – abbreviations – margins – spacing – heading – corrections – insertions - preparation of manuscript – report writing

UNIT IV : Statistical Methods: Sampling methods –variables – mean, mode, median, SD, SE, correlation & regression, t-Test, ANOVA. Statistical Tools: SSPP10. Bioinformatics Tools: BLAST, RASMOL, NCBI, EMBL & DDBT – protein sequence database – swis port and PDB

UNIT V : Biotechnological Tools: AGE, SDS-PAGE, Gel documentation – Immunotechniques – Blotting techniques – DNA finger printing – RFLP, RAPD, AFLP, PCR

REFERENCES:

1. MLA hand book for writers of research paper. Joseph Gibaldi, 6th edn. Affiliated East-West press Pvt ltd, New Delhi, India
2. Research methodology by Kothari
3. Research methodology by Gurumani
4. Writing the Doctoral Dissertation – Barrons Educational Series 2nd edn, Davis, G.B. and C.A. Parker, 1997
5. Authoring a Ph.D thesis: How to plan, draft, write and finish a doctoral dissertation, Duncary, p. 2003, Mac million Pub.
6. How to write & publish a scientific course, 5th Edn, Robert A. The Oxford Press

Core 11 - HERBAL TECHNOLOGY

Semester : IV
Hrs/ week : 5

Sub. Code : P5BT4004
Credits : 4

Unit I: General Introduction:

Definition, source of herbal raw materials, identification, authentication. Basic Knowledge of Siddha, Ayurvedia, Unani, Homeopathy. Collection and processing of herbal drugs. Seasonal & geographical variations; natural & artificial drying methods. Packaging & labeling of herbal drugs prior to extraction.

Unit 2: Standardizations:

Determination of physical and chemical constants such as extractive values, moisture content, volatile oil content, ash values, bitterness value and foreign matters applicable to the various herbal drugs.

Unit 3: Herbal Formulations:

Principle, methods, single herb formulation, poly-herbal formulation & their merits and demerits. Standardization of various herbal formulations.

Unit 4: Plant Tissue Culture Techniques & its Application in Pharmacy :

Introduction, techniques of initiation and maintenance of various types of cultures. Immobilized cell techniques & biotransformation studies including recent developments in production of biological active constituents in static, suspension and hairy root cultures.

Unit 5: Analysis of Bioactive Components of Natural Sources:

Phyto-chemical standardization of raw herbal extracts and their formulation by using TLC, HPTLC, GC, HPLC, UV& IR techniques.

BOOKS RECOMMENDED:

1. Herbal Drug Technology by S.S. Agrawal & M. Paridhavi
2. Modern Methods of Plant Analysis by Peach & Tracey
3. Biotechnology by S.S. Purohit
4. Quality control of herbal drugs: an approach to evaluation of botanicals by Pulok K. Mukherjee.
5. Pharmacognosy by C.K. Kokate, A.P. Purohit and S.B. Gokhale

**PRACTICAL 7– ENVIRONMENTAL BIOTECHNOLOGY,
INDUSTRIAL BIOTECHNOLOGY AND HERBAL TECHNOLOGY**

Semester: IV	Sub. Code: P5BTPR41
Hrs / week : 3	Credits : 3

1. Rate of O₂ Consumption under temp stress by fish.
2. Estimation of Dissolved Oxygen.
2. Estimation of Total Dissolved Solids / Total Suspended Solids.
3. Estimation of Alkalinity / Salinity.
4. Determination of BOD / COD from sewage sample.
5. Isolation of Xenobiotic degrading bacteria – by selective enrichment technique.
6. Microbial degradation of cellulose.
7. Immobilization of yeast cell.
8. Production of Ethanol.
9. Isolation of industrially important microbes for microbial processes.
10. Microbial production of citric acid using *Aspergillus niger*.
11. Microbial production of Antibiotics.
12. Isolation of Rhizobium from root nodules of higher plants
13. Testing purity of milk by assessing microbial presence.
14. Extraction of phytochemical
15. Test for alkaloid, Flavonoids, Saponins, Terpenoid
16. Extraction methods – aqueous, Ethanolic, etc.

Reference Books:

1. Waste water Engineering – Treatment, Disposal and Reuse. Metcalf and Eddy Inc. Tata McGraw Hill, New Delhi (1991)
2. Principles of Fermentation Technology by PF Stanbury, A. Whittaker and S. J Hall. 2nd Edition, Pergamon Press, Oxford (1995)
3. Molecular Cloning – A Laboratory Manual Vol – I – III by Sambrook et. al., (2001) Cold Spring Harbor Laboratory Press, New York.

M.Sc., (Computer Science)
III Semester DIGITAL IMAGE PROCESSING
[SUBJECT CODE - P5CS3001]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

Objectives: To inculcate a basic training in the processing of images for practical applications in the domain of medical, remoting sessions and in general.

UNIT - I

18 Hours

Introduction: What is Digital Image Processing? – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image processing System – Digital Image Fundamentals: Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationships between Pixels.

UNIT - II

18 Hours

The Image, its Mathematical Background: Overview – Linear Integral Transforms. Data Structures for Image Analysis: Level of Image Data Representation – Traditional Image Data Structures – Hierarchical Data structures. Image Pre-processing: Pixel Brightness Transformations - Geometric transformations – Local pre-processing: Image smoothing, Edge Detectors – Image Restoration.

UNIT - III

18 Hours

Segmentation : Thresholding – Edge Based Segmentation : Edge Image Thresholding, Border tracing - Region Based Segmentation – Matching – Shape Representation and Description: Region Identification – Contour Based Shape Representation and Description- Chain codes, Simple Geometric Border Representation - Region Based Shape Representation and Description, Simple Scalar Region Descriptors.

UNIT - IV

18 Hours

Object recognition: Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems- Mathematical Morphology – Basic Morphological concepts – Binary Dilation and Erosion.

UNIT - V

18 Hours

Image Data Compression: Image Data Properties – Discrete Image Transforms in Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchical and Progressive Compression Methods – Comparison of Compression Methods – Coding –JPEG Image Compression.

Total : 90 Hours

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E.Woods, Digital Image Processing, Prentice Hall, Third Edition, 2008. (Unit-1: Chapter 1-1.1, 1.3, 1.4, 1.5, Chapter 2 -2.1, 2.2, 2.3, 2.4, 2.5).
2. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, Cengage Learning, 2009 (Unit -II: Chapter 3 – 3.1, 3.2 ,Chapter-4, Chapter-5,5.1, 5.2,5.3, 5.3.1, 5.3.2, 5.4
Unit-III: Chapter 6 -6.1, 6.2, 6.2.1, 6.2.3., 6.3, 6.4, Chapter 8 – 8.1, 8.2,8.2.1,8.2.2, 8.3, 8.3.1
Unit-IV: Chapter 9,9.1,9.2, 9.3,9.7, Chapter 13- 13.1, 13.3
Unit-V: Chapter 14- 14.1, 14.2, 14.3, 14.4, 14.5,14.6, 14.8, 14.9,14.9.1)

REFERENCES:

1. Anil.K.Jain, Fundamentals of Digital Image Processing, Prentice-Hall, 1989.
2. Chanda & Majumdar, Digital Image Processing and Analysis, Prentice Hall, 3rdEdition

M.Sc., (Computer Science)
III Semester INFORMATION & NETWORK SECURITY
[SUBJECT CODE - P5CS3002]
(for candidates admitted from 2013-14)

**Subject Code :
25 (CIA)**

Max Marks:100 - 75 (ESE) ,

Objectives:

To study the critical need for ensuring Information Security in Organizations

UNIT I : INFORMATION SECURITY

15 Hours

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

UNIT II : SECURITY INVESTIGATION

15 Hours

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III : SECURITY ANALYSIS

15 Hours

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV: ATTACKS, SERVICES & MECHANISMS:

15 Hours

Security attacks – Security services – Network Security Model. Conventional Encryption: Classical Techniques: Conventional Encryption model - Stenography – Classical Encryption Techniques- Modern Techniques: The Data Encryption Standard – The Strength of DES – Differential and Linear, Crypto-analysis.

UNIT V : PUBLIC KEY CRYPTOGRAPHY:

15 Hours

Principles of public-key cryptosystems – The RSA algorithm - Key management – Diffie-Hellman key exchange – Elliptic curve cryptography

Total :

75 Hours

TEXT BOOK:

1. Principles of Information Security, Michael E Whitman and Herbert J Mattord, Vikas Publishing House, 2003
2. Cryptography and Network security – Principles and Practice , William Stallings, 2nd Edition, Pearson Education, 2002.

REFERENCES:

1. Handbook of Information Security Management, Micki Krause, Harold F. Tipton, Vol 1-3 CRC Press LLC, 2004.
2. Hacking Exposed , Stuart Mc Clure, Joel Scrambray, George Kurtz, Tata McGraw Hill, 2003
3. Computer Security Art and Science, Matt Bishop, , Pearson/PHI, 2002.

M.Sc., (Computer Science)
III Semester BUSINESS INTELLIGENCE AND DATA MINING
[SUBJECT CODE - P5CS3003]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

Objectives:

To expose the students to the concepts of Data warehousing Architecture and Implementation and to Understand Data mining principles and techniques

UNIT I : DATAWAREHOUSE**15 Hours**

Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.

UNIT II : DATAMINING & DATA PREPROCESSING**15 Hours**

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III : ASSOCIATION RULE MINING**15 Hours**

Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV : CLASSIFICATION & PREDICTION**15 Hours**

Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction –

Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V : CLUSTERING

15 Hours

Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

**Total : 75
Hours**

TEXT BOOK:

Data Warehousing, Data Mining, and OLAP , Berson,Alex & Smith, Stephen J, Tata McGraw Hill, 2012

REFERENCES:

1. Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Elsevier, 2nd Edition, Reprinted 2008.
2. Insight into Data mining Theory and Practice, K.P. Soman, Shyam Diwakar and V. Ajay, Easter Economy Edition, Prentice Hall of India, 2006.
3. Introduction to Data Mining with Case Studies, G. K. Gupta Easter Economy Edition, Prentice Hall of India, 2006.
4. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach and Vipin Kumar Pearson Education, 2007

M.Sc., (Computer Science)
III Semester DIGITAL IMAGE PROCESSING LAB
[SUBJECT CODE - P5CSE302]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

LIST OF EXERCISES

1. Arithmetic Operation on Images
2. Bit Planes Slicing
3. Contrast Enhancement
4. Geometric Transforms
5. Low Pass and High Pass Filters
6. Quantization Reduction
7. Reading Writing Images
8. Simple Image Manipulation
9. Spatial Resolution Reduction
10. Water Marking

REFERENCE:
Lab Manual

M.Sc., (Computer Science)
III Semester ADVANCED COMPUTER ARCHITECTURE
[SUBJECT CODE - P5CSE301]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

Objectives :

To provide an exposure to current and emerging trends in computer architecture, focussing on performance and the hardware / software interfaces.

UNIT I : INSTRUCTION LEVEL PARALLELISM

18 Hours

ILP – Concepts and challenges – Hardware and software approaches – Dynamic scheduling – Speculation - Compiler techniques for exposing ILP – Branch prediction.

UNIT II : MULTIPLE ISSUE PROCESSORS

18 Hours

VLIW & EPIC – Advanced compiler support – Hardware support for exposing parallelism – Hardware versus software speculation mechanisms – IA 64 and Itanium processors – Limits on ILP.

UNIT III : MULTIPROCESSORS AND THREAD LEVEL PARALLELISM

18 Hours

Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Introduction to Multithreading.

UNIT IV : MEMORY AND I/O

18 Hours

Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time – Main memory and performance – Memory technology. Types of storage devices – Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.

UNIT V : MULTI-CORE ARCHITECTURES

18 Hours

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – heterogeneous multi-core processors – case study: IBM Cell Processor.

Total :

90 Hours

TEXT BOOK:

Computer architecture – A Quantitative Approach , John L. Hennessey and David A. Patterson,
Morgan Kaufmann, Elsevier Publishers, 4th Edition, 2007.

REFERENCES:

1. Parallel computing architecture : A Hardware/Software approach David E. Culler, Jaswinder Pal Singh, Morgan Kaufmann /Elsevier Publishers, 1999.
2. Scalable Parallel Computing , Kai Hwang and Zhi.Wei Xu, Tata McGraw Hill, 2003.

M.Sc., (Computer Science)
III Semester THEORY OF COMPUTATIONS
[SUBJECT CODE - P5CSNM31]
(for candidates admitted from 2013-14)

Subject Code : **Max Marks:100 - 75 (ESE) ,**
25 (CIA)

Objective : To introduce the advanced concepts in theory of computations and the grammar of context free languages.

UNIT I : AUTOMATA

12 Hours

Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II: REGULAR EXPRESSIONS AND LANGUAGES

12 Hours

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III : CONTEXT-FREE GRAMMARS AND LANGUAGES

12 Hours

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.

UNIT IV : PROPERTIES OF CONTEXT-FREE LANGUAGES

12 Hours

Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM.

UNIT V : UNDECIDABILITY

12 Hours

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP.

Total :

60 Hours

TEXT BOOK:

Introduction to Automata Theory, Languages and Computations, J.E. Hopcroft, R. Motwani and J.D. Ullman, Pearson Education, 2nd Edition, 2007.

REFERENCES:

1. Elements of the theory of Computation , H.R. Lewis and C.H. Papadimitriou, Pearson Education, 2nd Edition, 2003.
2. An Introduction to the Theory of Computer Science, Languages and Machines, Pearson Education, Thomas A. Sudkamp, 3rd Edition, 2007.
3. Fundamentals of Theory of Computation, Principles and Practice , Raymond Greenlaw and H. James Hoover, Morgan Kaufmann Publishers, 1998.
4. Introduction of the Theory and Computation, Micheal Sipser, Thomson Brokecole, 1997.
5. Introduction to Languages and the Theory of computation , J. Martin, 3rd Edition, Tata Mc Graw Hill, 2007

**M.Sc., (Computer Science)
IV Semester CLOUD COMPUTING
[SUBJECT CODE - P5CS4001]
(for candidates admitted from 2013-14)**

**Subject Code :
25 (CIA)**

Max Marks:100 - 75 (ESE) ,

Objectives :

To introduce the concepts of cloud and related terms and various cloud services present currently.

UNIT – I : BASIC TERMINOLOGY

18 Hours

Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

UNIT – II : CLOUD COMPUTING FOR EVERYONE

18 Hours

Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping schedules managing projects, presenting on road.

UNIT – III : USING CLOUD SERVICES

18 Hours

Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.

UNIT – IV : OUTSIDE THE CLOUD

18 Hours

Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis

UNIT – V : STORING AND SHARING

18 Hours

Understanding cloud storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.

**Total :
90 Hours**

TEXT BOOK:

Cloud Computing , Michael Miller, Pearson Education, New Delhi, 2009

REFERENCES :

Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education, 2013

M.Sc., (Computer Science)
IV Semester HUMAN COMPUTER INTERACTION
[SUBJECT CODE - P5CS4001]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

Objectives :

To enable students to understand the various meanings of usability and how to build usability in products, product interfaces and product information.

UNIT - I

12 Hours

Introduction : Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - II

12 Hours

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT - III

12 Hours

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - IV

12 Hours

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - V

12 Hours

Software tools – Specification methods, interface – Building Tools. Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

Total : 60 Hours

TEXT BOOKS :

1. The Essential Guide to User Interface Design, Wilbert O Galitz, Wiley Dream Tech.
2. Designing the User Interface, Ben Shneidermann, Pearson Education Asia, 3rd Edition.

REFERENCES :

1. Human – Computer Interaction, Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson.
2. Interaction Design, Prece, Rogers, Sharps. Wiley Dream Tech,
3. User Interface Design, Soren Lauesen , Pearson Education.

M.Sc., (Computer Science)
IV Semester PRINCIPLES OF COMPILER DESIGN
[SUBJECT CODE - P5CS4003]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

Objectives :

To provide an introduction to the system software like assemblers, compilers and macros. It provides the complete description about inner working of a compiler.

UNIT I : LEXICAL ANALYSIS

18 Hours

Introduction to Compiling- Compilers-Analysis of the source program-The phases- Cousins-The grouping of phases-Compiler construction tools. The role of the lexical analyzer- Input buffering-Specification of tokens-Recognition of tokens-A language for specifying lexical analyzer.

UNIT II : SYNTAX ANALYSIS and RUN-TIME ENVIRONMENTS

18 Hours

Syntax Analysis- The role of the parser-Context-free grammars-Writing a grammar- Topdown parsing-Bottom-up Parsing-LR parsers-Constructing an SLR(1) parsing table. Type Checking- Type Systems-Specification of a simple type checker. Run-Time Environments-Source language issues-Storage organization-Storage-allocation strategies.

UNIT III : INTERMEDIATE CODE GENERATION

18 Hours

Intermediate languages-Declarations-Assignment statements - Boolean expressions- Case statements- Backpatching-Procedure calls

UNIT IV : CODE GENERATION

18 Hours

Issues in the design of a code generator- The target machine-Run-time storage management-Basic blocks and flow graphs- Next-use information-A simple code generator-Register allocation and assignment-The dag representation of basic blocks - Generating code from dags.

UNIT V : CODE OPTIMIZATION

18 Hours

Introduction-The principle sources of optimization-Peepphole optimization- Optimization of basic blocks-Loops in flow graphs- Introduction to global data-flow analysis-Code improving transformations.

Total :

90 Hours

TEXT BOOK:

Compilers- Principles, Techniques and Tools , Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Pearson Education Asia, 2007.

REFERENCES:

1. Modern Compiler Design , David Galles, Pearson Education Asia, 2007
2. Advanced Compiler Design & Implementation, Steven S. Muchnick, Morgan Kaufmann Pulishers, 2000.
3. Crafting a Compiler with C, C. N. Fisher and R. J. LeBlanc, Pearson Education,2000.

M.Sc., (Computer Science)
IV Semester COMPILER DESIGN LAB
[SUBJECT CODE - P5CSPR41]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

LIST OF EXERCISES

1. Construction Of NFA
2. Construction Of Minimized DFA
3. Implementation Of Lexical Analyser Using Lextool
4. Implementation Of Symbol Table
5. Construction Of Operator Precedence Parse Table
6. Syntax Analysis Using YACC
7. Implementation Of Shift Reduce Parsing Algorithm
8. Construction Of LR Parsing Table
9. Implementation Of Intermediate Code Generation
10. Implementation Of Code Optimization Techniques

11. Conversion Of Infix To Postfix Expression
12. Implementation Of Quadraples
13. Implementation Of Triples
14. Generation Of Tokens For Given Lexeme
15. Parsing The String

REFERENCES:

Lab Manual

M.Sc., (Computer Science)
IV Semester EMBEDDED SYSTEMS
[SUBJECT CODE - P5CSE401]
(for candidates admitted from 2013-14)

Subject Code :
25 (CIA)

Max Marks:100 - 75 (ESE) ,

Objectives :

To learn the method of designing real time systems.

UNIT I : EMBEDDED COMPUTING

12 Hours

Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

UNIT II : MEMORY AND INPUT / OUTPUT MANAGEMENT

12 Hours

Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.

UNIT III : PROCESSES AND OPERATING SYSTEMS

12 Hours

Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.

UNIT IV : EMBEDDED SOFTWARE

12 Hours

Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers.

UNIT V : EMBEDDED SYSTEM DEVELOPMENT

12 Hours

Design issues and techniques – Case studies – Complete design of example embedded systems.

Total :

60 Hours

TEXT BOOKS:

1. Computers as Components: Principles of Embedded Computer System Design , Wayne Wolf, Elsevier, 2006.
2. Embedded C , Michael J. Pont, Pearson Education , 2007.

REFERENCES:

1. Embedded System Design , Steve Heath, Elsevier, 2005.
2. The 8051 Microcontroller and Embedded Systems , Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, Pearson Education, 2nd edition, 2007.

ISLAMIAH COLLEGE (AUTONOMOUS)

M.A.HISTORY

VANIYAMBADI

III SEMESTER CORE PAPER IX

SOCIAL AND CULTURAL HISTORY OF INDIA

FROM 1857 TO 2010 AD [SUBJECT CODE - P5HI3001]

UNIT I

Education in India: Growth and Development of Education in British India – Dr. Radhakrishnan Commission – University Grants Commission – Kothari Commission – New Education Policy of 1986, 1992 and 2005

UNIT II

Social Reform Movements in British India: Hindu, Muslim, Sikh and Parsi

UNIT III

Peasant Movements: Agrarian Crisis – Mappila Rebellion

UNIT IV

Trade Union Movements and Its Impact

UNIT V

Art and Architecture – Cultural Development – National Academies

Books for Reference

1. Chandra, Bipin : India's Struggle for Independence, Penguin Books, New Delhi, 2000.
2. Chandra, Bipin, : India Since Independence , New Delhi, 2002.
3. Chandra Bipin, : Nationalism and Colonialism in Modern India, Orient Longman, New Delhi, 1999.
4. Majumdar, R.C, RayChaudhari, H.C and Kalikinkar Datta: An Advanced History of India, Macmillan Press, Madras, 1998.
5. Jones, Kenentah.W : Socio - Religious Reform Movements in British India, The New Cambridge History of India Series, Foundation Books, Cambridge University Press, New Delhi, 1994.

6. Sarkar, Sumit : Modern India 1885-1947, Macmillan Press, New Delhi, 2002

ISLAMIAH COLLEGE (AUTONOMOUS)

M.A.HISTORY

VANIYAMBADI

III SEMESTER CORE PAPER X

HISTORY OF MODERN CIVILIZATIONS

[SUBJECT CODE - P5HI3002]

UNIT I

Geographical Discoveries – Renaissance – Reformation and Counter Reformation

UNIT II

French Revolution – Russian Revolution – Chinese Cultural Revolution

UNIT III

Industrial Revolution – Agricultural Revolution

UNIT IV

First World War – League of Nations - Second World War – UNO

UNIT V

Scientific, Intellectual and Technological Movements of the 19th & 20th Centuries –
Inventions of the 20th Century – Information Technology Revolution

Books for Reference:

1. C.D.M. Kettleby, A History of Modern Times, S. Chand & Co.
2. C.D. Hazen, Modern European History, S. Chand & Co.
3. Ralph M. Stair, George Reynolds, George W. Reynolds, Fundamentals of Information Systems, Cengage Learning, 2008

ISLAMIAH COLLEGE (AUTONOMOUS)

VANIYAMBADI

CORE PAPER XI

M.A. HISTORY

III SEMESTER

HISTORIOGRAPHY

[SUBJECT CODE - P5HI3003]

UNIT I

Meaning, Nature and Scope of History – Kinds of History – Use and abuse of History –
History as a Science or an Art

UNIT II

History and other Social Sciences: History and Geography – History and Economics –
History and Psychology – History and Sociology – History and Political Science –
History and Literature

UNIT III

Causation in History: Theories of Causation – Divine Plan – Rationalist Theory –
Nationalist Theory – Scientific Theory – Historical Schools

UNIT IV

Research Methodology: Selection of Topic – Historical Sources – External and Internal
Criticism – Footnotes and Synthetic Operation

UNIT V

Indian Historiography – Ancient: Banabhatta – Bilhana and Kalhana – Medieval: Alberuni – Moulana Ziauddin Barani – Abdul Hamid – Modern: Sri Willam Jones – Jadunath Sarkar – K.M. Panikkar – Irfan Habib and Sheik Ali

Books for Reference:

1. Sheik Ali, History: Its Theory and Methods (New Delhi: Macmillan, 1980).
2. C.R. Kothari, Research Methodology: Methods and Techniques (New Delhi: 2002).
3. Estelle M. Phillips and D.S. Pugh, How to get a Ph.D.: A Handbook for Students and their Supervisors (New Delhi: UBS Publishers, 1987).

**ISLAMIAH COLLEGE (AUTONOMOUS)
VANIYAMBADI
CORE PAPER XII**

**M.A. HISTORY
III SEMESTER**

HISTORY OF THE OTTOMAN EMPIRE

[SUBJECT CODE - P5HI3004]

UNIT I

The Origin of Ottoman Turks – Rise of Osmanlis – Establishment of the Kingdom – Administration under Orkhan – The Janissanis – Penetration in Europe

UNIT II

Muhammad II – The conquest of Constantinople – His achievements

UNIT III

Sulaiman the Magnificent – Reforms – Expansion and administration of the empire – The Ottoman as a World Power

UNIT IV

Administration and Military organization of the Ottomans

UNIT V

Development of Art, Architecture and Literature – Decline of the Ottoman Empire

Books for Reference:

1. Sir Edward Creasy: Ottoman Turks
2. Stanley Lane Pool: Turkey
3. Gibbon, H.R. : The Foundation of the Ottoman Empire
4. P.K. Hitti : History of the Arabs
5. Ameer Ali : A Short History of the Saracens

**ISLAMIAH COLLEGE (AUTONOMOUS)
VANIYAMBADI
ELECTIVE III**

**M.A. HISTORY
III SEMESTER**

INTELLECTUAL HISTORY OF THE 20th CENTURY INDIA

[SUBJECT CODE - P5HIE301]

UNIT I

India at the beginning of the 20th Century – Political Condition – Social Condition – Economic Condition – Course of Freedom Movement

UNIT II

Political Thought: B.G. Tilak – Lala Lajpat Rai – B.C.Pal – Mahatma Gandhi – B.R. Ambedkar – S.V. Patel – Subhash Chandra Bose – Jawaharlal Nehru – Moulana Abul Kalam Azad – Zakir Hussain – Jayaprakash Narayan – Indira Gandhi

UNIT III

Social Thought: Sir Syed Ahmed Khan – Vinoba Bhave – Dr.Muthulakshmi Reddy – Periyar E.V.R – Mother Theresa

UNIT IV

Socialists and Communists: M.N.Roy – S.A.Dange – Ram Manohar Lohia – E.M.S. Namboodripad

UNIT V

Litterateurs: Rabindranath Tagore – Muhammed Iqbal – Subramaniya Bharathi – Thiru.Vi.Ka. – Sarojini Naidu – Bharathidasan – Kavikko Abdul Rahman

Books for Reference

1. Ahluwalia, B.K: Sardar Patel – Rebel and Ruler, Akbe Group, New Delhi, 1981. Shashi Ahluwalia
2. Bharathi: Mahatma Gandhi, Man of the Millennium, S. Chand & Co, New Delhi, 2000.
3. D.K .Publications: On Periyar, Chennai.
4. Gopalakrishnan, M.D.: Periyar, Father of Tamil Race, Emerald Publishers, Chennai.
5. Grover, B.L. & Grover, S.: A New Look at Modern Indian History, (From 1707 to the Modern Times), S. Chand & Co, New Delhi, 2006.

**ISLAMIAH COLLEGE [AUTONOMOUS]
VANIYAMBADI
NON-MAJOR**

**M.A. HISTORY
III SEMESTER**

CONSTITUTION OF INDIA [SUBJECT CODE - P5HINM31]

UNIT I

Origin and nature of the Constitution: Constituent Assembly and framing of the Constitution – Preamble – Salient Features of the Indian Constitution – Fundamental Rights – Fundamental Duties – Directive Principles of the State Policy

UNIT II

Union and State Executive: President of India – Election – Qualifications – Term of Office – Emoluments – Powers and Duties of the President – Vice President of India- Election – Qualifications – Term of Office – Emoluments – Powers and Duties of the Vice President – Council of Ministers – Ministerial Responsibilities – Powers and Functions of State Governor – State Council of Ministers – Indian Federalism at work

UNIT III

Union and State Legislature: Nature of Bicameral Legislature – Composition of Rajya Sabha and Lok Sabha – Elections and Quaifications – Powers and Functions of the Legislature – Powers and Functions of the Speaker and Deputy Speaker of Lok Sabha,

Chairman and Vice Chairman of Rajya Sabha – State Legislative Council and Assemblies- Procedure of Amendments and Important Amendments

UNIT IV

Judiciary: Supreme Court – Composition, Powers and Functions – High Courts in the States – Judicial System of States – Impeachment procedure – Judicial Review- Important Judicial Decisions

UNIT V

Local Self-Government: 73rd and 74th Amendments and its Features – State Election and Finance Commission – Three Tier System of Rural Panchayats - Municipal and Corporation Administration – Reservation for Schedule Caste , Schedule Tribes and Women

Books for Reference

1. Basu, D.D. Introduction to the Constitution of India, LexisNexis Butterworths Wadhwa Nagpur, Gurgoan, 2008.
2. Pylee, M.V. India's Constitution, S.Chand & Company, New Delhi, 2005.
3. Johari, J.C. The Constitution of India, Sterling Publishers Pvt Ltd, New Delhi, 2004.

M.A.HISTORY

IV SEMESTER

CORE PAPER XIII

HISTORY OF USA FROM 1865 TO 2010 AD [SUBJECT CODE - P5HI4001]

UNIT I

Reconstruction – Rise of Big Business – Rail Roads – Growth of Industry – Labour Movement – Granger and Populist Movement – Growth of Imperialism – The Spanish-American War of 1898

UNIT II

Open Door Policy – Theodore Roosevelt – Progressive Reforms – Foreign Policy – W.H. Taft – Dollar Diplomacy – Woodrow Wilson – New Freedom – USA and the First World War – 14 Points – Treaty of Versailles

UNIT III

Warren Harding – Coolidge Prosperity – Hoover – Great Depression – Franklin D. Roosevelt – New Deal – Good Neighbour Policy – USA and Second World War

UNIT IV

Domestic and Foreign Policy of Harry.S. Truman – Cold War – D. Eisenhower – John. F. Kennedy – Internal Policy – Foreign Policy – Civil Rights Movement – Martin Luther King

UNIT V

Lyndon.B. Johnson – Richard Nixon – Gerald Ford – Jimmy Carter – Ronald Reagan – George Bush – Gulf War and Saddam Husain – End of the Cold War – Bill Clinton – Bush – Barack Obama

Books for Reference

1. Beard and Beard: New basic History of the United States
2. Hill. C.P.: History of the United States, Edward Arnold, London, 1974.
3. Hofstadter: The American Republic, Vol 1, Upto 1865, Prentice – Hall Miller & Arooran. K Engle Wood Cliffs, New Jersey, 1959.
4. Nambi Arooran. K.: History of United States of America (Tamil), TamilNadu Text Book Society, Government of Tamil Nadu, Cehnnai, 1975
5. Parkes, H.B.: The United States of America – A History Khosla Publishing House, Delhi, 1986.

ISLAMIAH COLLEGE [AUTONOMOUS]

VANIYAMBADI

SEMESTER

CORE PAPER XIV

HISTORY OF CHINA FROM 1900 TO 2000 AD

[SUBJECT CODE - P5HI4002]

UNIT I

China under the Manchus – Boxer Movement – Reforms – Political, Social and Economic Conditions – Fall of Monarchy – Revolution of 1911 – Dr. Sun Yat Sen

UNIT II

M.A. HISTORY

IV

Yuan Shi Kai's Presidency – First World War and China – Twenty one Demands –The Paris Peace Conference and China – May Fourth Movement – War Lords – Washington Conference

UNIT III

The Kuomintang – Economic, Social, Intellectual and Cultural Progress of China up to 1931 – The Nationalist Government – Domestic Policies from 1929 to 33 – Chiang-Kai-Shek

UNIT IV

Second Sino-Japanese War – China and the World War II – Growth of Communism – Civil War – Rise of Mao-Tse-Tung – People's Republic of Taiwan

UNIT V

The Establishment of People's Republic of China – Political, Social, Economic Conditions –Cultural Revolution – Deng Ziao – Peng – Reorganization of Communism – 1982 Constitution – Foreign Policy up to 2000 AD

Books for Reference

1. Ahamed, L.L.: History of the Far East in Modern Time, S.Chand 7 Co.Ltd, Ram Nagar, New Delhi-55,1981
2. Clyde and Beers: The Far East, prentice hall of India Pvt Ltd, New Delhi-1, 1977.
3. Chatterji, B.R : Modern China, Meenakshi Prakashan, Begum Bridge, Meerut, 1974.
4. Gupta.R.S. History of Modern China. Sterling Publishers, New Delhi-16, 1974.
5. Latourette, K.S : The Chinese, Their History and Culture.

**ISLAMIAH COLLEGE (AUTONOMOUS)
VANIYAMBADI
CORE PAPER XV**

**M.A. HISTORY
IV SEMESTER**

HISTORY OF ENGLAND FROM 1603 TO 1901 AD [SUBJECT CODE - P5HI4003]

UNIT I

Early Stuarts – James I and his relation with Parliament – Charles I – Long Parliament – Policy of Early Stuarts –Civil War

UNIT II

Common Wealth and the Protectorate – Cromwell – Foreign Policy – Constitutional Experiments – The Restoration

UNIT III

Later Stuarts – Charles II – Foreign and Domestic Policy – Origin of the Party System in Britain –James II – Glorious Revolution – William III and Mary – Queen Anne

UNIT IV

The Hanoverian Period – George I and II – Cabinet System under the first two Georges – George III – War of Independence

UNIT V

Revolutionary Era – French, Industrial and Agrarian Revolutions – Humanitarian Movements – George IV – William IV – Victorian Era 1837-1901

Books for Reference:

1. Carter & Mears – History of Britain
2. R.J. White – A Short History of England
3. L.C.B. Seaman – A New History of England
4. David Thomas – England in the 20th Century

**ISLAMIAH COLLEGE [AUTONOMOUS]
VANIYAMBADI
CORE PAPER XVI**

**M.A. HISTORY
IV SEMESTER**

HISTORY OF WEST ASIA FROM 1900 TO 2000 AD [SUBJECT CODE - P5HI4004]

UNIT I

Background History of West Asia – Arab Nationalism – First World War and West Asia – Balfour Declaration

UNIT II

Peace Treaties after First World War – British and French Mandates – Birth of Israel – Arab Jewish Conflict

UNIT III

Emergence of Arab Nations after First World War – Syria – Iraq – Jordan – Saudi Arabia – Second World War and West Asia

UNIT IV

Rise of Arab Nations after Second World War – Lebanon – UAR – UAE – Qatar and Bahrain – Yemen – Oman – Kuwait – Gulf War

UNIT V

CENTO – OPEC – PLO – Nixon and Kissinger – Regan Camp David Agreement – Formation of Palestine – Role of UNO in Peace Maintenance

Books for Reference:

1. Majumdar and Srivastava: History of Middle East, Surjeet Publications, Delhi.
2. Kirk. G. E: A Short History of Middle East, Surjeet Publications, Delhi.
3. Fisher Sydney Netland: The Middle East A History, Routledge and Kegan Paul, London.
4. Wilber Domnald N: Iran – Past and Present, Princeton University Press, New Jersey.
5. Leoinard Binder: Iran Political Development in a Changing Society, University of California.

**ISLAMIAH COLLEGE (AUTONOMOUS)
VANIYAMBADI**

**M.A. HISTORY
IV SEMESTER**

ELECTIVE IV

GROWTH OF PANCHAYATI RAJ INSTITUTIONS IN INDIA (WITH SPECIAL REFERENCE TO TAMIL NADU)

[SUBJECT CODE - P5HIE401]

UNIT I

Historical Setting – Self-Governing Village System in Ancient India – Vedic Period and Chola Period – Village as an Autonomous Self-Governing Unit in Pre-British Period and Its Decline – Local Self-Governance – Lord Mayo and Lord Rippon – Contribution Of Gandhiji

UNIT II

Balwantarai Mehta Committee Report – Ashok Mehta Committee Report – 73rd Constitutional Amendment Act – Implications of Panchayathi Raj System

UNIT III

Panchayat Raj in Tamilnadu since Independence – Salient Features of Tamil Nadu Panchayat Act 1994

UNIT IV

Powers and Functions: Functionaries and Finance of Village Panchayat, Panchayat Union and District Panchayat

UNIT V

Finance Commission – Election Commission – District Planning Committee – Critical Evaluation of Tamil Nadu Panchayat Act 1994

Books For Reference:

1. G. Palanithurai, Empowering People for Prosperity: A Study In New Panchayati Raj System (New Delhi: Kanishka Publications, 1995).
2. S. Malcom Adhishesaiyah And Et. Al., Decentralized Planning and Panchayati Raj ((New Delhi: Concept Publishing Company, 1994).

COMMONWEALTH LITERATURE [SUBJECT CODE - P5EN3001]

CORE COURSE IX

SEMESTER III

UNIT – I POETRY

Australia – Judith Wright
England - P.K. Page

Fire at Murdering Hut
Adolescence

New Zealand -

The Noosing of the Sun-God

UNIT – II POETRY

The West Indies - Derek Walcott

A Far Cry from Africa

Africa – David Rubadiri

A Negro Labourer in Liverpool

Canada- F.R. Scott

The Canadian authors' meet

UNIT – III PROSE

INDIA – M.K.GANDHI

The Story of My Experiments with Truth

UNIT – IV DRAMA

Nigeria – Wole Soyinka

The Lion and the Jewel

UNIT – V FICTION

Nigeria – Chinua Achebe

Things Fall Apart

Canada- Margaret Atwood

Surfacing

REFERENCES

Margaret J.O'Donnell. An Anthology of Commonwealth Verse, Madras: Blackie.

C.D. Narasimhaiah. An Anthology of Commonwealth Poetry, Madras: Macmillan

LITERARY THEORY AND CRITICISM - I [SUBJECT CODE - P5EN3002]

CORE COURSE X

SEMESTER III

UNIT – I

Introduction to Classical Literary Criticism (Plato, Aristotle and Sydney)

UNIT – II

Johnson Preface to Shakespeare

Wordsworth Preface to the Lyrical Ballads

UNIT – III

Arnold Study of Poetry

T.S.Eliot Tradition and Individual Talent

UNIT – IV

Literary criticism – Feminism (Showalter)

UNIT – V

N.Frye Archetypes of Literature

Reference Books:

1. Literary Criticism: Seetharama, Macmillan Publishers. (Unit III & IV)

2. Postmodernism for Beginners (Unit V)

ENGLISH LANGUAGE TEACHING [SUBJECT CODE - P5EN3003]
CORE COURSE XI
SEMESTER III

UNIT-I

English Language Teaching in India

UNIT- II

Psychology of Language Learning

Theories of Language Learning

Cognitive-Code

Behavior theory

First Language acquisition and Second Language learning

UNIT- III

Methods and Approaches of Teaching English

Translation method – Direct method – Bilingual method – Structure approach –

Situational approach – Eclectic approach

UNIT- IV

Curriculum Design

Modern concept of curriculum - Curriculum and Education – Need and importance of curriculum – Types of curriculum

UNIT- V

Audio – visual aid in teaching English

Importance of audio- visual aids – choice of visual aids – chart and tables – flash cards – cue sheets – OHP – slide projector – language laboratory.

REFERENCES

Howall A.P.R. A History of English Language Teaching, OUP, 1984

Richards, J and Rodgers, S. Approaches and Methods in Language Teaching, Cambridge University Press, 2001

David Nunan, Language Teaching Methodology, Prentice Hall, 1991

Dr. S. V. Shrangare. English Language Teaching. Swasthik Publication, Delhi.

CONTEMPORARY LITERARY THEORIES [SUBJECT CODE - P5EN3004]
CORE COURSE XII
SEMESTER III

UNIT – I

Jacques Derrida- Structure, Sign and Play in the Discourse of Human Sciences

UNIT – II

Sigmund Freud: Interpretation of Dreams

Stanley Fish: Is there a text in this Class?

UNIT – III

Stephen Greenblatt: Shakespeare and the Exorcists

UNIT – IV

Louis Althusser: Ideology and Ideological State Apparatuses

UNIT – V-

Elaine Showalter: Towards a Feminist Poetics

Ania Loomba: Situating Colonial and Post Colonial Studies

John Fiske: Culture, Ideology, Interpellation

REFERENCES

Literary Theory: An Anthology II ed. Julie Rivkin and Michael Ryan. Australia:

Blackwell Publishing Ltd. 1998

The English Critical Tradition Vol.1 and 2. Ed. S.Ramasami and V.S.Sethuraman.

Macmillan:Chennai 1978

Contemporary Criticism: An Anthology, Ed. V.S. Sethuraman. Macmillan: Chennai 1989

TECHNICAL WRITING [SUBJECT CODE - P5ENE301] ELECTIVE COURSE III SEMESTER III

UNIT I

Definition and Concept of Technical Writing

UNIT II

Writing Process – Prewriting, Writing and Rewriting; the Rationale; the Process; Writing Effective Sentences; Structure of a Paragraph; Writing Effective Paragraphs

UNIT III

Instructions and User Manuals; Writing Summaries, Reports and Proposals

Writing different kinds of letters, memos, CV, E-mail communication, Presentation

UNIT IV

Technical Writing Today, Case Studies, Designs and Layout, Computer Skills, Production.

UNIT V
Practical Exercises for Technical Writing

REFERENCES

Communication Skills for Technical Students. T.M. Farhatullah: Orient Longman, Chennai, 2002

Science and Technical Writing: A Manual of Style. Philip Rubens. Routledge NY, 2004

Writing Remedies: Practical Exercises for Technical Writing. Edmund H Weiss.

Hyderabad University Press, 1990

COMPUTER LITERACY IN TEACHING LANGUAGE & LITERATURE [SUBJECT CODE - P5ENNM31] NON MAJOR SEMESTER III

Unit I

About Windows – My Computer – My documents – Recycle Bin – Wall Paper – Screen Saver - Time and Date – Windows Accessories – Resizing and Moving a Window

Unit II

Formatting in MS Word – Formatting the text – Text Effects – Aligning the text – Applying Border and Shading – Adding Bullets and Numbering

Unit III

Microsoft Office PowerPoint

– Starting – Title Bar – Ribbon – Quick Access Tool Bar – Slides/Outline Pane – Creating a new presentation – Inserting Slides – Saving – Slide show – Closing the Presentation – Opening a saved file

Unit IV

Microsoft Office Publisher

-to create Newsletters, Web Page, Poster, Chart and Certificate

Unit V

Apps [Applications] – Vocaroo – Skype – Blogging – Podcast

Reference Book

Peter Norton- Introduction to Computers 2009 7th Ed, TMH Publication

LITERARY THEORY AND CRITICISM – II [SUBJECT CODE - P5EN4001] CORE COURSE XIII SEMESTER IV

UNIT – I

Lionel Trilling	Sense of the Past
Cleanth Brooks	The Language of Paradox

UNIT – II

Georg Lukacs	Ideology of Modernism
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UNIT – III

Jacques Lacan	Of Structure As An In mixing of an Otherness Prerequisite to any Subject Whatever
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UNIT – IV

Said	From Orientalism- Extract in Modern Criticism And Theory
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UNIT – V

Barthes	Death of the Author
Foucault	From Archeology Of Knowledge

Reference Books:

Theory of Criticism: David Lodge
20th Century Reader: David Lodge

SOFT SKILLS [SUBJECT CODE - P5EN4002]
CORE COURSE XIV
SEMESTER IV

UNIT – I

Communication - Body language, facial expression, humor, eye contact, tone of voice, etiquette

UNIT – II

Empathy - Honesty, cultural diversity, ability to take other's point of view, integrating Cognitive and affective skills

UNIT – III

Intrapersonal - Self-management, self-esteem, self-awareness, self-regulation, self-critique

UNIT-IV

Interpersonal - Team work, persuasion, negotiation, conflict resolution, Reading social situations, learning to say no, active listening

UNIT – V

Leadership - Critical, lateral, strategic thinking, delegation, taking responsibility, giving praise, appreciation, giving and receiving feedback, ability to motivate, problem solving.

REFERENCES

Working with Emotional Intelligence. Daniel Coleman.

How to Develop Self Confidence and Influence People by Public Speaking. Dale Carnegie.

[Unit I- Body Language: Alan Pease]

JOURNALISM AND MASS COMMUNICATION
[SUBJECT CODE - P5EN4003]
CORE COURSE XV
SEMESTER IV

UNIT-I

Introduction to Journalism and Mass Communication - Growth of Journalism and its impact on society - Radio Journalism - T.V journalism- Growth, Impact, Merits and Demerits

UNIT-2

Introduction to Journalism and Mass Communication - Print Journalism - Role of Cinema as a Mass Medium - Investigative Journalism

UNIT-3

Newspaper Organization - Reporting: Ethics of Good Reporting, T.V. Reporting, Radio Reporting etc. - Feature Writing: Economic, Politics, Sports etc. -Editing, Organization and Presentation - Presenting Book Reviews

UNIT-4

Aspects of communicative Studies - Definition of Communicative Studies - Communicative Terms and Principles- Communicative Purpose and Setting

UNIT-5

Communicative Skills – Skimming – Scanning – Referencing – Coding – Decoding - Transcoding - Advertising

REFERENCE BOOKS

Mass Communication and Journalism in India. D.S. Mehta
Theory and Practice of Journalism. B.M.Ahuja
News Reporting and Editing-K.M. Shrivastava : Sterling Publishers. Bangalore 1987.

WOMEN'S WRITING IN ENGLISH

[SUBJECT CODE - P5EN4004]

CORE COURSE XVI

SEMESTER IV

UNIT I POETRY

Elizabeth Barret Browning: A Dead Rose
Sylvia Plath: Blackberrying
Maya Angelou: I Know Why The Caged Bird Sings
Kamala Das: An Introduction

UNIT II PROSE

Virginia Woolf: A Room of One's Own
Arundhati Roy: How deep shall we dig?

UNIT III DRAMA

Maha Sweta Devi: Mother of 1084
Caryl Churchill: Serious Money

UNIT IV FICTION

Jhumpa Lahiri: The Namesake
Margaret Atwood: The Handmaid's Tale

UNIT V GENERAL

Mary Wollstone Craft: A vindication of the Rights of women
Elaine Showalter: A literature of their own

M.A ENGLISH

SEMESTER IV

ELECTIVE PAPER V

ANATOMY OF LITERATURE [SUBJECT CODE - P5ENE401]

UNIT-I : THE ANATOMY OF PROSE

The form of prose - vocabulary - grammar and idiom written and spoken prose - the paragraph - prose rhythm - individual and common style - common style and cheap style - simplicity and ornamentation - objective and subjective - abstract and concrete - realism, romance and unreality - special inventions - prose for its own sake - the historical approach - the science of rhetoric - writing prose

UNIT-II : THE ANATOMY OF POETRY

The importance of form - the physical form of poetry - metre - variation - rhyme - onomatopoeia - internal pattern - form in intonation - repetition - the main types of poetry - logical sequence - the use of associations - patterns of imagery - traditional verse forms - free verse - the choice of words - illustrations - cautions - twentieth - century techniques.

UNIT-III : THE ANATOMY OF NOVEL

The concept of fiction - verisimilitude - the point of view - plot - character - character revealed - conversation - scene and background - dominant themes - the experimental novel

UNIT-IV : THE ANATOMY OF DRAMA

Live literature - action - plots - conventional divisions - direct experience of characters - dialogue and conversation - verse and prose - types of drama - drama and history - use of notes - interpretation

UNIT-V : LITERARY RESEARCH

Research and writing - the mechanics of writing - the format of the research paper - documentation: preparing the list of works cited - documentation: citing sources in the text - abbreviations

Reference

Marjorie Boulton, The Anatomy of Prose (1954)

Marjorie Boulton, The Anatomy of Poetry (1953)

Marjorie Boulton, The Anatomy of Novel

Marjorie Boulton, The Anatomy of Drama (1960)

Joseph Gibaldi, MLA Handbook for Writers of Research Papers, 6th Ed

M.Phil. BIOTECHNOLOGY

Core –I :: Advanced Biotechnology

(75+25 = 100 Marks)

Unit I:Plant Biotechnology

In-vitro regeneration protocols amenable for gene transfer, Vectors used in gene transfer in plants. Ti plasmids, Biolistic gun. Antisense and RNAi strategies for metabolic engineering. Transgenic crops for herbicide, pest and abiotic stress resistance. Terminator gene technology. Biosafety issues, IPR and Bioethics.

Unit – II:Animal Biotechnology

Different cell culture techniques ; Development of cell lines; Characterization and maintenance of cell lines; cryopreservation, Cell cloning and selection; transfection and transformation of cells; Application of animal cell culture for in vitro testing of drugs; Applications of cell culture technology in production of human and animal viral vaccines. Transgenic animal models: gene knock-outs; Cre-lox systems-applications.

Unit – III:Medical Biotechnology

Human health care, genetic disorder, gene therapy, Infectious diseases, DNA-based disease diagnosis, Stem cell biology: stem cell types- haematopoietic and embryonic-chord blood cells- regenerative medicines. Production of Bioactive Compounds, Drug delivery, Development of recombinant vaccines, Herbal medicine.

Unit – IV: Industrial Biotechnology

Production of enzymes & organic acids, Downstream processing, Solid state fermentation, Bioprocess monitoring, modeling and control, Biocatalysis & Biotransformation, Bioconversion of biomass, Biosensors, Biofuel- bioethanol and biohydrogen, Biopolymers. Principles and applications of Nanobiotechnology.

Unit – V:Environmental Biotechnology

Global environmental issues and biotechnological solutions. Treatment of industrial effluents- solid waste management- Management of nuclear waste. Bioremediation- *in situ* and *ex situ* bioremediation. Biodegradation of xenobiotics. Biomonitoring . Biodiversity conservation.

REFERENCES:

1. Sathyanarayana. (2010). Biotechnology, India.
2. Slater,A. Scot,N. and Fowler,M. (2007) Plant Biotechnology-the genetic manipulation of plants. Oxford press,
3. Watson,J.D; Gilman,M; Witkowshi,J and M.Zoller, 1992. Recombinant DNA, 2nd edition. Scientific American Books, W.H. Freeman and Co; New york, USA
4. Glick, B.R and J.J. Pasternak. 2005. Molecular Biotechnology- Principles and application of recombinant DNA, 3rd edition. ASM press. Washington, USA
5. Environmental Biotechnology, principles and applications, Bruce Rittman, Perry Mccarty, McGraw- Hill, 2nd edition, 2000.
6. Therapeutic Immunology, K. Frank Austen, Steven J. Burakoff, Fred.S.Rosen, Terry.B.Storm (2nd edition) 2001.

(75+25 = 100 Marks)

RESEARCH METHODOLOGY

UNIT- 1 RESEARCH METHODOLOGY

Meaning of research-Objectives of research-motivation of research- Types, approaches and significance-Methods versus methodology- Research in scientific methods- research process- Criteria for good research- Problem encountered by research in India – Funding agencies.

UNIT - 2 RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research designs- Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT- 3 DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types- Processing and presenting of data- Techniques of ordering data- Meaning of primary and secondary data- The uses of computers in research- The library and internet – uses of search engines – virtual libraries-common software for documentation and presentation.

UNIT-4 DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-comparison of sets of data- Chi square analysis of data-Characteristics of probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting- Measurement of Errors – Types and source of errors- Determination and control of errors.

UNIT- 5 RESEARCH COMMUNICATION

Meaning of research report- logical format for writing thesis and paper – Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations ; Tables and figures - Reference styles; Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research methodology, Methods and techniques- C.R.Kothari - Vishwapragasam publications, 2nd edition.
2. Research ; An introduction - Robert Ross – Harper and Row publications
3. Research methodology – P.Saravanavel – Kitlab mahal, 6th edition.
4. A hand book of methodology of research- Rajmmal P.A.Devadas- Vidhalaya press.
5. Introduction to computers – N.Subramanian

6. Statistical methods – G.W.Snedecor and W.Chcharan – Oxford and IBH, New delhi.
7. Research methodology methods and statistical techniques – Santhosh gupta.
8. Statistical methods – S.P.Gupta.
9. Scientific social survey and research – P.young – Asia publisher, Bombay
10. How to write and publish a scientific paper – R.A.Day, Cambridge University press.
11. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

Special Paper / Guide paper: ENDOCRINE BIOTECHNOLOGY

Unit I:

Endocrinology- definition- scope and importance. peptide and steroid hormones types. Mechanisms of peptide and steroid hormone actions-positive and negative feed backs.

Unit – II:

Pituitary gland anterior- anterior pituitary-adenohypophysis- ACTH,GH,PRL,TSH,LH,FSH.

Posterior pituitary-neurohypophysis- Antidiuretic hormone (ADH),Oxytocin. Pathophysiology of pituitary – hypopituitarism. Pituitary adenoma, gigantism, Acromegaly, Dwarfism, hypogonadism.

Unit – III:

Thyroid gland- thyroid hormone synthesis, secretion and functions. Hypothyroidism and hyperthyroidism, thyroid cancer. Parathyroid hormone(PTH) and calcitonin their role in bone metabolism. Adrenal gland, glucocorticoids and biological effects. Adrenal medullary hormone- hypo and hyper function of adrenal cortex and medulla.

Unit – IV:

Pancreas- Insulin and diabetes mellitus, treatment. Testis: spermatogenesis and male gonad disorders, Ovary- ovarian cycle and ovarian disorders. Endocrinology of pregnancy and contraception.

Unit – V:

Hormones and cancer: Steroid dependent cancer, uterine, endometrial breast cancer in women. Endocrine autoimmune disease. Endocrine therapy for cancer.

Special Paper / Guide paper: AQUACULTURE BIOTECHNOLOGY

Unit 1. Principles of aquaculture and Aqua farm engineering

Definition, history and scope of aquaculture, constraints and recent advances in aquaculture, criteria for selection of species. Design and construction of aqua – hatcheries, aeration in aquaculture types and design, equipments, automatic feeders Heaters ,Thermostats,Filters-Under gravel, power filter.

Unit 2. Fish breeding

Induced breeding, hypophysation, different ovulating agents, hatchery and bundh breeding, multiple breeding, natural collection of seed, live transportation of brood fish and seed.

Unit 3. Feed formulation and Live food culture technology

Types of feeds, feed ingredients and their selection, formulation and preparation of feed, , feed attractants and preservatives. Natural food and their importance. Methods of collection, maintenance and rearing of fish food organisms

Unit 4. Disease diagnosis and Parasitic diseases

Principles of disease diagnosis in fish .Clinical diagnosis, histopathological and haematological methods. Diseases caused by bacteria, fungi and viruses, their prophylactic and therapeutic measures.

Unit 5. Ornamental fish

Aquarium ornamental fishes, their breeding and culture,-Guppy Molly,Gold fish Fighter, Angel and Morph. Common aquarium plants and their multiplication.

Reference Books:

4. Encyclopedia of Ornamental fishes. Herbert Axel rod – T.F.H. pub. NewJercy. (1992)
5. Hand Book of aquarium fishes. Dr.Schultz and H.Axel rod. (1980)
6. Fish and fisheries of India by Jhingran (2000).

Special Paper / Guide paper : ENVIRONMENTAL BIOTECHNOLOGY

UNIT 1

Environment – basic concepts and issues, global environmental problems – ozone depletion, global warming, greenhouse effects and acid rain due to anthropogenic activities, their impact and biotechnological approaches for management.

UNIT 2

An overview of atmosphere, hydrosphere, lithosphere and anthrosphere – environmental problems.

Environmental pollution – types of pollution, source of pollution, measurements of pollution, methods of measurement of pollution, fate of pollutants in the environment.

UNIT 3

Microbiology of waste water treatment, aerobic process - activated sludge, oxidation ponds, trickling filter, oxidation ditch. Anaerobic process – anaerobic digestion, anaerobic filters, up-flow anaerobic sludge blanket reactors. Treatment schemes for waste of dairy, distillery, tannery, sugar and antibiotic industries

UNIT 4

Xenobiotic compounds – organic[chlorinated hydrocarbons, substituted simple aromatic compounds, polyaromatic hydrocarbons, pesticides, surfactants] and inorganic[metals, radionuclides, phosphates, nitrates]. Bioremediation of xenobiotics in environment – ecological consideration, decay behavior and degradative plasmids, molecular techniques in bioremediation.

UNIT 5

Role of immobilized cells/enzymes in treatment of toxic compounds. Biopesticides, bioreactors, bioleaching, biomining, biosensors, biotechniques for air pollution abatement and odour control.

Special Paper / Guide paper: HERBAL BIOTECHNOLOGY

Unit 1

Principles and Medicinal Plants in Indigenous Systems: Institutionalized - Ayurveda, Siddha, Unani and Homeopathy. Non-institutionalized – Ethnomedicine

Unit 2

Drugs Developed from traditional medicines. Traditional medicines under trial for developing drugs. The role of ethnobotany in relation to drug discovery in India. Plants in folklore with special reference to South India.

Unit 3

Collection and processing of herbal drugs. Seasonal & geographical variations; natural & artificial drying methods. Packaging & labeling of herbal drugs prior to extraction.

Unit 4

Disease & Control: Callus and protoplast culture, cell line selection and mass culture. Hormones, Important plant hormones.

Unit 5 Brioprospecting and equitable compensation and Biopiracy. Intellectual Property in Drug Discovery and Biotechnology: Patent protection and strategy

References

Banthrope, D.V. and Charlwood, B.V. 1980. The Terpenoids. In: Bell, E.A., and Charlwood, B.V.

Secondary Plant Products. (Encyclop. Plant Physiology, Vol. 8). Springer Verlag, Berlin.

Busse, W. D. and Ganellin, C. R. 1993. Views from Industry on the Medicinal Chemistry Curriculum: Answers to a Questionnaire. In Trends in Drug Research, (Ed.) V. Claassen, Pharmacochimistry Library, 20, Elsevier, Amsterdam.

Harborne, J. B. and Baxter, H. 1993. Phytochemical dictionary - a handbook of bioactive compounds from plants. Taylor and Francis Limited, London.

Hiatt, A. 2001. Transgenic plants: fundamentals and applications. Marcel Dekker Incorporated, New York.

Hopkins, S. J. 1992. Principal drugs, 10th Edn. Mosby Year Book Europe Limited, London.

Khan, I. A. and Khanum, A. 1999. Role of Biotechnology in Medicinal and Aromatic Plants, Vol. II. Ukaaz Publications, Hyderabad, India.

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PAPER-I**CORE COURSE I****RESEARCH METHODOLOGY**

UNIT I - Research Methodology

Meaning of Research - Objectives of research – motivation of research – Types, approaches and significance – Methods versus Methodology – Research in Scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies/

UNIT II - Research Design

Research problems – Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT III – Data Collection and Documentation

Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and internet – Uses of search engines – virtual libraries - common software for documentation and presentation

UNIT IV – Data and Error analysis

Statistical analysis of data – Standard deviation – Correlation – Comparison of sets of data – Chi square analysis of data – Characteristics of Probability distribution – Binomial, Poisson and normal distribution - principles of least square fittings – Curve fitting – Measurement of errors – Types and sources of errors – Determination and control of errors.

UNIT V – Research Communication

Meaning of research report – logical format for writing thesis and paper – Essential of scientific report – Abstract, Introduction , Review of literature , Materials and Methods and discussion. Write up steps in drafting report – Effective illustrations : Tables and figures – Reference styles : Harvard and Vancouver Systems.

Reference Books

1. Research methodology , Methods and techniques – C.R. Kothari – Viswapragasam Publications, 2nd Edition.
2. Research : An Introduction – Robert Ross – Harper and Row Publications.
3. Research methodology – P. Saravanavel – Kitab Mahal, 6th edition.
4. A handbook of methodology of Research – Rajammal P.A. Devadas – Vidhalaya press
5. Introduction to computers – N. Subramanian
6. Statistical Methods – G.W. Snedecor and W. Cochran – Oxford and IBH, New Delhi
7. Research methodology methods and statistical techniques – Santhosh gupta.
8. Statistical Methods – S.P. Gupta
9. Scientific social survey and research - P. Young – Asia publisher, Bombay.
10. How to write and publish a scientific paper – R. A. Day, Cambridge University Press.
11. Thesis and assignment writing – Anderson – Wiley Eastern Limited

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**PAPER-II
CORE COURSE II**

COMPUTER GRAPHICS AND IMAGE PROCESSING

UNIT I

Scan conversion – lines, circles and Ellipses; Filling polygons and clipping

algorithms: Scan Converting Lines, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Scan Converting Ellipses, Filling Polygons, edge data structure, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky.

UNIT II

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)

Illumination and Shading: Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenuation, Phong's model, Gouraud shading.

UNIT III

Image Enhancement and Image Restoration

Image Enhancement in the Spatial Domain: Basic Gray Level Transformations, Histogram

Processing, Enhancement Using Arithmetic/Logic Operations, Spatial Filtering, Fuzzy sets for

spatial filters – Image Enhancement in the Frequency Domain: Frequency Domain Filters - Image

Restoration: Model of Image Degradation/Restoration Process, Noise Models, Linear and non linear

image restoration techniques, Blind Deconvolution

UNIT IV

Multiresolution analysis and Image Compression

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Fast Wavelet Transforms,

Lifting scheme. Image Compression: Fundamentals – Models – Elements of Information Theory –

Error Free Compression – Lossy Compression-wavelet based image compression techniques –

Compression standards-JPEG/MPEG, Video compression.

UNIT V

Image Segmentation and Description

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection,

Thresholding, Region Based Segmentation, Basic Morphological Algorithms, Morphological Water

Sheds - Description: Boundary Descriptors, Regional Descriptors.

REFERENCES:

1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education, 2003.
2. D. Hearn and M. Pauline Baker, Computer Graphics (C Version), Pearson Education, 2nd Edition, 2004.
3. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition, 1990.
4. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Pearson Education, Third Edition, 2008.
5. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.
6. Rafael C.Gonzalez, Richard E.Woods, and Eddins, "Digital Image Processing Using MATLAB", Tata McGraw-Hill, Second Edition, 2009.