ISLAMIAH COLLEGE

(AUTONOMOUS)
VANIYAMBADI – 635 752

(AIDED & SELF FINANCE)

SYLLABI

BOOK VIII

9TH ACADEMIC COUNCIL MEETING

(For the UG & PG Candidates Admitted from 2015-2016 & PG Candidate Admitted from 2016-2017)

21st JANUARY 2017

DEPARTMENT OF ENGLISH

SYLLABUS
For
B.A.ENGLISH

SEMESTERS – V & VI

(UNDER NEW CBCS)

SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEE K
U5EN5001	**ENGLISH PHONETICS**	5	CC07	5

Objectives: Phonetics can be very useful for the students in any field of academics. Students majoring in English, education, psychology, sociology and political science benefit from studying phonetics. The prime and prominent role of studying phonetics is to learn about underlying principles of speech sounds and becoming aware of its many application. To learn phonics alphabets and combinations – To introduce to vowel sounds- To identify different branches of linguistics- To trace the historical development of linguistics.

Unit – I

1. Elements of English language – Definitions
   (i) Phonology (ii) Morphology (iii) Syntax (iv) Meaning
2. Social, psychological and applied perspectives
3. Organs of Speech and their role

Unit – II

1. Sounds of English language – Consonants – Vowels – Diphthongs.
2. Classification of Consonants – according to place of articulations – manner of articulation
3. Classification of Vowels
4. Classification of Diphthongs – closing diphthongs – centering diphthongs

Unit – III

1. Syllable
2. Stress – word stress (Primary & Secondary) – Sentence stress.
3. Accent and rhythm in connected speech

Unit - IV

1. Strong and weak form
2. Tone group (Breath group)
3. Intonation

Unit – V

Phonemic transcription: Individual Words – Sentences
Reference books:

1. **English Phonology: An Introdution.** Heinz J. Giegerich (Pub: Cambridge)

2. **Elements of General Linguistics** Dr. Sharad Rajimwale (Pub: Rama Brothers)
3. **Elements of Linguistics and Phonetics** Dr. Amresh Sharma (Pub: Ritu Publication, Jaipur)

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SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN5002	AMERICAN LITERATURE - II	5	CC07	5

Objectives: To understand nation's unique culture – to understand different periods and movements – to understand how literature created national identity – to relate different works to each other – to understand political and social ideas.

Unit I – Poetry
   a) Emily Dickinson- A Bird Came Down the Walk
   b) Robert Frost   - Stopping by the Woods on a Snowy Evening

Unit II- Poetry
   a) R.W. Emerson- Brahma
   b) W. Whitman   - O Captain, my Captain

Unit III- Prose
   a) R.W. Emerson- The American Scholar
   b) H.D. Thoreau- What I Lived For

Unit IV- Drama
   a) Eugene O'Neil- The Emperor Jones

Unit V- Fiction
   a) E. Hemingway- A farewell to Arms

Reference books:

   1. American Literature of the Nineteenth Century –An anthology, Eurasia Publishing House- New Delhi'
   2. American Literature 1890-1965, an Anthology, Eurasia Publishing House, New Delhi.

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SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN5003	AMERICAN LITERARY HISTORY	5	CC07	5

Objectives: To introduce the learners to the early form of American Literature and acquaint the learners with the colonial impact on the American Literary History

Unit I
Colonial Literature – Captain John Smith; Political Writing – Samuel Adams, Benjamin Franklin and Thomas Paine
Unit II
One of the earliest American Novels –a struggle to find a unique American voice - William Hillbrown's *The Power of Sympathy* (1789)

Unit III
Unique American Style – Washington Irving, Edgar Alan Poe, Melville
Unit IV
Nineteenth Century Poetry – Walt Whitman, Emily Dickinson
Unit V
Realism – Mark Twain (1835-1910), Henry James (1843-1916)

SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN5004	INTRODUCTION TO LITERARY CRITICISM	5	CC07	5

*Objectives***:** *To acquaint learners with Classical background- to familiarize learners with dramatic traditions*

Unit I: CLASSICAL CRITICISM
 The Classical background- A brief introduction to Plato, Aristotle, Longinus, and Horace
Aristotle's views on poetry and tragedy – key concept like mimesis, catharsis, Hamartia and anagnorises

Unit II: MEDIEVAL AND RENAISSANCE CRITICISM
 Sir Philip Sydney: Apology for Poetry (superiority of poetry over philosophy - objections to poetry and Sydney's answer)

Unit III: NEO CLASSICAL CRITICISM

John Dryden: An Essay of Dramatic Poesy (Dryden's defense of the English dramatic tradition – function of poetry – dramatic poetry)

Unit IV:

Alexander Pope: Essay on Criticism

Unit V:

Dr. Johnson: Preface to Shakespeare

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SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN5005	20TH CENTURYLITERATURE - I	2	CC07	4

Objectives: *To achieve sense of the historical significance- to develop critical analysis- develops logical writing skills to write essays on literary topics- to develop them in literary debate.*

Unit – I Poetry

    W.B. Yeats: A Prayer for My Daughter

    Dylan Thomas: The Hunchback in the Park

    A.S. Housman: "The Carpenter's Son"

Unit – II Poetry

    T.S. Eliot: The Love Song of J. Alfred Prufrock

    W.H. Auden: The Unknown Citizen

    Thom Gunn: Ted Hughes

Unit – III Prose

    Sir James Jeans: Our Home in Space

    J.B.S Haldane: The Scientific Point of View

    Arnold Toynbee: "India's Contribution to world unity"

Unit – IV Drama

    Synge: "The Playboy of the Western World"

Unity – V Fiction

    Conrad: Lord Jim

    Green: Heart of the Matter.

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SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN5006	AFRICAN-AMERICAN LITERATUTRE	2	CC07	4

Objectives: Students will be acquainted with a scope of African American authors, poets and recognize their contributions to the contextual fabric of America. Students will explore many historical benchmarks within African American history such as slavery, the Reconstruction and the Civil Rights movement.

UNIT I
Introduction to African American Literature
Short Biographies: Alice Walker (1944 – Present), James Weldon Johnson (1871 - 1938), Phillis Wheatley (1753 - 1784), James A. Emmanuel (1921 -2013)

UNIT II & III
The Native Son by Richard Wright (Novel)

UNIT IV
Come and Gone by Joe Turner (Play)

UNIT V
An Hymn to Humanity by Phillis Wheatley (1753 - 1784) - Poem
Full Moon by Robert Hayden (1913 - 1980) - Poem

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SEMESTER-V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5ENSB51	ENGLISH FOR COMPETITIVE EXAMINATIONS - I	1	CC07	2

Objectives: To make student proficient in writing letters in the field of management, administration, and defense. To inculcate the values and ethics of e-mail

Unit I
    Essay- Definition- Types of Essays
Unit II
    Letter writing –personal- official- Business letters forms

Unit III

Expansion

Unit IV

Paraphrasing

Unit V

E-mails- Ethics- Do's and don'ts at the time of composing e-mails, e-mails structure

Reference books:

a) 'English for Competitive examination' by Rajul Bhargava, Macmillan publishers.

b) English for Competitive examinations by V. Saeaswathi, Emerald Pub.

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SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN6001	JOURNALISM AND MASS COMMUNICATION	5	CC07	5

Objectives: To teach the learners how to expose serious misdemeanor- to teach health and safety – to prevent learners from being mislead by statement or action.

Unit I

a) Principles of Journalism
 b) Social Responsibilities of the Press
 c) Functional of the journalistic medium as a part of Mass communication

Unit II

a) News: Introduction/Definition
b) Elements of News
c) The Inverted Pyramid style of news writing and the Five 'W' and One 'H

Unit III

a) Reporting, News value, human interest and story angle
b) Writing features, opinion- editorials, personal columns, reviews etc.,

Unit IV

a) Editorial Writing
b) Letters to the Editor
c) Art of interviewing, Crime reporting, Sports reporting

Unit V

   A) Role of the Editor
   B) Duties of the news Editor
   C) Functions of the Sub-editor
   D) Characteristics of a Reporter

Reference books

a) Rangaswami Parthasarthy- Basic Journalism, Macmillan Publishers, Chennai.
b) B.N. Ahuja: Theory and practice of journalism, Surjeeth publishers
c) Pathanjali Sethi- Professional Journalism, New Orient Longman, Bombay

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SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN6002	20TH CENTURYLITERATURE - II	5	CC07	5

Objectives: To achieve sense of the historical significance- to develop critical analysis- develop logical writing skills to write essays on literary topics- to develop them in literary debate.

Unit-I Poetry

W.H. Auden: The Unknown Citizen
D.H. Lawrence: Snake

Unit-II Poetry

T.S. Elliot: Journey of the Magi
Thomas Hardy: The Darkling Thrown

Unit-III: Prose

W.R. Inge: Spoon Feeding
Aldous Huxley: Selected Snobberies

Unit-IV: Drama

Galsworthy: Silverbox

Unit-V: Fiction

Kinglsy Arms: Lucky Jim
Referemce Books:
Nine Modern Poets, Ed. Black. Macmillan

SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN6003	COMMON WEALTH LITERATURE	5	CC07	5

Objectives: To extend student's knowledge of literature from common wealth countries – to give training in research methods – to develop writing skills – to provide foundation knowledge of those who intending to proceed to an M.A. English

Unit I: Detailed poetry

Derek Walcott- 'The Ruins of a Great House'

Unit II: Non-detailed poetry

  a) David Rubadiri- A Negro Labourer in Liverpool
  b) Margaret Atwood- Journey to the interior

Unit III: Drama

WoleSoyink- The lion and the jewel

Unit IV: Prose

Chiua Achebe- The Novelist as Teacher

Unit V: Novel

Margaret Atwood- Handmaid's Tale

Reference Books:

'An Anthology of commonwealth poetry', edited by C.D. Narasimhaiah, Macmillan Publishers, Chennai.
'Readings in commonwealth Literature', Edited by William Walsh, Oxford University Press, London

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SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN6004	GENDER STUDIES	5	CC07	5

Objectives: To demonstrate an understanding of the social construction of gender and knowledge about gender issues as they affect diverse populations.

Unit I

Emily Dickinson	Because I could not stop for Death
Sylvia Plath	Daddy

Unit II Poems

Kamala Das	An Introduction
Grace Nicholas	Of Course, when they ask for Poems

Unit III Prose

Virginia Woolf	A room of one's own

Unit IV Drama

Henrick Ibsen	A Doll's House
Vijay Tendulkar	Silence! The court is in session

Unit V Fiction

Thomas Hardy	Tess of the D'Ubervilles
Edith Wharton	The House of Mirth

References:

1. Sandra M Gilbert and Susan Gubar, 1985, The Norton Anthology of literature byomen, New York
2. Rajani P, V. Rajagopalan and NirmalSelvamani, An Anthology of American Women Writing, Dept. of English, Madras Christian College

SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN6005	CREATIVE WRITING	2	CC07	4

Objectives: Creative Writing is an integral part of the English Department which helps students to achieve critical thinking by reading between the lines and helps them to express their inner voices nationally and internationally through structured writing.

Unit I

Creative Writing
Imagination and Writing-Measuring creative writing-The importance of Reading.

Unit II

The Art of Writing
Tropes and figures-Style and Register-Playing with words

Unit III

Definition of Poetry-Dominant modes of Poetry-Lyrical, Narrative and Dramatic.

Unit IV

Writing Fiction and Short Stories
Fiction and Non-fiction-Literary and popular fiction-Character, Plot, Point of View and Setting in short Story.

Unit V

Writing Drama
Concepts and Characteristics of Drama- Plot, Structure and Characterization.

References:

Creative writing: Anjana Neira Dev, Anuradha Marwah, Swathi Pal. Pearson Longman Publication

SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5EN6006	SOFT SKILLS	2	CC07	4

Objectives: To realistic work and work experience – to teach to make appropriate and reasonable decisions – to educate learners about unproductive thinking and self-defeating behaviors.

Unit I:

1. Work Experience
2. Positive work Ethics

Unit II:

1. Reporting to work on time
2. Good personal appearance
3. Wanting to do good job
4. Flexibility

Unit III:

1. Safety in work place
2. Safety rules
3. Good references
4. Good work history

Unit IV:

Interview Skills – Types of interviews: Group Interview, Panel and Telephone Interviews

Unit V:

Leadership Quality
Traits of leadership: Honesty, Integrity, Dedication, Responsibility, Goal setting and Decision making.

Reference Books: Essential Job Skills. T.Ravidran. Pub. Oxford University Press,Soft Skills. S. Hariharan. MJP Publishers.

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SEMESTER-VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5ENSB61	ENGLISH FOR COMPETITIVE EXAMINATIONS - II	1	CC07	2

Objectives: To make student proficient in reading and reasoning in the field of management, administration, and defense. To inculcate the values of dedication in understanding socio-economic and national issues

Unit I

Reading and reasoning

Unit II

Use of particular words

Unit III

Use of Idioms and Expression

Unit IV

Use of Phrases/slang, expression, Corporate English Jargon

Unit V

General Knowledge

Reference Books; English for competitive Examinations by Rajul Bhargava, Macmillan publishers.

English for Competitive examinations by Saraswathi, Emerald publishers

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DEPARTMENT OF ENGLISH

SYLLABUS
For
M.A.ENGLISH

SEMESTERS – III & IV

(UNDER CBCS)

SEMESTER-III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN3001	COMMON WEALTH LITERATURE	5	CC07	6

Objective: To acquaint the students in overlapping fields of commonwealth Literature, Postcolonial Literature and New Literatures in English.

UNIT – I   POETRY

Australia – Judith Wright   Fire at Murdering Hut
England -   P.K. Page   Adolescence
New Zealand - Jessie Mackay   The Noosing of the Sun-God

UNIT – II   POETRY

The West Indies - Dereck 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 – 1V   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

SEMESTER-III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN3002	LITERARY THEORY AND CRITICISM I	5	CC07	6

Objective: To expose the learners to the elements of literature and classical criticism.

UNIT – I

    (i)   Introduction to Classical Literary Criticism (Aristotle, and Horace)
    (ii)   Introduction to Indian Classical Criticism (Tholkappiam)

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

Elaine Showalter   Towards Feminist Poetics

UNIT – V

N.Frye   Archetypes of Literature

Reference Books:

1. Literary Criticism: Seetharama, Macmillan Publishers. (Unit III & IV)
2. Postmodernism for Beginners (Unit V)

SEMESTER-III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN3003	ENGLISH LANGUAGE TEACHING	4	CC07	6

Objective: To acquaint the learners with the theories and practices of teaching English.

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 in teaching English
Translation methods – Direct Method – Bilingual Method – Structural approach – Situational approach – Eclectic approach

UNIT- IV

Curriculum Design
Modern concept of Curriculum – Curriculum and Education – Need and the importance of Curriculum – Types of Curriculum

UNIT- V

Audio – Visual Teaching aids in ELT – importance of teaching aids – charts and tables – flash cards – cue sheets – language laboratory

REFERENCES

Howall A.P.R. A History of English Language Teaching, OUP, 1984
Richards, J and Rudgers, S. Approaches and Methods in Language Teaching, Cambridge University Press, 2001
David Nunan, Language Teaching Methodology, Prentice Hall, 1991

SEMESTER-III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN3004	CONTEMPORARY LITERARY THEORIES	4	CC07	6

Objective: To familiarize the students with modern literature and criticism.

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 – 1V

Louis Althusser: Ideology and Ideological State Appararuses

UNIT – V

Ania Loombaa: Situating Colonial and Post Colonial Studies
John Fiske: Culture, Ideology, Interpellation

REFERENCES

Literary Theory: An Anthology II ed. Julie Rivikin 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

SEMESTER-III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6ENE301	TECHNICAL WRITING	4	CC07	6

Objective: To familiarize the learners in creating meaningful documents for different technical situations.

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

Mini-Project

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

SEMESTER-III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6ENE302	RESEARCH METHODOLOGY	4	CC07	6

Objectives: To introduce the students to the concept of research and to enable them to understand the stages of research. To familiarize the learners to the procedures involved in research and to sensitize them to the requirements of cohesion and coherence in continuous composition

Unit-I- Meaning and Nature of Research

What is research? Objectives of Research the fundamentals of Research Characteristics of Research Types of research Qualities of a Good Researcher

Unit II: Materials and Tools of Research

Primary and Secondary sources Books, Anthologies, Biographies, Thesauruses, Encyclopedia, Conference proceedings, Unpublished theses, Newspaper articles, Journals, e-journals, Monographs, Translations, Web references, Library catalogues, Literature Resource Center, Govt. publications, Special libraries, Advanced study centers, Virtual libraries, Web search engines

Unit-III: Research in Literature and Language

Literary research and research in other Disciplines Literary research-Interpretative, Theoretical, Biographical etc Research methods in Linguistics Research methods in Literature How research in language is different from research in literature Emerging areas of research in language and literature Use of literary and linguistic theories in research

Unit-IV: Methods and Techniques of Research

Research Methods vs. Research Methodology Variants in Methodology Types of methods: Statistical, Sampling, Applied, Case study, Survey, Interpretative, Experimentation, Interviews, Questionnaire etc Evaluation of different methods: Historic, Comparative, Descriptive, Scientific

Unit V: Presentation of Research

Format of the thesis, Language of the thesis, Logical writing language and style of the thesis. Introductions and conclusions; Presentation of findings Suggestions for future research; Writing a Short Research Paper

References:

Hunt, Andy (2005), Your Research Project, New Delhi: Foundation Books

Abdul Rahim, F. (2005), Thesis Writing: A Manual for Researchers (New Delhi: New Age International)

Gibaldi, Joseph (6thedn. 2003), MLA Handbook for Writers of Research Papers,New York: MLA Association

Eliot, Simon and W. R. Owens (4thedn. 1998), A Handbook to Literary Research, London: Routledge & Open University

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SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN4001	LITERARY THEORY AND CRITICISM II	5	CC07	5

Objective: To expose the learners to the advance elements of literature and classical criticism.

UNIT – I
Lionel Trilling   Sense of the Past
Cleanth Brooks   The Language of Paradox
UNIT – II
Georg Lukacs   Ideology of Modernism
UNIT – III
Jacques Lacan   Of Structure As An Inmixing of an Otherness
                     Prerequisite to any Subject Whatever
UNIT – IV
Said   From Orientalism- Extract in Modern Criticism And
            Theory
UNIT – V
Barthes   Death of the Author
Foucault   From Archeology Of Knowledge
Reference Books:
Theory of Criticism: David Lodge
20th Century Reader: David Lodge
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SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN4002	SOFT SKILLS	5	CC07	5

Objective: To expose the learners to a group of personality traits involving communication, social graces and interpersonal skills.

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]

SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN4003	JOURNALISM AND MASS COMMUNICATION	4	CC07	6

Objective: To acquaint the learners with creative works and innovative teaching in journalism and mass communication.

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.

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SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6EN4004	WOMEN'S WRITING IN ENGLISH	4	CC07	5

Objective: To demonstrate an understanding of the social construction of gender with respect to women and knowledge about gender issues as they affect diverse populations.

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
Arundhathi Roy   How deep shall we dig?

UNIT III   DRAMA

Maha Sweta Devi   Mother of 1084
Caryll 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

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SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6ENE401	**ANATOMY OF LITERATURE**	**4**	**CC07**	**5**

Objective: To acquaint the students with various components of literature along with its subjective and objective analysis with respect to different genres.

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 – 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 – physical form of poetry – meter – variation – rhyme – onomatopoeia – internal pattern – form in intonation – repetition – main types of poetry – logical sequence – use of associations – patterns of imagery – traditional verse forms – free verse – choice of words – illustrations – cautions – twentieth century techniques

UNIT III: THE ANATOMY OF NOVEL

The concept of fiction – verisimilitude – point of view – plot – character – character revealed – conversation – scene and background – dominant themes – experimentation

UNIT IV: THE ANATOMY OF DRAMA

Live literature – action –plots – conventional categories – direct experience of characters – dialogue and conversation – verse and plot – types of drama – drama and history – use of notes – interpretation

UNIT V: LITERARY RESEARCH

Research and Writing – mechanics of writing – format of research paper – documentation: preparing the list of works cited – 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 Edition

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SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6ENE402	PROJECT	4	CC07	5

Objective: Project Work is a preparatory exercise for research writing. Students are trained to write academically following the entrenched rules to effectively express their Thesis on carefully selected topic.

The Project should have the following format:

The Title Page

Certificate of the Student

Declaration of the Students

Acknowledgements

Table of Contents

Introduction

Chapters

Conclusion

Works Cited

Annexures (if any)

Reference:

MLA Handbook for Writers of Research Papers, New Delhi: Affiliated East-West Press Pvt.Ltd.
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SEMESTER-IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6ENNM41	COMPUTER LITERACY IN TEACHING	2	CC07	4

Objective: To expose the learners to computing and contemporary software required to create language components.

Unit I

About Windows – My Computer – My documents – Recycle Bin – Wall Paper – Screen Saver - Time and Data – 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
Introduction – 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
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

DEPARTMENT OF HISTORY

SYLLABUS
For
B.A.HISTORY

SEMESTERS – V & VI

(UNDER NEW CBCS)

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI5001	HISTORY OF THE ARABS FROM 500 TO 750 AD	5	CC13	5

UNIT – I

Geography of Arabia – Jahiliya Period – Political, Social, Cultural and Religious life of the Arabs

UNIT - II

Prophet Muhammad (PBUH) – Early life – Prophethood – Teachings of Islam – Five Pillars of Islam – Quran and Hadith

UNIT – III

The Pious Caliphate – Hazrat Abu Bakr – Hazrat Umar – Hazrat Uthman and Hazrat Ali – Administration under the pious Caliphate

UNIT – IV

The Umayyad dynasty – Muawiyah I – Yazid I – Abdul Malik – Al-Walid I – Umar Bin Abdul Aziz – Fall of the Umayyads

UNIT V

Cultural Progress under the Umayyad – Literature – Art and Architecture

Books for Reference:

1. Abbas Ali: Civilization in Islam, Reference Press, New Delhi, 2005
2. Ameer Ali Syed: The Spirit of Islam, Idara-i-Adabiyat, New Delhi, 1997
3. Ameer Ali Syed: History of the Saracens, Kitab Bhawan, New Delhi, 1995
4. Arnold Thomas: The Legacy of Islam, Oxford University Press, 1980
5. Hitti Philip. K: History of Arabs, Mac Millan India, New Delhi, 1974
6. Zaydan Juriji: History of Islamic Civilization, Kitab Bhawan, New Delhi, 1978
7. Syed Shahabuddeen: Arabia Varlarum Panpadum, Vaniyambadi.

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI5002	HISTORY OF THE USA FROM COLONIZATION TO 1865 AD	5	CC14	5

UNIT – I

Discovery and Colonization of America - Thirteen Colonies - Red Indians - American War of Independence - Causes and Course of the Revolution - The Treaty of Paris 1783 – Confederation - The Constitutional Convention

UNIT – II

Federalist and Republicans - George Washington - John Adams - Republican Revolution - Administration of Jefferson

UNIT – III

Grievances of the Indians - Tecumseh Mission - The War of 1812 - Treaty of Ghent 1814 – Monroe Doctrine - Jackson and his Democracy

UNIT – IV

Territorial Expansion – Louisiana Purchase – Acquisition of Florida – Manifest Destiny – Colonization of Texas and Oregon - President Polk and Manifest Destiny - The Mexican War

UNIT – V

Issue of Slavery – Abraham Lincoln - The Civil War – Causes, Course and Results of the Civil War.

Books for Reference

1. Beard and Beard: New Basic History of the United States, New York, USA, 1985
2. Majumdar R.K. & Srivastava, A.N: History of the United States of America.
3. Marshall Smelsor: American History-At A Glance, Barnes and Noble, INC, New York
4. Parkes H. B: The United States of America- A History, Scientific Book Agency,Calcutta, 1975
5. Rajayyan, K: History of the United Sates, Madurai Publishing House, Madurai,1978

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI5003	HISTORY OF EUROPE FROM 1453 TO 1789 AD	5	CC15	5

UNIT – I

Geographical Discoveries – Renaissance in Italy, England, Spain and France – Impact on Art, Architecture, Literature and Science

UNIT – II

Reformation in Germany, England, France and Switzerland – Counter Reformation

UNIT – III

Rise of Nation States – Nationalism – Thirty Years War

UNIT – IV

Age of Benevolent Despotism – Louis XIV of France – Frederick II of Prussia – Joseph II of Austria – Peter the Great and Catherine of Russia

UNIT – V

Louis XV and Louis XVI – Ancient Regime – France on the eve of French Revolution

Books for Reference

1. Meena M : The Pelican History of Medieval Europe
2. C.J.H. Hayes : Modern Europe
3. H. A. L. Fischer : History of Europe
4. Hayes Baldwin Cole: History of Western Civilization up to 1508 AD
5. Gordon Junior : History of Europe

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI5004	HISTORY OF JAPAN FROM 1853 TO 2000 AD	5	CC16	5

UNIT - I

Japan in the 19th century - Arrival of Europeans - Fall of Tokugawa Shoguns - Perry Mission - Treaty of kanagawa and Harris Treaty.

UNIT - II

Meiji Restoration - Modernization of Japan - Rise of Political Parties - Sino-Japanese War of 1895 - Russo-Japanese War.

UNIT - III

Japan and First World War - Twenty One Demands - Washington Conference - Manchurian Crisis - Rise of Militarism - Second World War and Japan.

UNIT - IV

Japan under Occupation - Mac Arthur and New Constitution - Political, Social and Economic Reforms - Industrial Growth - Japan as Economic Super Power.

UNIT - V

Post War Politics - Foreign Policy of Japan - Japan and ASEAN - Japan and UNO - Relations with China.

Books for Reference

1. Clyde and Beers: The Far East, Prentice Hall of India Ltd., New Delhi
2. Harold M. Vinacke: A History of the Far East, Kalyani Publishers, New Delhi
3. Michael and Taylor: The Far East in Modern Times
4. Lav Furathe: The Far East
5. S.L.Roy: A Short history of the Far East

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI5005	CONSTITUTIONAL HISTORY OF INDIA	2	CC17	4

UNIT – I

Introduction – Government of India Act of 1858 – Indian Councils Act of 1861 – Indian Councils Act of 1892

UNIT – II

The Government of India Act of 1909 – The Government of India Act of 1919 – Diarchy in the Provinces

UNIT – III

Government of India Act of 1935 – Cripps Proposals – Wavell Plan

UNIT – IV

Mountbatten Plan – Indian Independence Act of 1947 – Cabinet Mission Plan

UNIT – V

Formation of the Constituent Assembly and its Activities – Constitution of the Indian Republic – Salient Features of Indian Constitution

Books for Reference

1. Aggarval, R.C : Constitutional History of India and National Movement, Chand & Company Ltd., Ram Nagar, New Delhi, 1998
2. Banerjee, A.C : Constitutional History of India, Macmillan Company of India Ltd., Meerut, 1978
3. Dr.Durga Das Basu: Introduction to the Constitution of India, Wadhwa & Company, law Publishers, Agra, 2004
4. Grover,B.L & Grover, S : A New Look at Modern Indian History, 1707 – The Modern Times, S.Chand & Company Ltd., New Delhi, 1983
5. Dodwell; The Cambridge History of India, S.Chand & Company Ltd., Ram Nagar, New Delhi

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI5006	HISTORY OF SCIENCE & TECHNOLOGY IN INDIA FROM 1750 TO 1900 AD	2	CC18	4

UNIT – I

Introduction – Impact of Indian Science – Introduction of Modern Sciences by the Europeans – Asiatic Society of Bengal – Zoological Survey – Botanical Survey – Geographical Survey – Trigonometrical Survey – Development of Meteorological and Astronomical Sciences

UNIT – II

Learned Institutes for Development of Science – Indian Association for the Cultivation of Science – Indian Science Congress Association – Institution of Engineers – National Academy of Sciences – Indian National Science Academy

UNIT – III

Medical Education and Research – Technical Education and Research – Agricultural Education and Research – Veterinary Science – Agriculture and Irrigation – Food Crops – Commercial Crops – Plantation Crops – Engineering and Industry – Cottage Industry – Rural and Urban Arts and Crafts

UNIT – IV

Transport and Communication – Roads and Bridges – Harbours – Ports and Lighthouses – Waterways

UNIT – V

Great Scientists – Sawai Jai Singh - J.C.Bose – Srinivasa Ramanujam – Sir C.V.Raman – Role of Universities and Scientific Institutions

Books for Reference

1. Vadivel Dagil: Science and Technology in India
2. Varghese Jeyaraj, S: History and Science and Technology, Anns Publications, Uthamapalayam, 2004
3. Venkatraman, R: History of Science and Technology, Ennes Publications, Madurai, 1988
4. Gupta, S.P: Science, Technology and Society in Modern Age
5. Gupta, S.P: Modern India and Progress in Science and Technology
6. Kalpana Rajaram: Science and Technology in India

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HISB51	GENERAL KNOWLEDGE AND AWARENESS	1	AEC5	2

UNIT - I

Politics: Election – Political Parties – Constitution – Power of Constitutional Authorities – Rajya Sabha – Lok Sabha – State and Union Territories – State Legislature – Judiciary.

UNIT - II

Subject Knowledge: History – Geography – Civics – Economics – Sociology – Literature – Religions – Sciences.

UNIT - III

Indian Tourism: Monuments – National Park – Wild Life Sanctuaries – Hill Stations – Waterfalls – Other Tourist Destinations.

UNIT - IV

Current Affairs: India since Independence – Developments since World War II – Awards and Honours in Civil, Military and Sports.

UNIT - V

Cultural Academies at Centre and State Levels – Educational, Scientific and Research Organizations of Repute – Fine Arts: Dances, Music, Painting, Folk Arts.

Books for Reference:

1. Competition Success Review – year Book.
2. Competition Success Review – Fortnightly.
3. Manorama Year Book.
4. Chronicle Year Book.
5. Upkar's General knowledge – Year Book.
6. General Studies Manual

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI6001	HISTORY OF THE ARABS FROM 750 TO 1258 AD	5	CC19	5

UNIT – I

Abbasid Revolution – Abul Abbas as-Saffah – Abu Jafar al-Mansur – Harun al-Rasheed – Mamun al-Rasheed

UNIT - II

Al-Mutawakkil – Causes for the down fall of Abbasids – The Crusades – Imaduddin Zengi – Sultan Salahuddin Ayyubi

UNIT – III

The Fatimids of Egypt – Ubaidullah al-Mahdi – Al-Muiz – Al-Aziz – Cultural Contribution of the Fatimids – Downfall of the Fatimids

UNIT – IV

Moors of Spain – Abdul Rahman I - Abdul Rahman II - Abdul Rahman III – Development of Education – Art and Architecture under the Moors

UNIT - V

Contribution of the Arabs to Science: Medicine, Astronomy, Mathematics, Chemistry, Hospital and Public Library, Ophthalmology – Famous Muslim Scientists and Historians

Books for Reference

1. Abbas Ali: Civilization in Islam, Reference Press, New Delhi, 2005
2. Syed Mahmudun: Islam its concept and History, Kitab Bhawan, New Delhi, 1981
3. Khuda Baksh. S: The Orient under the Caliphs, Idara-i-Adabiyat, New Delhi, 1893
4. Ameer Ali Syed: The Spirit of Islam, Idara-i-Adabiyat, New Delhi, 1997
5. Ameer Ali Syed: History of the Saracens, Kitab Bhawan, New Delhi, 1995
6. Arnold Thomas: The Legacy of Islam, Oxford University Press, 1980
7. Hitti Philip. K: History of Arabs, Mac Millan India, New Delhi, 1974
8. Syed Shahabuddeen: Contributions of Muslims to Humanity, 2016

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI6002	HISTORY OF U.S.A. FROM 1865 TO 2010 AD	5	CC20	5

UNIT - I

Reconstruction - End of the Reconstruction - Rise of Big Business - Rail Roads - Growth of Industry - Labour Movement - Granger and Populist Movements - 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 - 14Points - Treaty of Versailles.

UNIT - III

Warren Hardinge - 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 Movements - Martin Luther King

UNIT - V

Lyndon B.Johnson - Richard Nixon - Gerald Ford - Jimmy Carter - Ronald Reagan - George Bush - Gulf War and Saddam Hussain - End of the Cold War - Bill Clinton.

Books for Reference

1. Hill C.P.: History of the United States, Edward Arnold, London, 1974
2. Nambi Arooran.K. : History of the United States of America (Tamil),
3. Parkes, H.B: The United States of America – A History, Khosla Publishing House,Delhi, 1986
4. Somervel: History of the United States
5. Rajayyan, K. : A history of the United States, Madurai Publishing House, Madurai, 1978

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI6003	HISTORY OF EUROPE FROM 1789 TO 1945 AD	5	CC21	5

UNIT – I

French Revolution of 1789 - Causes, Courses and Results of the French Revolution - French Philosophers

UNIT – II

Napoleon Bonaparte - Conquests - Civilian Works- Continental System - Fall of Napoleon

UNIT – III

France after 1815 - Congress of Vienna – Metternich - Concert of Europe

UNIT – IV

Holly Alliance - Revolution of 1830 and 1848 - Unification of Germany - Unification of Italy - Second Republic - Napoleon II - Eastern Question

UNIT – V

Third French Republic - First World War and Peace Treaties - League of Nations - Rise of Dictatorship – Mussolini – Hitler - Causes, Courses of the Second World War.

Books for Reference

1. South Gate: Text Book of Modern European History
2. H.A. L Fisher: From the beginning of the 18th Century A. D. to 1935 A.D.,VOL,-II Surjeet Publications, Delhi- 1987
3. B.V Rao: History of Modern Europe (1789 to 1992), Sterling Publishers Private Ltd.,ew Delhi – 16
4. C.D.M. Ketelby: A History of Modern Times from 1789, George G. Harrap & Co.Ltd.,London, 1964

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI6004	**HISTORY OF CHINA FROM 1900 TO 2000 AD**	5	CC22	5

UNIT – I

China under the Manchus – Boxer Rebellion – Manchu Reforms – Revolution of 1911 – Decline of Manchus

UNIT – II

Dr.Sun-Yat-Sen – Yuan-Shi-Kai – China and the First World War – May 4th Movement – Washington Conference

UNIT – III

Rise of Kuomintang Party – Chiang-Kai-Sheik – Birth of Communism in China - Civil War in China – Manchurian Crisis – Second Sino-Japanese War

UNIT – IV

Mao's Era – Establishment of Peoples Republic of China – Cultural Revolution – China Since Cultural Revolution – Estimate of Mao

UNIT – V

Post Mao Era in China – Hua-Gua-Feng – Deng Xiaoping – Jiang Zemin – China in the World Affairs

Books for Reference

1. Ahamed L.L: A Comprehensive History of the Far East, S.Chand and Co., Ltd., New Delhi, 1981
2. David M.D: The Making of Modern China, Himalaya Publishing House, Bombay, 1993
3. Paul.H.Clyde & Burton F, Beers: The Far East – A History of Western Impacts and Eastern Responses 1830-1975, Princeton Hall of India (P) Ltd, New Delhi, 1988

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI6005	**INDIA AND HER NEIGHBOURS FROM 1947 TO 2010 AD**	2	CC23	4

UNIT – I

India and Pakistan: Kashmir Conflict – Indus Treaty – 1965 and 1971 War and Shimla Agreement – Agra Summit

UNIT – II

India and China: Panch Sheel Agreement – Tibet, Dalai Lama and Border Dispute – 1962 War and Frozen Relations – Rajiv Gandhi's visit to China – Improvement in Bilateral Relations – Areas of Concern

UNIT – III

India and Bangladesh: Early Relations under Mujibur Rahman – Farakka Water Dispute and Settlement – Chakma Refugees – Border Dispute Redressal – Indo-Nepal Relations – Trade and Transit Treaty – India's Security Concerns

UNIT – IV

Indian and Sri Lanka: Shastri-Srimavo Pact of 1964 – Katchativu Settlement – Eelam Question and Indian Response – IPKF and its impact – India and Maldives – Indo-Bhutanese Relations

UNIT – V

India and Non-Alignment Movement – SAARC – Indian Ocean as a Zone of Peace

Books for Reference

1. A. Appadurai, The Domestic Roots of India's Foreign Policy, Oxford University Press, Delhi, 1981
2. Hall D.G.E: History of South East Asia
3. Rao B.V: History of Modern Asia, Sterling Publishers Pvt Ltd., New Delhi
4. Palanithurai G & Mohanasundaram K: Dyanamics of Tanmil Nadu Politics in Sri Lankan Ethinicity (New Delhi: Northern Book Centre, 1993)
5. Dixit J.N: India's Foreign Policy and its Neighbours, Gyan Publishing House, New Delhi, 2001

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HI6006	HISTORY OF SCIENCE AND TECHNOLOGY IN INDIA FROM 1900 TO 2010 AD	2	CC24	4

UNIT - I

Contribution of Europeans to Indian Science: Government policies after Independence-Establishment of Scientific Institution after Independence-Prominent Indian Scientist since Independence

UNIT - II

Agriculture: Agricultural Education and Research-Veterinary Science-Green and White Revolution-Irrigation Projects and Water Management-Live Stock and Fisheries-Promotion of Agriculture since Independence-Problems faced by Farmers and Farming Sector

UNIT – III

Energy: Various forms of Energy – Energy Production Projects during the British period – Organisations Monitoring and Distributing Power – Atomic Power Stations in Independent India – Advantages and Disadvantages of Atomic Power – Hydro Electric Projects in Independent India – Thermal Power Stations – Alternative Power Resources and their Utilization – Energy Sufficiency and Management

UNIT – IV

Transport and Communication: Railways, Roadways, Airways and Shipping – National and State Highways – International and Domestic Transport – Harbours – Aeronautical Industries – Space Research organisation – Satellites - INSAT Systems – Launch Vehicle Technology – Telecommunications – Comparative Assessment of Growth with other Countries

UNIT – V

Industries – Small Scale and Cottage Industries – Handloom and Textile Industry – Iron and Steel – Software and Information Technology – Pharmaceutical Industries – Assessment of Industrial Growth – Brain Drain – Effects of Science to Masses.

Books for Reference

1. Varghese Jeyaraj, S : History and Science and Technology, Anns Publications,
   Uthamapalayam, 2004
2. Kalpana Rajaram : Science and Technology in India
3. Gupta,S.P : Modern India and Progress in Science and Technology

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5HISB61	CIVIL SERVICES AND OTHER COMPETITIVE EXAMINATIONS	1	AEC6	2

UNIT - I

Competitive Examinations in India: Civil Service – Preliminary and Main Examinations – Government in Other Service – Examination Patterns

UNIT - II

Central Services: Union Public Service Commission – Railway Recruitment Board – Defence Examinations – LIC/GIC Examinations – Staff Selection Commission Examinations – UGC/NET Examinations – Bank Examinations

UNIT - III

TNPSC: Tamil Nadu Public Service Examinations – Combined Civil Service Examinations, Group I - Combined Civil Service Examinations, Group II (Interview Post) – Madras High Court Service Examinations – District Educational Officers Examinations – Village Administrative Officer Examinations – Other Technical Examinations

UNIT - IV

Subjects of Study for TNPSC Examinations Group I: Mathematics – Physics – Chemistry – Biology – Zoology – History – Sociology – Computer Science – TNPSC Group II, III and IV General Knowledge – Politics – History – Current Affairs – National Movement – Science – Geography – Economics and Business – Intelligent Quotient – General Tamil – Perusing Previous Years Question Paper

UNIT - V

Competitive Examination Preparation Tips: Motivation – Active Learner – Organizing Studies – Time Management – Reading Newspapers, Magazines, Subject and Reference Books – Writing Examinations at Home – Good Handwriting practice – Avoiding Stress – Perusing Previous Years Question Papers.

Books for Reference:

1. Dr. Divya S Iyer, Path Finder: Civil Services Main Examination, DC Books Pvt Ltd,New Delhi
2. Edgar Thorpe, the Pearson CSAT Manual 2013: Civil Services Aptitude Test for the   UPSE Civil Service Preliminary Examination, New Delhi
3. S.A. Majid, Special Current Affairs for Civil Services Examination, Kalinjar Publications, New Delhi
4. Sanjiv Verma, The Indian Economy: For UPSC and State Civil Service Preliminary and Main Examination, Unique Publications, New Delhi
5. Veerasekaran, TNPSC Group II, Kizhakku Publishers, Chennai

DEPARTMENT OF HISTORY

SYLLABUS
For
M.A.HISTORY

SEMESTERS – III & IV

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI3001	SOCIAL AND CULTURAL HISTORY OF INDIA FROM 1857 TO 2010 AD	5	PAPER 9	5

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 – Mapilla 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 KalikinkarDatta: 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

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI3002	HISTORY OF MODERN CIVILIZATIONS	5	PAPER 10	5

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&
20[th]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
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SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI3003	HISTORIOGRAPHY	4	PAPER 10	5

UNIT I
Meaning, Nature and Scope of History – Kinds of History – Uses and abuses 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 – Contributions of Ibn Khaldun to Historiography
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 Ziyauddin Barani – Abdul Hamid – Modern: Sir William 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)
4. Subramaniyan N: Historiography, 1974
5. Rajayyan, K.: History its Theory and Method

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI3004	HISTORY OF THE OTTOMAN EMPIRE	4	PAPER 10	5

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

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HIE301	INTELLECTUAL HISTORY OF THE 20th CENTURY INDIA	4	ELECTIVE 3	5

UNIT I
India at the beginning of the 20th Century – Political Condition – Social Condition – Economic Condition – 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 – Jawaharalal Nehru – Moulana Abul Kalam Azad – Zakir Hussain – Jayaprakash Narayan

UNIT III
Social Thought: Sir Syed Ahmed Khan – Vinoba Bhave – Dr.Muthulakshmi Reddy – Periyar E.V.R – Mahatma Jothiba Phule - 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. 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.

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SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HIE302	**FUNDAMENTALS OF INDIAN GEOGRAPHY**	4	ELECTIVE 3	5

UNIT – I
Introduction – Location – Physical Divisions – Climate – Indian Monsoon – Natural Vegetation and Vegetation

UNIT – II
Agriculture – Problems of Indian Agriculture – Irrigational Developments – Crops – Food Crops – Cash Crops – Plantation Crops

UNIT – III
Minerals – Iron – Manganese – Mica – Lead – Zinc – Bauxite – Copper – Reserves, Distribution, Production, Power Resources

UNIT – IV
Industry – Lcoalisational factors – Major Industries – Iron & Steel – Textiles – Ship Building – Chemicals – Paper – Cement – Sugar

UNIT – V
Population – Growth, Distribution and Density – Food Production and Population

Books for Reference:
1. Government of India: The Gazetteer of India, Publication Divisions, Ministry of Information and Broadcasting, New Delhi, 1965
2. Gopal Singh: Geography of India
3. Dubey & Negi: Economic Geography of India

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SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI4001	**HISTORY OF USA FROM 1865 TO 2010 AD**	5	PAPER 13	5

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

UNITIII

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, NewJersey, 1959.
4. NambiArooran. K.: History of United States of America (Tamil), Tamil Nadu Text Book Society, Government of Tamil Nadu, Chennai, 1975
5. Parkes, H.B.: The United States of America – A History Khosla Publishing House, Delhi, 1986.

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SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI4002	HISTORY OF CHINA FROM 1900 TO 2000 AD	5	PAPER 14	5

UNIT I

China under the Manchus – Boxer Movement – Reforms – Political, Social and Economic Conditions – Fall of Monarchy – Revolution of 1911 – Dr. Sun Yat Sen

UNITII

Yuan Shi Kal'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 upto 1931 – The Nationalist Government – Domestic Policies from 1929 to 33 – Chiang-Kal-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

UNITV

The Establishment of People's Republic of China – Political, Social, Economic Conditions–Cultural Revolution – Deng Ziao – Peng – Reorganization of Communism – 1982 Constitution – Foreign Policy upto 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.

SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI4003	HISTORY OF ENGLAND FROM 1603 TO 1901 AD	4	PAPER 15	6

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

SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HI4004	HISTORY OF WEST ASIA FROM 1900 TO 2000 AD	4	PAPER 15	5

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.

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SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HIE401	**GROWTH OF PANCHAYATI RAJ INSTITUTIONS IN INDIA (WITH SPECIAL REFERENCE TO TAMIL NADU)**	**4**	**ELECTIVE 4**	**5**

UNIT I

Historical Setting – Self-Governing Village System in Ancient India – Chola Period – Village as an Autonomous Self-Governing Unit in Pre-British Period and Its Decline – Local Self-Governance – Lord Mayo and Lord Ripon – 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 Adhiseshaiyah and Et.Al., Decentralized Planning andPanchayati Raj,
New Delhi, Concept Publishing Company, 1994.

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SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HIE402	FUNDAMENTALS OF INDIAN ECONOMY	4	ELECTIVE 4	5

UNIT - I

Approaches to economic development and its measurement – Sustainable development: Role of State, market and other institution; Indicators of development – Human Development Index (HDI), Gender Development Index (GDI).

UNIT - II

Planning: Meaning, types, origin – Indian Five Year Plans; Objectives, strategies, financing – Targets, Achievements and failures.

UNIT - III

Broad demographic features of India's population; Rural – Urban migration; Urbanization and civil amenities; Poverty and Inequality

UNIT - IV

Land Reforms in India; Technological changes in agriculture – Pricing of agricultural inputs and output – Industrial policy; Public sector enterprises and their performance; Problem of sick units in India; Privatization and disinvestments debate.

UNIT - V

Rationale of internal and external reforms; Globalization of Indian economy; WTO and its impact on the different sectors of the economy – Financial sector reforms – Fiscal Reforms.

Books for Reference

1. Ahluwalia, I.J. and I.M.D Little (eds) (1999), India's Economic Reforms and Development Essays in honour of Manmohan Singh), Oxford University Press, New Delhi
2. Bardhan, P.K. (9th Edition) (1999), The Political Economy of Development in India,Oxford University Press, New Delhi
3. Chakravarty, S. (1987), Development Planning: The India Experience, Oxford University Press, and New Delhi
4. Daniwala, M.L. (1999), Dilemmas of Growth: The India Experience, Sage Publications, New Delhi

SEMESTER IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6HINM41	CONSTITUTION OF INDIA	2	ELECTIVE 4	4

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 Amendmentsand 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 Refrence

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.

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DEPARTMENT OF B.B.A

SYLLABUS
For
B.B.A.

SEMESTERS – V & VI

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA5001	HUMAN RESOURCE MANAGEMENT	5	CC13	5

Objective:

The objective of the course is to make students familiar with different aspects of human resource management in the organization through the different phases of acquisition, development, maintenance and retention.

Unit I

Meaning, Nature and scope of HRM – Difference between Personnel Management and HRM – Functions of HRM – Environment of HRM – Strategic HRM.

Unit II

Human Resource Planning – Recruitment – Sources of Recruitment – Selection – Methods of Selection – Application of various Tests – Interview techniques in selection – Placement-Job Analysis ,Job Description and job specification –Job Enrichment.

Unit III

Induction –Meaning of Training and Development - Training Methods – Techniques – Identification of Training needs.

Unit IV

Performance Appraisal – Need for Appraisal – Methods – Job Evaluation – Wages and Salary Administration-Objectives-Time rate and Unit rate-Incentive methods of wage payment-Permissible additions and deductions in wage and salary-Provisions of payment of wages Act, 1932.

Unit V

Transfer – Objectives – Procedure -Promotion -purpose –methods - termination of services – Career development – Mentoring – HRM Audit – Nature – Benefits – Scope –Approaches.

TEXT BOOKS:
1.Aswathappa   : Human Resource and Personnel Management
2.J Jayasankar   : Human Resource Management
3.Subba Rao P   : HRM and Industrial Relations

REFERENCE BOOKS:
1.Memoria C B   : Personnel Management
2.Gary Dessier   : Human Resource Management
3. Dwivedi R S   : Human Relations and Organization Behavior
4. Beard well and Holden   : Human Resource Management

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA5002	BUSINESS LAW	5	CC14	5

Objective: *To enlighten the students the elements of General Contract and Special Contract.To expose the students to legislations relating to sales.*

Unit I:
Business Law-Introduction and meaning-Law of Contract (General Contract only)-Kinds of Contract-Elements of Valid Contract-Offer-Tenders-Special terms in Contract-Acceptance.
Unit II:
Consideration-Stranger to Contract -Contracts without Consideration-Contractual Capacity-Free Consent-Coercion, Undue Influence, Misrepresentation and Fraud, Mistake.
Unit III:
Legality of Object- Void Agreements -Contingent Contracts -Performance of Contract- Discharge and Breach of Contract- Quasi Contract.
Unit IV:
Special Contracts- Bailment and Pledge- Lien- Hypothecation charge-Mortgage.
Unit V:
Sale of Goods Act- Sale and Agreement to Sell - Conditions and Warranties- Transfer of Property- Performance- Unpaid Seller- Rights.

TEXT BOOKS:
1.Kapoor N D   : Business Law
2.Shukla   : Business Law
3.R S N Pillai & Bagavathi   : Business Law

REFERENCE BOOKS:
1.   P C Tulsian   : Business Law
2.   Sreenivasan M R   : Business Law
3.   Pathak   : Legal aspects of Business

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA5003	COST ACCOUNTING	5	CC15	5

Objectives:*To familiarize the students on the importance of cost ascertainment , reduction and control.To develop the skills needed to apply costing techniques for each element of cost.To help students to understand the procedures to calculate the cost of the product and service.*

Unit -I
Cost accounting: Nature and Scope – Objective, Advantages and Limitations – Financial Vs Cost Accounting - Cost Classification – Elements of cost

Unit-II
Cost Sheet – Meaning – Objectives – Specimen of Cost Sheet – Preparation of Cost Sheet, Tenders and Quotations.

Unit –III
Purchase department and its objectives – Purchase procedure – Store Records – Bin Card – Store Ledger Account - EOQ - Levels of Stock –Re-Order Level, Maximum Level, Minimum Level, Average Level - Methods of Pricing of Material Issues - FIFO, LIFO, Simple Average price and Weighted Average price methods.

Unit-IV

Methods of Wage Payment – Piece Rate – Straight Piece Rate – Differential Piece Rate –Taylor's Differential Piece Rate – Merrick's Multiple Piece Rate – Time Rate – Incentive Plan :Halsey plan , Rowan Plan.

Unit-V

Overhead – Meaning - Classification of Overhead costs – Departmentalization of overheads – Allocation and Apportion of overhead costs – Primary Distribution of Overhead - Secondary distribution of overheads (Repeated Distribution Only).
Note: Weightage of Marks - Problems 80%, Theory 20%

Text Books:

   1. T.S. Reddy & Hari Prasad Reddy – Cost Accounting – Margham Publications, Chennai

2. Murthy A &Gurusamy – Essentials of Cost Accounting –Vijay
   Nicole Imprints Pvt. Ltd
3. S.P. Jain and Narang – Cost Accounting Kalyani Publishers, New
   Delhi.S.N. Maheswari – Principles of Cost Accounting – Sultan
   Chand & Sons, New Delhi.

Books for Reference:

1. Murthy A & Gurusamy S – Cost Accounting – Vijay Nicole Imprints
2. Tulsian P.C. – Cost Accounting – Tata McGrao Hills.
3. S.P. Iyangar – Cost Accounting – Sultan Chand & Sons, New Delhi.

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA5004	ENTREPRENEURIAL DEVELOPMENT	5	CC16	5

Objective: *The objective of the course is to make students understand the concept of entrepreneurship and to give comprehensive idea of opportunities for small enterprises.*

Unit I

Introduction – Understanding the meaning of Entrepreneurial ship – Characteristics of an Entrepreneur – Classification of the Entrepreneurs – Entrepreneurial Scene in India – Factors influencing Entrepreneurship.

Unit II

Entrepreneurial growth – Role played by government and Non-Government agencies – EDP's, TIIC, SIDBI, PIPDIC, IDBI, IFCI, ETC.

Problems and prospects of Women Entrepreneurs – Rural Entrepreneurs – Small Scale Entrepreneurs.

Unit III

Criteria for market selection -Business Idea generation Techniques – Identification of Business Opportunities – Marketing Feasibility – Financial Feasibility – Technical Feasibility – Legal Feasibility – Managerial and Location Feasibility.

Unit IV

Project Appraisal – Methods – Techniques – Preparation of Business Plan – Content of a Business Plan – Project Report.

Unit V

Procedure for starting an enterprise – Factors involved in selecting New Unit- Franchising and Acquisition.

Qualities of successful Entrepreneurs – case study.

TEXT BOOKS:
1.Jayshree Suresh   -   Entrepreneurial Development –Margham Publications
2.Raj Shankar – Essentials of Entrepreneurship – Vijay Nicole Imprints Pvt. Ltd.,
3.Khanka   -   Entrepreneurial Development
Books for Reference:
1.Gupta C B - Entrepreneurial Development
2.Saini - Entrepreneurship-Theory and Practice

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA5005	MARKETING MANAGEMENT	2	CC17	4

Objective: *To impart the students the need for marketing science in the modern business world.*
Unit I
Fundamentals of Marketing – Role of Marketing- Relationship of Marketing with other functional areas- Concept of Marketing Mix- Marketing approaches- Various Environmental factors affecting the marketing functions.
Unit II
Buyer Behavior- Buying motives- Buyer Behavior Model- Factors influencing buyer behavior.
Market segmentation- Need and basis of segmentation- Marketing Strategy.
Unit III
Sales Forecasting- various methods of Sales Forecasting- The Product- Characteristics- Classification- Consumer goods- Industrial goods-New product development-process- Product Life Cycle- Product line and product mix decisions- Branding- Packaging.

Unit IV

Pricing- Factors influencing pricing decisions – Pricing objectives – Pricing policies – Pricing strategies .

Unit V

Channels of Distribution – Definition-Importance- Types-Factors considered in selecting channels –Classification of middle men – Wholesaler-Definition-Functions- Retailer- Definition-Functions of Retailers .

TEXT BOOKS:

1.Rajan Nair   :Marketing
2.J. Jayasankar   :Marketing

REFERENCE BOOKS:

1.Philip Kotler & Armstrong   :Marketing Management
2.Saxena   : Marketing Management
3.Ramaswamy and Namakumari   : Marketing Management
4.Varshney and Gupta S L   : Marketing Management

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA5006	RETAIL MANAGEMENT	2	CC18	4

Objective: *The objective of this paper is to make the students understand the basic concepts of retailing, design and operation of retail facilities*.

UNIT 1

Definition of retailing- feature of retailing -importance of retailing- functions of retailing- types of retailers -Retail in India-Retailing from International perspectives.

UNIT II

Retail shopper behavior –factor influencing the retail shopper-the customer decision making process-online retailing –types of online retail-importance of online retailing-advantage of online retail- disadvantage of online retail.

UNIT III

Site selection –influencing factor in site selection –geographical location decision –types of geographical location zones (location area,market area and primary trading /concentric zones) - Location and types of retail development (solitary site ,unplanned shopping area site , planned shopping area site) – types of planned shopping area.

UNIT IV

Merchandise Management – visual merchandise management – category management – space management .

UNIT V

Retail promotion – definition – promotion al objectives –SMARRTT objectives – promotional advertising –sales promotion.

Text Books:
1. Dr.L.Natarajan – Retail Management – Margham Publications.
2. Suja Nair –Retail Management –HPM
3. Swapan Pradhan – Retailing Management
4. K.Venkataraman – Retail Management –SHBP
5. A rif Sakh – Retail Management –HPH

Books for Reference:

1. Berman Berry & Joel Evans – Retail Management
2. Pradhan – Retail Management
3. Levy Michale & Barton – A weitz - Retail Management
4. Chetan Bajaj Etal – Retail Management

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BASB51	EXPORT MANAGEMENT	1	AEC5	2

Objective:
The objective of the course is to convey the relevance of export, foreign exchange and to create an understanding on export procedures.

Unit I
Export Management – Meaning and Definition –Need for Export Management–functions of Export Manager – Barriers to Export.

Unit II
Export Incentives –Duty Entitlement Pass Book Scheme- Duty Exemption Entitlement –Export Promotion Capital Goods Scheme –Export Oriented Units-Export Houses – Trading Houses- Star Trading Houses.

Unit III
Export Finance – Pre-shipment Finance –Post-shipment Finance- Role of EXIM Bank and Export Credit Guarantee Corporation.

Unit IV
Export Procedures (Customs formalities and Shipping).

Documentation (Pro forma Invoice ,Commercial Invoice ,GR 1 Form , ,Bills Receivables ,Shipping Bill ,Shipping Order ,Vehicle Ticket, Bill of Lading, Mate Receipt, Airway Bill.
Terms of Payment (Free On Board (FOB), Cost and Freight (C&F),,Cost Insurance and Freight (CI &F),Documents against Acceptance (D/A), Documents against payment (D/P).
Letter of Credit (L/C) - Advantages - Types of letter of credit.

Unit V

Government Institutions assisting in promoting export (Ministry of Commerce, Directorate General Of Foreign Trade- Export Promotion Council- Indian Institute of Foreign Trade –India Trade Promotion Organization-Federation of Indian Export Organization only).

TEXT BOOKS:

1.P.R.Khurana-Export Management –Galgotia Publishing House, Delhi
2.Balagopal –Export Management.
3.Kumar and Mittal – Export Management
4. D.C .Kapoor –Export Management-Vikas Publishing House

REFERENCE BOOKS:

1.Francis Cheruvilam-Himalaya Publishing House.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA6001	**INDUSTRIAL RELATIONS**	5	CC19	5

Objective: *The objective of the course is to make the students capable of maintaining peace and harmony in the organization by the application of various labour laws and ensuring maximum efficiency*

Unit I

Industrial Relations –Meaning – Nature and Scope of Industrial Relations – Importance – Trade Unions –Objectives and Functions of Trade Union – Procedure for Registration – Rights of registered Trade Union – Causes for failure of Trade Unions in India.

Unit II

Industrial Disputes – Definition – Meaning – Machineries available under Industrial Dispute Act for the prevention and settlement of Industrial

disputes – Causes for Industrial Dispute – Industrial Unrest – Employee Dissatisfaction – Disciplinary Action – Strikes – lockout – Legal and illegal – Prevention of Strikes and Lockouts.

Unit III

Participative Management – Structure – Scope – Collective Bargaining – Works Committee – Joint Management Councils– Role of Government in Collective Bargaining.

Unit IV

Indian Factories Act, 1948 – Objectives –Provisions of the Act regarding Welfare, Health and Safety of Workers.

Unit V

Workmen's Compensation Act and International Labor Organization – Role and Functions.

Text Books:

1. Sreenivasan M R   : Industrial Relations and Labor legislations
2. Monoppa   : Industrial Relations
3. B.Nanda Kumar   : Industrial Relations Labour Welfare and Labour Laws
4. Subba Raop   : Human Resource Management and Industrial Relations

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA6002	ADVERTISING AND SALESMANSHIP	5	CC20	5

Objective:

The objective of the course is to make students understand the concept of advertising and salesmanship.

Unit I

Advertising- Meaning and Definition-Publicity Vs Advertising-Objectives-Benefits of Advertising to Manufacturers, Customers, Middlemen and Sales force-Arguments against Advertising.

Unit II

Kinds of Advertising - Advertisement Copy - Qualities of a good Advertisement Copy –Advertising Budget.

Unit III

Advertisement Media – Print Media, Broad cast Media and other Media – Factors influencing in the selection of Media –Measuring the advertisement effectiveness.

Unit IV

Salesmanship – Meaning and Definition –Salesmanship Vs Advertising – Process of Selling – Kinds of salesmen.

Unit V

Training and supervising the salesman – Remunerating salesman – Motivating the salesman.

Text Books:

1. Dawar S.R Salesmanship and Advertisement
2. P.K. Agarwal –Advertising Management
3. C.N.Sontaki –Advertising – Kalyani Publishers.
4. P.K. Sahu and K.C.Rout –Salesmanship and Sales management – Vikas
5. S.L. Gupta –Sales and Distribution Management

Books for Reference:
1. Still, Cundiff, Govoni – Sales Management
2. U.C.Mathur –Advertising Management
3. Chunawala &Sethia –Foundation of Advertising Theory and Practice.

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA6003	SERVICES MARKETING	5	CC21	5

Objective:

To familiarize the service marketing concept, fundamentals, tools, techniques and its significance in liberalized business environment.

UNIT I: Marketing Services

Meaning and Definition of Services – components of service – characteristics of services – Differences between services and goods – activities coming under services – evolution and growth of the service sector.

Unit II: **Marketing Mix in Services Marketing**

Meaning of Marketing Mix –meaning of service marketing mix – Seven components of service marketing mix – product, price, promotion, place, people physical evidence, process.

Unit III :**Marketing of Services**

Marketing of financial services – classification of financial services ,Banking services and Insurance services –characteristics of marketing financial services – Marketing Mix of financial services.

Unit IV: **Marketing of Insurance Services**

Meaning of marketing of insurance services –market segmentation in insurance business – marketing mix for insurance companies

Unit V: **Effective Management of Services Marketing**

Quality of service – Five dimensions of service quality – customer gap – causes of customer gap –strategies to close the customer gap.

Text Books:

1. Dr. L. Natarajan – Services Marketing –Margham Publications.

2. Ravi Shankaer –Services Marketing-Excel Books

3. A.Payne – The essence of Sservices Marketing

4. S.M. Jha - Services marketing

5. R. Srinivasan –Services Marketing – The Indian Context

6. Govind Apt – Services Marketing

Books for Reference:

1. Nimit Chowdhary & Monica Choudary – The Text Book of Services – The Indian Experience
2. Christopher H Lovelock –Services: Marketing.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA6004	MARKETING RESEARCH	5	CC22	5

Objective:

The objective of this course is to understand the various aspects of Marketing Research, identify the various tools available to a Marketing Researcher and helps in marketing decision making.

UNIT- I
Introduction to Marketing Research – Definition – Objectives –Growing importance of Marketing Research – Main Divisions of Marketing Research – Uses of Marketing Research – Limitations and Threats to Marketing Research.

UNIT – II
Marketing Research Process – Problem Definition – Research Purpose – Research Objective – Research Design.

UNIT – III
Data Collection – Methods of Data Collection – Secondary Data – Sources of Secondary Data –Primary Data –Collection of Primary Data – Observation – Questionnaire – Designing a Questionnaire – Interviewing – Interviewing skills on the part of the investigator.

UNIT – IV
Basics of Sampling – Advantages and Limitations of Sampling – Sampling Process – Sampling Techniques – Probability and Non-Probability Sampling.

UNIT –V
Application of Marketing Research – Product Research – Advertising Research .

Text Books:

1. Dr.P. Ravilochanan –Marketing Research – Margham Publications
2. Sharma D - Marketing Research
3. S.L. Gupta - Marketing Research
4. G.C. Berry - Marketing Research
5 S. Sumathi and P. Saranaval,Marketing Research and Consumer Behaviour

Reference Books:

1. Tull and Hawkings - Marketing Research
2. Boyd and Westfall- Marketing Research
3. Aaker - Marketing Research

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA6005	COMPUTER APPLICATION IN BUSINESS	2	CC23	4

Objective:

The main objective of this course is to acquaint the students with special applications of IT in business. It will also familiarize students regarding IT application in documents handling and various other computer application in business.

Unit I

Information Technology Basics – Information definition – Prerequisite of information – need for information – components of information Technology – Role of Information Technology in Business.

Unit II

Word processing with MS Word- starting MS word – MS word environment –working with word documents – working with text – working with tables – checking spelling and grammar – printing a document.

Unit III

Spreadsheets and MS Excel: Starting MS Excel – MS Excel environment – working with Excel workbook – working with worksheet – Formulas and Functions – Inserting Charts – printing in Excel.

Unit IV

Making presentation with MS power point: Starting MS power point – MS power point environment – working with power point – working with different views – designing presentation – printing in power point

Unit V

Electronic Commerce – Types – Advantages and disadvantages – Electronic data interchange (EDI) – How EDI works – EDI benefits – EDI limitations – SMART card – SMART card applications.

Text Books:
1. Leon & Leon – Computer Application in Business – Vijay Nicole Imprints Pvt. Ltd
2. Dr.P. Rizwan Ahmed – Computer Application in Business with Tally – Margham Publications
3. Mohan Kumar – Computer Application in Business – Vijay Nicole Imprints Pvt. Ltd.
4. Ananthi Sheshasayee – Computer Application in Business – Margham Publications.

Book for Reference:
1. Introduction to Information Technology, ITL ESL, Pearson Education
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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BA6006	COMPANY LAW	2	CC23	4

Objective:

The objective of this course is to make students understand the rules and the regulations regarding Company formation, Corporate Governance and raising of Capital.

Unit I

Company –Definition- Characteristics of a Company - Types of Company, Private and Public Limited Company –Distinction between private and public company – Holding and Subsidiary Company – Government Company.

Unit II

Articles of Association – Meaning and contents of Articles of Association - Memorandum of Association – Meaning –Content of Memorandum of Association - Prospectus -meaning and contents - Statement in lieu of Prospectus

Unit III

Share Capital – Types of Share s –Equity Shares – Preference Shares – Types of Preference Shares – Debentures – Types of Debentures – Management of Company – Powers of Directors and Managing Director.

Unit IV

Company Meetings – Types of Meeting -Statutory, Annual General Body, Extraordinary General Body Meeting only) – Procedures for conducting meetings

Unit V

Winding up of companies – Meaning – Modes of Winding up of a Company -Compulsory winding up under order of Court – Grounds for compulsory winding up – Voluntary Winding up of company – Types of voluntary winding up

Text Books:

1. N D Kapoor - Company Law
2. R.R. Gupta and V.S.Gupta –Indian Company Law
3. Avtar Singh – Indian Company law
4. M.P. Tandon –Text Book of Company Law
5. Shukla -Company Law
6. RSN Pillai and Bagavathi – Company Law.

Books for Reference:
1.   Dr. M R Sreenivasan   :Company Law
2.   P C Tulsian – Company Law

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BASBP6	MS OFFICE (PRACTICALS)	1	AEC6	2

Objective:

To give knowledge of MS-Office to the students so that the students can prepare test documents and Excel sheets and to prepare 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

DEPARTMENT OF COMMERCE

SYLLABUS
For
B.Com COMMERCE

SEMESTERS – V & VI

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO5001	COST ACCOUNTING - I	5	CC13	5

Objective: To make the students familiar with the concepts of Cost Accounting.

Unit – I: Introduction
Cost Accounting - Definition and Features - Nature and Scope – Objectives - Advantages and Limitations – Financial Accounting Vs Cost Accounting – Cost Concepts and Classifications – Requisites of a Good Costing System – Cost Sheet and Quotation – Target Costing - Reconciliation of Cost and Financial Profits.

Unit – II: Materials
Material Control – Inventory Control – Objectives, Advantages & Limitations – Essentials of Material Control – Inventory Control and its Techniques – Inventory Turnover Ratio – ABC Technique – Levels of Stock and EOQ – Perpetual Inventory System.

Unit –III: Pricing and Issue of Materials
Pricing of Material Issues – FIFO – LIFO – Simple and Weighted Average Method – Market Price Method - Accounting for Material Losses.

Unit – IV: Labour
Labour Turnover – Idle and Over time – Remuneration and Incentives – Time Rate System – Piece Rate System – Taylor's, Merrick's, Gantt's, Halsey and Rowan Plans – Calculation of Earnings of Workers.

Unit – V: Overheads
Overhead – Meaning - Classification - Importance – Allocation, Absorption and Apportionment of Overhead Costs – Primary and Secondary Distribution of Overheads – Computation of Machine Hour Rate and Labour Hour Rate.

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

Books for Study:
1. S.P Jain and Narang, Cost Accounting – Kalyani Publishers, New Delhi.
2. T.S. Reddy & Hari Prasad Reddy, Cost Accounting – Margham Publication, Chennai.

Books for Reference:
1. S.P Iyangar, Cost Accounting _ Sultan Chand & Sons, New Delhi.
2. P.C Tulsin, Cost Accounting – Tata McGraw Hills, New Delhi.S.N Maheswari,
3. Principles of Cost Accounting – Sultan Chand & Sons, New Delhi.

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO5002	MANAGEMENT ACCOUNTING - I	5	CC14	5

Objective: To enable the students to understand the concepts and various tools of Management Accounting.

Unit – I: Introduction
Management Accounting – Definition - Objectives – Nature & Scope – Advantages & Limitations – Management Accounting Vs. Financial Accounting – Management Accounting Vs. Cost Accounting – Duties of a Management Accountant.

Unit – II: Analysis and Interpretation
Financial Analysis – Types – Tools – Comparative Statements – Common Size Financial Statements – Trend Percentages.

Unit – III: Ratio Analysis
Ratio Analysis – Definition –Advantages & Limitations - Classification of Ratios - Profitability Ratios - Turnover Ratios – Financial Ratios – Preparation of Balance Sheet from Ratios.

Unit – IV: Fund Flow Statement
Fund Flow Statement - Definition - Need – Advantages & Limitations – Statement of Changes in Working Capital – Calculation of Funds from Operation – Preparation of Fund Flow Statement.

Unit – V: Cash Flow Statement
Cash Flow Statement - Definition – Advantages and Limitations - Objectives and Scope – Fund Flow Statement Vs. Cash Flow Statement – Calculation of Cash From Operation - Preparation of Cash Flow Statement as per AS-3 – Theoretical Methods of Accounting for Changing Prices.

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

Books for Study:
1. T.S.Reddy & Y. Hari Prasad Reddy, Management Accounting, Margham Publications, Chennai.
2. S N. Maheswari, Management Accounting, Sultan Chand & Sons, New Delhi.

Books for Reference:
1. Khan and Jain, Management Accounting, Tata McGraw Hill, New Delhi.

2. Sharma & Sasi K. Gupta, Management Accounting, Kalyani Publications,New Delhi.

3. I M Pandey, Management Accounting, Vikas Publishing House, New Delhi.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO5003	AUDITING	5	CC15	5

Objective: To inculcate the knowledge on Auditing in the modern scenario that gets the students familiarized with the subject.

Unit – I: Introduction
Auditing - Definition – Objectives – Merits and Demerits – Classification – Differences between Accounting and Auditing – Qualities of an Auditor.

Unit – II: Internal Control and Audit Programme
Internal Control - Definition – Objectives – Internal Check and Internal Audit – Audit Programme – Objectives and Contents – Audit Note Book and Audit Working Papers.

Unit – III: Vouching, Depreciation and Reserves
Vouching – Definition – Objectives - Vouching of Trading Transactions – Depreciation – Auditors' Duties in respect of Depreciation – Reserves – Classification of Reserve.

Unit – IV: Valuation, Verification and Company Audit
Verification of Assets and Liabilities – Distinction Between Verification and Valuation – Company's Audit – Qualification and Disqualification of Company Auditor – Rights and Duties – Comptroller & Auditor General (CAG) of India.

Unit – V: Audit Report and E- Audit
Audit Report – Importance and Contents – EDP Audit - Procedure of Audit under EDP System – Electronic Audit – Uses of Computers in Auditing.

Books for Study:
1. Kamal Gupta, Contemporary Auditing –Tata Mc Graw Hill. New Delhi.
2. B.N. Tandon, Practical Auditing –S Chand and Co., New Delhi.

Books for Reference:
1. Dr. K. Sundar, Auditing –Vijay Nicole Imprints Private Limited, Chennai.
2. V.H. Kishadwala,Auditing Principles and Practices –Sultan Chand & Sons, New Delhi.
3. D P. Jain, Auditing –Konark Publishers Pvt. Limited.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO5004	HUMAN RESOURCE MANAGEMENT	5	CC16	5

Objective: To familiarize students with various concepts and techniques of HRM which will contribute to the progress of an Organization

Unit – I: Introduction to HRM

Human Resource Management - Definition - Characteristics – Scope – Objectives – Importance – Functions – Personnel Management vs Human Resource Management – Recent trends in HRM.

Unit – II: Human Resources Planning and Recruitment

HR Planning - Definition - Need and Importance – Steps in HR Planning – Job Analysis – Job Description – Job Specification - Recruitment – Definition – Sources – Selection – Meaning - Selection Process – Meaning of Placement and Induction.

Unit – III: Training and Development

Training - Need and Importance – Methods and Techniques – Executive Development – Methods and Techniques – Training vs Development.

Unit – IV: Performance Appraisal

Performance Appraisal – Objectives – Importance – Methods - Traditional and Modern Methods – Performance Appraisal vs Potential Appraisal.

Unit – V: Employee Grievances and Employee Discipline

Employee Grievance - Features– Sources of Grievances – Grievance Procedure – Grievance Redressal System – Employee Discipline - Features – Objectives – Types – Causes of Indiscipline.

Books for Study:

1. C.B. Gupta, Human Resource Management, Sultan Chand and Sons, New Delhi.
2. J. Jayasankar, Human Resources Management, Margham Publications, Chennai.

Books for Reference:

1. Gary Dessler, Human Resource Management, Pearson Education India, New Delhi.
2. K. Sundar & J. Srinivasan, Essentials of Human Resource Management, Vijay Nicole Imprints Private Ltd., Chennai.
3. S.S Khanka, Human Resource Management, S. Chand Publishing, New Delhi.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO5005	INCOME TAX LAW & PRACTICE - I	2	CC17	4

Objective: To introduce the students to concepts of Income tax and to give an insight into the different heads of income.

Unit – I: Basic Concepts, Residential Status & Exempted Incomes

Basic Concepts – Assessment Year – Previous Year – Persons – Assessee – Income – Gross Total Income – Total Income – Determination of Residential Status – Individual – HUF – Firm – Company – Relationship between Residential Status and Incidence of Tax – Incomes Exempt from Tax u/s 10.

Unit – II: Income from Salaries

Salary – Definition – Characteristics of Salary Income – Allowances – Perquisites – Profits in Lieu of Salary – Deductions from Salary Income – Provident Fund – Computation of Income from Salary.

Unit – III: Income from House Property

Income from House Property – Basis of Charge –Exemptions – Annual Value – Self-Occupied and Let-out Properties –Deductions u/s 24 – Computation of Income from House Property.

Unit - IV: Profits and Gains of Business or Profession

Income from Business – Basis of Charge – Basic Principles – Specific Deduction under the Act – General Deductions – Specific Disallowances – Deemed Profits – Computation of Income from Business – Computation of Income from Profession.

Unit - V: Depreciation

Depreciation Allowance – Section 32 – Conditions for Claiming Depreciation – Block of Assets – Computation of Normal Depreciation Allowance – Additional Depreciation – Conditions and Rates of Depreciation – Meaning of Actual Cost – Unabsorbed Depreciation – Terminal Depreciation – Balancing Charge.

Note: Weightage of Marks - Theory 40% and Problems 60%

Books for Study:

1. Gaur & Narang, Income Tax Law and Practice, Kalyani Publishers, New Delhi.

2. Dr. A. Murthy, Income Tax, Vijay Nicole Imprints Private Ltd., Chennai.

Books for Reference:

1. Vinod K Singhania & Monica Singhania, Students' Guide to Income Tax, Taxmann, New Delhi.
2. Mehrotra H C, Income Tax Law and Practice, Sahithya Bhavan, Agra.
3. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt.Ltd.,Chennai.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO5006	SERVICES MARKETING	2	CC18	4

Objective: To acquaint the students to gain expert knowledge in marketing of various services.

Unit - I: Introduction
Services Marketing - Definition - Classification - Evolution of Services - Contribution of Services Sector to the Modern Economy - Services vs Goods – Significance of Service Marketing – Reason for Growth of Service Sector.

Unit - II: Service Marketing Mix and Service Product
Service Marketing Mix - Definition – Characteristics – Marketing Mix - Concept of Service Product – Planning and Creating of Services – Identifying and Classifying Supplementary Services – Product Life Cycle – Branding of Services – New Service Development (NSD).

Unit - III: Pricing of Services
Pricing of Services - Objectives – Factors affecting Pricing Decisions – Approaches of Pricing Services – Methods of Pricing – Problems in Pricing Services.

Unit – IV Distribution and Promotion of Services
Distribution in a Service Context – Service Location Decision – Options for Service Delivery – Service Delivery in Cyberspace – Role of Intermediaries – Distribution Channels – Promotional Objectives – Sales Promotion Tools.

Unit - V: Marketing of Services
Marketing of Services – Financial – Banking – Insurance – Healthcare – Tourism – Professional and Consultancy – Telecom Services.

Books for Study:
1. Dr. Natrajan L, Services Marketing, Margham Publications, Chenai.
2. Khan M Y, Services Marketing, Tata McGraw Hill, New Delhi.

Books for Reference:
1. Dr. Balaji B, Services Marketing and Management, S. Chand & Company Ltd., New Delhi.
2. Jain N C and Saakshi – Services Marketing, AITBS Publisher, New Delhi.
3. Jha S M, Services Marketing, Himalaya Publishing House, Mumbai.

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5COSB51	E-COMMERCE	1	AEC5	2

Objective: To familiarize the students to concepts of Electronic Commerce.

Unit - I: Introduction to E-Commerce

E-Commerce - Definition – Features of E-Commerce – Advantages and Disadvantages.

Unit – II: E-Business Models

Introduction to E- Business - E-Commerce Models – Models based on Transaction Parties – B2C – B2B – C2C – Models based on Transaction Types (Basic Concepts only).

Unit – III: Electronic Data Interchange & Online Shopping

Electronic Data Interchanges (EDI) – Benefits of EDI – Online Shopping – Benefits and Limitations – Modes of Payment in Online Shopping.

Unit – IV: E-Marketing & E-CRM

E-Marketing – Traditional Marketing vs. E- Marketing – Online Marketing – Benefits and Limitations – E- Advertising – E- Branding – E- CRM (Basic Concepts only).

Unit – V: E – Banking

E-Banking – Features – Mobile Banking - E-Payment System – Risks in E-Payment System.

Books for Study:

1. K. Abirami Devi & Dr. M. Alagammai, E-Commerce, Margham Publications, Chennai.
2. P.T.Joseph, S.J., E- Commerce – An Indian Perspective, Prentice Hall of India, New Delhi.

Books for Reference:

1. Elias M. Awad, Electronic Commerce, Prentice Hall of India, New Delhi.
2. Gary P.Schneider, E-Commerce – Strategy, Technology and Implementation, Cengage Learning India Pvt. Ltd., New Delhi.
3. Greenstein & Merylin, Electronic Commerce, Tata Mc.Graw Hill, New Delhi.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO6001	COST ACCOUNTING - II	5	CC19	5

Objective: To make the students familiar with the concepts of cost accounting.

Unit – I: Job, Batch and Contract Costing

Job, Batch, Contract Costing - Job Costing – Definition and Features – Distinctions between Job Costing and Contract Costing – Cost Accumulation - Batch Costing – EBQ Contract Costing – Definition – Features – Work Certified and Uncertified – Incomplete Contract – Escalation Clause – Cost Plus Contract and Contract Account.

Unit – II: Process Costing

Process Costing - Definition and Features – Advantages and limitations– Job Costing vs Process Costing – Normal Loss and Abnormal Loss – Abnormal Gain – By Product and Joint Products – Process Accounts.

Unit –III: Service Costing

Operating and Service Costing - Operating Cost Units – Operating Costing in some Service Industries – Transport Costing – Advantages of Operating

Costing in Transport Organisation – Costing Procedure in Transport Organisation – Costing for Lodging Houses, Hotels and Tourism.

Unit – IV: Standard Costing

Standard Costing - Advantages and Limitation – Analysis of Variances – Direct Material – Direct Labour and Overhead.

Unit – V: Cost Audit

Cost Audit - Definition – Objectives – Types – Advantages – Auditing Techniques – Cost Audit Programme – Cost Auditor – Appointing Authorities of Cost Auditor – Appointment of Cost Auditor – Eligibility for Appointment – Functions of a Cost Auditor – Rights, Duties and Responsibilities.

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

Books for Study:
1. T.S. Reddy & Hari Prasad Reddy, Cost Accounting – Margham Publication, Chennai.
2. S.P Jain and Narang, Cost Accounting – Kalyani Publishers, New Delhi.

Books for Reference:
1. S.P Iyangar, Cost Accounting – Sultan Chand & Sons, New Delhi.
2. P.C Tulsin, Cost Accounting – Tata McGraw Hills, New Delhi.
3. S.N Maheswari, Principles of Cost Accounting – Sultan Chand & Sons, New Delhi.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO6002	MANAGEMENT ACCOUNTING - II	5	CC20	5

Objective: To familiarize the students with various tools of Management Accounting.

Unit – I: Budget & Budgetary Control

Budget & Budgetary Control - Definition - Objectives - Advantages - Limitations – Classification of Budgets – Zero Based Budgeting – Preparation of Sales Budget –Material Budget- Production Budget – Cash Budget – Flexible Budget – Master Budget.

Unit – II: Marginal Costing

Marginal Costing – Definition – Features – Advantages & Limitations – Cost-Volume-Profit Analysis – Break Even Point – Margin of Safety – Pricing Decision – Make or Buy Decision.

Unit – III: Capital Budgeting

Capital Budgeting – Definition - Features – Need and Significance – Evaluation of Capital Budgeting Proposals – Pay Back Period (PBP) – Accounting Rate of Return (ARR) – Discounted Cash Flows – Net Present Value (NPV) – Internal Rate of Return (IRR) – Profitability Index Method (PIM).

Unit – IV: Working Capital Management

Working Capital Management – Working Capital - Objectives – Advantages & Limitations - Types – Sources - Determination of Working Capital Needs.

Unit – V: Responsibility Accounting and Management Audit

Responsibility Accounting – Definition- Steps- Advantages – Cost Centres vs. Responsibility Centres - Management audit – Objectives – Need – Difference between Financial Audit and Management Audit – Conducting Management Audit. (Theory Only)

Note: Weightage of Marks - Theory 20% and Problem 80%.

Books for Study:
1. T.S.Reddy & Y. Hari Prasad Reddy, Management Accounting, Margham Publications, Chennai.
2. S N. Maheswari, Management Accounting, Sultan Chand & Sons, New Delhi.

Books for Reference:
1. Khan and Jain, Management Accounting, Tata McGraw Hill, New Delhi.
2. I M Pandey, Management Accounting, Vikas Publishing House, New Delhi.
3. Dr. A. Murthy & Dr. A. Guruswamy, Management Accounting, Vijay Nicole Imprints Private Ltd., Chennai.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO6003	ENTREPRENEURIAL DEVELOPMENT	5	CC21	5

Objective: To convey the practical knowledge of entrepreneurship to the students that results in making good entrepreneurs.

Unit – I: Introduction

Entrepreneurship – Definition – Types – Factors affecting Entrepreneurship – Entrepreneur – Definition – Qualities of an Entrepreneur – Classification of Entrepreneur – Functions of Entrepreneur – Role of Entrepreneurs in Economic Development.

Unit – II: Project Management and Idea Generation

Project Management – Meaning – Project Appraisal – Preparation of Project Report – Tools for Analysis – Project Finance - Identification and Selection of Business Opportunity – Idea Generation – Techniques used for Idea Generation.

Unit – III: Entrepreneurial Development Agencies

Commercial Banks – District Industries Centre (DIC) – National Small Industries Corporation (NSIC) - Small Industries Development Organization (SIDO) – Small Industries Development Corporation (SIDCO) - Financial Institutions – IDBI – IFCI – ICICI – SIDBI – SFC.

Unit – IV: Entrepreneurial Development Programme and Rural Entrepreneurship

Entrepreneurial Development Programme – Phases of EDP – Role of Government in Organising EDPs- National Skill Development Corporation(NSDC) – Critical Evaluation – Rural Entrepreneurship – Need – Problems – Development of Rural Entrepreneurship.

Unit – V: Incentives and Subsidies

Meaning of Incentives and Subsidies – Need and Problems – Incentives for Development of Backward Areas – Incentive for SSI units in Backward Areas – Taxation Benefits to MSME Units – Subsidies and Incentives in Tamil Nadu – Incentives to Women Entrepreneurs.

Books for Study:
1. Dr. S.S. Khanka, Entrepreneurship Development - S. Chand & Co., New Delhi.
2. Jayashree Suresh, Entrepreneurial Development –Margam Publication, Chennai.

Books for Reference:
1. Vasant Desa, Dynamics of Entrepreneurial Development –Himalaya Publication.
2. Robert D. Hisrich, Michael P. Peters & Dean A. Shepherd, Entrepreneurship - Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Entrepreneurship – Ravindranath V. Badi & Narayana, Vrinda Publication (P)Ltd, New Delhi.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO6004	INDUSTRIAL LEGISLATIONS	5	CC21	5

Objective: To familiarize the students with various industrial legislations and to expose the students to legislation's relating to welfare of workers.

Unit - I: The Factories Act, 1948

The Factories Act: Definitions – Health – Safety – Welfare – Working Hours – Special Provisions for Women and Young Children - Annual Leave with Wages – Penalties.

Unit - II: The Industrial Disputes Act, 1947

The Industrial Disputes Act: Industrial Dispute - Objectives - Definitions - Strikes and Lockouts - Layoff – Retrenchment – Closure - Special Provisions - Unfair Labour Practices – Dispute Settlement Machineries.

Unit - III: The Workmen's Compensation Act, 1923

The Workmen's Compensation Act: Workman's Compensation – Scope - Defenses available to Employers before Passing of the Act – Rules - Defenses available to Employees – Amount of Compensation – Occupational Diseases.

Unit - IV: The Payment of Gratuity Act, 1972 & The EPF & Miscellaneous Provisions Act, 1952

The Payment of Gratuity Act: Gratuity - Scope - Definitions - Payment of gratuity - Compulsory Insurance and Protection of Gratuity - Determination and Evaluation of Gratuity - Obligation and Rights of Employee and Employer - Penalties. The EPF & MP Act - Definitions – EPF schemes – Fund – Employees Deposit Linked Insurance Scheme.

Unit - V: The Trade Unions Act, 1926

The Trade Unions Act: Definitions – Registration of Trade Union –

Cancellation of Registration – Functions –Rights and Privileges.

Books for study:

1. N.D. Kapoor , A Handbook on Industrial Laws, Sultan Chand & Sons,Delhi, 2005.
2. Dr.M.R.Sreenivasan & C.D Balaji, Industrial Law & Public Relations, Margham Publications, Chennai.

Books for Reference:

1. S.C.Srivastava, Vikas Publications House Pvt Ltd., New Delhi
2. Sumeet Malik, Industrial Laws, Eastern Book Company, Lucknow, 2008.
3. Sinha   P.R.N.,   SinhaInduBala&ShekharSeemaPriyadarshini, Industrial Relations,Trade Unions and Labour Legislation, PHI, 2012.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO6005	INCOME TAX LAW & PRACTICE - II	2	CC21	4

Objective: To equip the students with the working knowledge of Income Tax.

Unit – I: Capital Gains

Capital Gains and its Computation – Capital Assets – Definition –

Exceptions – Short-term and Long-term Capital Assets – Transfer –

Exceptions – Computation of Capital Gain – Indexed Cost – Deductions

under Section 54.

Unit – II: Income from Other Sources

Income from Other Sources and its Computation – Specific Incomes and

Other Incomes –Deductions.

Unit – III: Clubbing of Income & Set-Off and Carry forward of Losses

Clubbing of Income (Aggregation of Income) – Deemed Incomes - Set-Off and Carry Forward of Losses.

Unit - IV: Assessment of Individuals and Taxability

Deductions from Gross Total Income – Deductions in respect of Certain Payments and Deductions in respect of Certain Incomes (80C to 80U). Computation of Taxable Income of an Individual – Computation of Tax Liability.

Unit - V: Filing of Return of Income and Assessment

Procedure for Filing of Return of Income – E-Filing – Due Date of Filing of Return – PAN – Types of Assessment– Self Assessment – Regular Assessment – Best Judgment Assessment and Income Escaping Assessment.

Note: Weightage of Marks - Theory 40% and Problems 60%

Books for Study:
    1. Gaur & Narang, Income Tax Law and Practice, Kalyani Publishers, New Delhi.
    2. Dr. A. Murthy, Income Tax, Vijay Nicole Imprints Private Ltd., Chennai.

Books for Reference:
1. Vinod K Singhania & Monica Singhania, Students' Guide to Income Tax, Taxmann, New Delhi.
2. Mehrotra H C, Income Tax Law and Practice, Sahithya Bhavan, Agra.
3. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt.Ltd., Chennai.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CO6006	FINANCIAL MANAGEMENT	2	CC21	4

Objective: To familiarize the students with the various tools and techniques of Financial Management.

Unit – I: Introduction

Financial Management – Definition – Scope – Objectives – Significance - Profit Maximization vs Wealth Maximization – Finance Function - Role of Financial Manager – Methods and Tools of Financial Management.

Unit – II: Cost of Capital

Meaning – Importance - Components of Cost of Capital – Factors determining Cost of Capital — Cost of Debt – Cost of Equity – Cost of Redeemable Preference Share (excluding Dividend Yield Method) – Computation of Cost of Capital.

Unit – III: Capital Structure

Capital Structure – Definition – Optimum Capital Structure – Features of an Appropriate Capital Structure – Factors Determining Capital Structure – Techniques of Planning the Capital Structure - Capital Structure Theories.

Unit – IV: Leverages

Leverage – Definition – Types – Operating Leverage – Degree of Operating Leverage – Financial Leverage – Degree of Financial Leverage - Combined Leverage.

Unit – V: Dividend Policy

Dividend Policy – Objectives of Dividend Policy – Dividend Theories – Walter, Gordon and MM Hypothesis Models.

Note: Weightage of Marks - Theory 40% and Problems 60%

Books for Study:
1. Maheshwari S N, Financial Management, Sultan Chand & Sons, New Delhi.
2. Murthy A, Financial Management, Margham Publications, Chennai.

Books for Reference:
1. Khan M Y & Jain P K, Financial Management, Tata McGraw Hill Publishing Co New Delhi.
2. Bhalla V K, Financial Management, S.Chand Publishing, New Delhi.
3. Pandey I M, Financial Management, Vikas Publishing House, New Delhi.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5COSBP6	**COMMERCE PRACTICAL**	1	CC21	2

Objective: To impart practical knowledge to the students of commerce in filling up of different forms and their processing.

Unit – I
1. Preparation of Invoice, Receipts, Voucher, Delivery Challan, Entry Pass, Gate Pass - Debit and Credit Notes.
2. Preparation of transaction from the Receipts, Vouchers - Credit Notes and Debit Notes.
3. Preparation of Application for Shares and Allotment - Letter for Share Transfer forms.

Unit – II
4. Drawing, Endorsing and Crossing of Cheques - Filling up of Pay in Slips – Demand Draft Application and Preparation of Demand Drafts.
5. Making entries in the Pass Book and Filling up of Account Opening Forms for SB account, Current Account and FDR's.
6. Drawing and Endorsing of Bills of Exchange and Promissory Notes.

Unit – III
7. Filling up of Application Forms for admission to Cooperative Societies.
8. Filling up Loan Application Forms and Deposit Challan.
9. Filling up Jewel Loan Application Form, procedure for releasing of Jewellery in Jewel Loans and Repayment.

Unit – IV
10. Preparation of Agenda and Minutes of Meetings-both General Body and Board of Directors.
11. Using Bin Card and Inventories.
12. Using Cost Sheets.

Unit – V
13. Filling up of an Application Form for LIC policy, Filling up of the Premium Form - Filling up the Challan for Remittance of Premium.
14. Preparation of an Advertisement Copy, Collection of Advertisements in Dailies and Journals, Critically Evaluating the Advertisement Copy.
15. Filling up Income-Tax Returns and Application for Permanent Account Number.

NOTE: Students may be requested to collect original or Photocopies of the documents and affix them on the record note book after having filled up. Drawing of the documents should not be insisted.

Distribution of marks: Practical 75% and Record Note Book 25%.
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DEPARTMENT OF COMMERCE

SYLLABUS
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SEMESTERS – III & IV

SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO3001	ADVANCED ACCOUNTING - I	5	PAPER 9	6

Objective: To enable the students to understand the application of advanced accounting practices in the fields of modern business.

UNIT – I: Accounting Standards and Company Final Accounts

Accounting Standards: Concept – Objectives – Significance – Need for Accounting Standards – Accounting Standards in India – An overview of International Financial Reporting Standards (IFRS) - Company Final Accounts as per Revised Schedule VI.

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 of Valuation – Net Assets, Yield and Fair Value Methods.

UNIT – III: Amalgamation, Absorption and External Reconstruction

Amalgamation – Types - Absorption – Calculation of Purchase Consideration as per AS 14 - Accounting Treatment in the Books of Transferor and Transferee - External Reconstruction of a Company (Inter Company Investment excluded).

UNIT – IV: Alteration of Share Capital and Internal Reconstruction

Alteration of Share Capital – Internal Reconstruction – Accounting Treatment – Preparation of Financial Statements after Internal Reconstruction.

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 - Theory 20% and Problems 80%

Books for Study:

    1. T.S Reddy and Murthy, Corporate Accounting – Margham Publication, Chennai

    2. M.C. Shukla and T.S Grewal, Advanced Accounts – S.Chand & Co. New Delhi.

Books for Reference:
  1. R.L Gupta and Radhasamy, Advanced Accounts – Sultan Chand & Sons, New Delhi.
  2. Jain and Narang, Advanced Corporate Accounting – Kalyani Publishers, New Delhi.
  3. S.N Maheshwari, Advanced Corporate Accounting – Vikas Publication, New Delhi.

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SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO3002	ADVANCED COST ACCOUNTING – I	5	PAPER 10	6

Objective: To impart the knowledge of advancements in Cost Accounting.

UNIT – I: Introduction

Cost Accounting – Meaning - Functions – Objectives – 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.

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

Books for Study:

1. Dr. Reddy & Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai.

2. Dr. A. Murthy & Dr. S. Gurusamy, Cost Accounting, Vijay Nicole Publications, Chennai.

Books for Reference:

1. S.P Jain & K.L Narang – Cost Accounting, Kalayani Publishers, New Delhi.

2. R.S.N Pillai & V. Bagavathi – Cost Accounting, S.Chand & Co., New Delhi.

3. Nigam & Sharma – Cost Accounting–Principles and Application, Himalaya Publishers, New Delhi.

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SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO3003	ORGANISATIONAL BEHAVIOUR	4	PAPER 11	6

Objective: To make the students understand the Psychological Aspects of an Organisation.

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.

Books for Study:
1. S.S. Khanka, Organisational Behaviour, S.Chand & Co. Ltd., New Delhi.
2. Stephen P. Robbins, Organizational Behavior, Pearson Education, New Delhi.

Books for Reference:
1. Margie Parikh and Rajen Gupta, Organisational Behaviour, Tata McGraw Hill Education, New Delhi.
2. K. Aswathapa, Organisational Behaviour, Himalaya Publishing House,
3. L.M. Prasad, Organisational Behaviour, Sultan Chand and Sons, New Delhi.

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SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO3004	RESEARCH METHODOLOGY	4	PAPER 12	6

Objective: To develop the attitude among the students towards Research.

UNIT I: Introduction

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

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

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: Only one Problem in B Section.

Books for Study:
1. C.R.Kothari, Research Methodology: Methods and Techniques, Wiley Eastern Ltd., New Delhi.
2. Ravilochanan, Research Methodology, Margham Publications, Chennai.

Books for Reference:
1. D. Amarchand, Research Methods in Commerce, Emerald Publishers, Chennai.
2. Anderson, R.L., Berry H.D., Poole,M, Thesis and Assignment Writing, Wiley Eastern Ltd., New Delhi.
3. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi.

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SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6COE301	INDIRECT TAXES	4	ELECTIVE 3	6

Objective: To make the students familiar with the concepts of Indirect Taxes especially GST.

UNIT – I: Introduction

Concept of Taxation – Objectives of Taxation - Indirect Taxes – Meaning – Features –Types of Indirect Taxes– Advantages and Disadvantages – Direct Taxes Vs. Indirect Taxes – Canons of Taxation – Highlights of Latest Finance Act.

UNIT – II: Central Level Indirect Taxes

Central Excise Duty: Concept of Excise Duty – Types of Excise Duty – Methods of Levy – Bases of Excise Duty – Concept of Manufacturer –

Excisability of Manufacturer – Clearance of Excisable Goods. Customs Duty: Historical Background – Levy and Collection – Provisions relating to Detection and Prevention of Illegal Exports and Imports – Clearance of Imports/Exports. CENVAT – Features of CENVAT – Conditions for availing CENVAT Credit.

UNIT –III: State Level Indirect Taxes

TN Value Added Tax (VAT) – Introduction – Meaning – Objectives – Types – Computation of TN VAT – Pros and Cons of VAT.

UNIT – IV: 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.

UNIT – V: Goods and Services Tax (GST)

Concept of GST – History – Constitutional Amendment – Problems in present Indirect Tax Structure – Working of GST – Tax Rates – Tax Gains – Other Benefits of GST – GST Council.

Books for Study:
1. Dr. V. Balachandran, Indirect Taxation , Sultan Chand , New Delhi.
2. Dr. H.C. Mehrotra & Prof. V.C. Agarwall, Indirect Taxes, Bawan Publications

Books for Reference:
1. Gupta SS, Service Tax – How to meet your obligations? Taxmann, New Delhi
2. T.S. Reddy & Y. Hari Prasad Reddy, Business Taxation, Margham Publications, Chennai.
3. Goods and Services Tax – Online Mode

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SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6COE302	MANAGERIAL ECONOMICS	4	ELECTIVE 3	6

Objective: To make the students understand the use of economic tools, principles, laws etc in facilitating business decisions.

UNIT I: Introduction to Managerial Economics

Managerial Economics – Meaning, Nature, Features, Scope and Application – Its Relationship with other disciplines- Role of Managerial Economist – Demand Analysis – Elasticity of demand – Determinants of demand and supply – Forecasting of demand.

UNIT II: Production Function and Cost Concepts

Production function – Law of Returns – Law of variable proportions – Law of Returns to Scale – Economics of large scale operation – Cost Concepts – Cost function – Cost output relationship – Cost Control and Cost Reduction.

UNIT III: Market Structures

Market structure – Features of Perfect and Imperfect Market – Price and Output decisions under Competitive conditions – Perfect competition – Monopoly Competition, Monopolistic Competition and Oligopoly Competition – Price Leadership – Price discrimination.

UNIT IV: Theories of Profit

Profit – Concept and meaning – Theories – Measurement – Economic profit Vs Accounting Profit – Profit maximization Vs Profit Restriction – Profit planning and Forecasting – Cost Volume profit Analysis – BEP Analysis.

UNIT V: Macro Economics and National Income

Macro Economics and Business decisions – Business Cycle – Economic Forecasting for business – National Income – Concepts – Methods of Computation – Complexities of Measurement – Inequalities in Income – Causes, Consequences and Remedies.

Books for Study:

1. Varshney and Maheswari, Managerial Economics, Sultan Chand & Sons, New Delhi.
2. Mithani D. Managerial Economics, Himalaya Publishing House, Mumbai.

Books for Reference:

1. Mehta P.L, Managerial Economics, Sultan Chand & Sons, New Delhi.

2. Gupta G.S, Managerial Economics, Tata McGraw Hill, New Delhi.

3. Joel Dean, Managerial Economics, Prentice Hall, New York.

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO4001	ADVANCED ACCOUNTING - II	5	PAPER 13	5

Objective: To enable the students to understand the application of advanced accounting practices in the fields of modern business.

UNIT – I: Liquidation Accounting

Liquidation Accounting – Modes - 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 – Holding & Subsidiary Companies - Legal Definition and Requirements – Calculation of Goodwill or Cost of Control – Treatment of Unrealised Profit - Consolidation of Financial Statements as per AS 21 – Preparation of Consolidated 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. (New Format Only)

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: Recent Developments in Accounting

Human Resource Accounting – Environmental Accounting – Corporate Social Responsibility (CSR) - Social Responsibility Accounting – Accounting for Intangibles Assets (Theory only).

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

Books for Study:
1. T.S Reddy and Murthy, Corporate Accounting – Margham Publication, Chennai
2. M.C. Shukla and T.S Grewal, Advanced Accounts – S.Chand & Co. New Delhi.

Books for Reference:
1. R.L Gupta and Radhasamy, Advanced Accounts – Sultan Chand & Sons, New Delhi.
2. Jain and Narang, Advanced Corporate Accounting – Kalyani Publishers, New Delhi.

3. S.N Maheshwari, Advanced Corporate Accounting – Vikas Publication.

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO4002	ADVANCED COST ACCOUNTING - II	5	PAPER 14	5

Objective: To make the students get expertise knowledge in dealing with costing and costing techniques.

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.

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

Books for Study:
1. Dr. Reddy & Hari Prasad Reddy, Cost Accounting, Margham Publications, Chennai.
2. Dr. A. Murthy & Dr. S. Gurusamy, Cost Accounting, Vijay Nicole Publications, Chennai.

Books for Reference:
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

SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO4003	DIRECT TAXES	4	PAPER 15	5

Objective: To enable the students to do tax planning, compute taxable income and file return of income.

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, e-filing of Return and Tax Planning
Assessment Procedure – Methods - Assessment of Individuals – Assessment of Firms and AOP – e-Filing of Tax Return - Tax Planning – Meaning, need and limitations – Tax Evasion – Tax Avoidance.

Books for Study:
1. Gaur and Narang, Income Tax Law and Practice, Kalyani Publishers, New Delhi.
2. Reddy TS and Hari Prasad Reddy Y, Income Tax Law & Practice, Margham Publications, Chennai.

Books for Reference:
1. Vinod K Singhania and Monica Singhania, Students" Guide of Income Tax, Taxmann, New Delhi.
2. H.C. Mehrothra, Income Tax Law and Practice, Sahithya Bhavan, Agra.
3. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt.Ltd., Chennai.

SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CO4004	SECURITY ANALYSIS	4	PAPER 16	5

Objective: To imbibe the students the working knowledge on Security Analysis for the purpose of Investments
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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 – Kondratev 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.

Books for Study:
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.

Books for Reference:
1. Dr. Ranganathan and Madhumathi R, Investment Analysis and Portfolio Management, Pearson Education, New Delhi.
2. S.Kevin, Portfolio Management, Prentices Hall of India (Pvt. Ltd) New Delhi.

3. Dr. L. Natarajan, Investment Management, Margham Publications, Chennai.

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6COE401	EXPORT MANAGEMENT	4	ELECTIVE4	5

Objective: To create awareness about various concept, terms, procedures and avenues in Export.

UNIT-I: Introduction to Export and Registration Formalities
Meaning of Export – Role of Export in the development of Indian Economy – Methods of Exporting – Registration Formalities in Export Trade – IEC – RCMC – Export Licensing.

UNIT-II: Export Management and EXIM Policy
Export Management – Meaning – Need – Features – Functions of Export Manager – EXIM Policy – Highlights of EXIM Policy – Impact of GST on Export.

UNIT-III: Export Pricing and Export Financing
Export Pricing – Factors influencing Export Price – Methods of Export Pricing – Modes of Payment in Export – Advance Payment – Payment against Documents – Letter of Credit - Export Financing – Pre-shipment and Post-shipment Finance – Incoterms.

UNIT-IV: Export Procedures and Export Incentives
Stages in Export Process – Export order – Product preparation – Quality Control and   Pre-shipment Inspection – Packaging – Freight Forwarders – Cargo Insurance – Customs Clearance – Documentation Procedure – Export Incentives available to Indian Exporters.

UNIT-V: India's Export Trade and Export Promotional Measures
Performance of India's Export Trade – Problems in India's Export Trade – Need for Export Promotion in India - Export Promotional Measures – Export Promotion Councils – Commodity Boards – Market Access Initiative (MAI) and Marketing Development Assistance (MDA) for Exporters – Export Trading Houses – SEZ.

Books for Study:
1. Francis Cherunilam, International Trade & Export Management, Himalaya Publishing House, Mumbai.
2. TAS Balagopal, Export Management, Himalaya Publishing House, Mumbai.

Books for Reference:
1. Varshney & Battacharya, International Marketing, Sultan Chand & Sons, New Delhi.

2. B.S.Rathor, Export Management, Himalaya Publishing House, Mumbai.
3. D.C. Kapoor, Export Management, Vikas Publishing House, Chennai.

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6COE402	ENTREPRENEURIAL DEVELOPMENT	4	ELECTIVE 4	5

Objective: To impart conceptual knowledge & skill about entrepreneurship to the students so as to inspire them to start their own business.

Unit-I: Introduction

Entrepreneurship - Definition, Concept, Growth and role. The Entrepreneur: types, Characteristics, theories of Entrepreneurial class, Urges and importance of Entrepreneurship Stimulants; Seed-Beds of Entrepreneurship - Influencing Factors - Problems - Operational and Non-Operational - Obstacles.

Unit-II: Theories of Entrepreneurship

Theories of Entrepreneurship - Schumpeter's Ducker's and Walker's views on Entrepreneur; Evolution of Entrepreneurs in India; Business-skills, Inventory in Entrepreneurs; Information as a strategic catalyst of Entrepreneurial Development; Managers and entrepreneurs; Similarities, Creation of Dream for Entrepreneurs.

Unit-III: Project Process & Feasibility Report

Identification of opportunities by an Entrepreneur; The steps to identify the project/ventures; Process of converting business opportunities into reality. Feasibility Report Analysis; Process of setting up a small scale industry / unit.

Unit-IV: Factors Influencing Entrepreneurship

Promotion of a venture, External Environment Analysis: Economic, Social, Technological and competition; Legal Framework for establishing and fund raising Venture Capital: Sources and Documents required.

Unit-V: Entrepreneurship Development

The Skills for a New Class of Entrepreneurs - Entrepreneurial Development –Meaning - Need, Programmes -Rural Area and ED, Structuring the EDPs;

Inputs for and methods of Training, entrepreneurship Development Programmes in India: An Evaluation. Recent Developments in India

Books for Study:
1. S.S. Khanka, Entrepreneurial Development, S. Chand & Co., New Delhi.
2. C.B. Gupta & N.P. Srinivasan, Entrepreneurial Development, Sultan Chand & Sons, New Delhi.

Books for Reference:
1. Robert D. Hisrich, Michael P. Peters & Dean A. Shepherd, Entrepreneurship, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Jay Shree Suresh, Entrepreneurial Development, Margham Publications, Chennai.
3. Ravindranath V. Badi&Narayana V. Badi, Entrepreneurship, Vrinda Publications (P) Ltd., New Delhi.

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CONM41	COMPUTER APPLICATIONS IN BUSINESS	2	NM PAPER	4

Objective: To teach the students the use of Computers in Practical Business Situations.

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-Transactions

Definition, Benefits and Limitations – Online Ticket Booking – Online Shopping – Online Library – Telecommunicating - Teleconferencing – Teleworking.

Books for Study:
1. Ananthi Sheshasaayee & Sheshasaayee, Computer Applications in Business and Management, Margham Publications, Chennai.
2. SrinivasVallabhan SV, Computer Applications in Business, Sultan Chand & Sons, New Delhi.

Books for Reference:
1. Kapoor VK, Computers and Information Technology, Sultan Chand & Sons, New Delhi.
2. Alexis Leon & Mathews Leon, Computer Applications in Business, Vijay Nicole Imprints Pvt.Ltd., Chennai.
3. Peter Norton, Introduction to Computers, Tata McGraw Hill, Publishing Co., Ltd., New Delhi.

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DEPARTMENT OF COMMERCE [F&A]

SYLLABUS
For
B.Com [F&A]

SEMESTERS – V & VI

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA5001	INCOME TAX LAW & PRACTICE – I	5	CC13	5

Objectives: To gain basics of income tax law and practical application under various heads of Income.

UNIT-I: Basic concept of Income Tax

Basic Concepts –Income tax- Assessment Year – Previous Year – Persons – Assesses – Scope of Income – Determination of Residential Status – Individual – HUF – Firm – Company – Relationship between Residential Status of person -Incidence of Tax- Income from Agriculture- Income exempted from Income Tax.

UNIT-II: Income from Salary

Income under the head Salaries and its Computation – Characteristics of Salary Income – Different Forms of Allowances – Perquisites – Profits in Lieu of Salary – Deductions from Salary Income – Treatment of Provident Funds – Deduction under Section 80C- Exempted income from Salary.

UNIT-III: Income from House Property

Income under the head Income from House Property and its Computation – Basis of Charge – Exemption – Annual Value – Self-occupied and Let-out Properties – Partly Let-out and Partly Self-occupied – Deductions- Exempted Income from House Property.

UNIT-IV: Income from Business and Profession

Income from Business and Profession - Computation of Income under the head Business or Profession – Basic of Charge – Basic Principles – Specific Deduction – General Deductions -Allowable- Disallowable Expenses– Deemed Profits.

UNIT-V: Treatment of Depreciation in Income Tax

Concept of Depreciation – Depreciation Provisions – Section 32 – Conditions for Claiming Depreciation – Block of Assets – Computation of Normal Depreciation – Additional Depreciation – Conditions and Rates of Depreciation – Meaning of Actual Cost – Unabsorbed Depreciation – Terminal Depreciation – Balancing Charge.

Note: Weightage of marks: Theory 40% and Problems 60%

Book for Study:
1. Dr.A.Murthy, "Income Tax Law and practice", Vijay Nicole imprint Private Limited, Chennai-2017.

Books for Reference:
2. Gaur and Narang, "Income Tax Law and Practice", Kalyani Publishers, New Delhi-2017.
3. Reddy T.S and Hari Prasad Reddy, "Income Tax- Theory, Law and Practice", Margham Publications, Chennai-2017.
4. Vinod K Singhania & Monica Singhania, "Students' Guide to Income Tax", Taxman, New Delhi-2017.

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA5002	COST ACCOUNTING - I	5	CC14	5

Objectives: To gain knowledge of basic concepts and techniques of cost accounting.

UNIT-I: Basic concept in Cost Accounting

Introduction - Cost Accounting – Nature and Scope – Objectives, Advantages and Limitations Financial Vs Cost Accounting – Cost Concepts and Classification- Elements of Cost - Cost Sheets and Quotation.

UNIT-II: Cost Component- Material

Materials - Material Control – Inventory Control – ABC Technique – Levels of Stock and EOQ – Perpetual Inventory System.

UNIT-III: Pricing of Materials

Pricing of Materials - Methods of Pricing of Material Issues - FIFO – LIFO – Simple and Weighted Average Method – Accounting for Material Losses.

UNIT-IV: Calculation of Labour

Labour: Labour Turnover – Idle and Overtime – Remuneration and Incentives – Time Rate System – Piece Rate System – Taylor's, Merrick's Gantt's, Halsey and Rowan Plans – Calculation of Earning of Workers.

UNIT-V: Overheads

Overhead - Classification of Overhead Costs – Allocation, Absorption and Apportionment of Overhead Cost – Primary and Secondary Distribution of Overheads – Computation of Machine Hour Rate and Labour Hour Rate.

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

Book for Study:

1. T.S.Reddy and Hari Prasad Reddy, "Cost Accounting", Margham Publication, Chennai-2016.

Books for Reference:

1. S.P. Jain and Narang "Cost Accounting", Kalyani Publishers, New Delhi-2012.
2. T.S.P. Iyengar, "Cost Accounting", Sultan Chand & Sons, New Delhi-2015.
3. Shukla,Grawal & Gupta,"Cost Accounting", S.Chand & Co Pvt ltd,, New Delhi-2013.
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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA5003	MANAGEMENT ACCOUNTING	5	CC15	5

Objectives: To gain knowledge of basic concepts and techniques of management accounting.

UNIT-I: Management Accounting and Financial Statement

Introduction **-** Management Accounting – Meaning – Definition - Objectives – Nature & Scope – Advantages & Limitations – Management Accounting vs. Financial Accounting – Management Accountings vs. Cost Accounting – Financial statement analysis – Comparative and common size statements – Trend analysis.

UNIT-II: Ratio Analysis

Ratio Analysis**-**Meanings, Significance, Advantages and Limitations - Analysis and Interpretation of Financial Statements – Basic purpose of various ratios –Types of Ratio- Liquidity Ratio – Solvency Ratio - Profitability Ratio - Turnover Ratio – Financial Ratio.

UNIT-III: Fund Flow and Cash Flow Analysis

Funds Flow Statement – Meaning - Need – Advantages and Limitations – Statement of Changes in Working Capital – Calculation of Funds from Operation – Preparation of Funds Flow Statement. Cash Flow Statement – Meaning - Objectives and Scope – Funds Flow Statement Vs Cash Flow Statement – Preparation of Cash Flow Statement as per AS-3.

UNIT-IV: Budget and Budgetary Control

Budget and Budgetary Control – Objectives - Advantages and Limitations – Classification of Budgets – Zero Based Budget – Preparation of Sales Budget – Production Budget – Cash Budget – Flexible Budget.

UNIT-V: Capital Budgeting

Capital Budgeting – Meaning – Significance – Methods of Evaluation of Capital Expenditure Discounted cash flow- Net Present Value-Profitability index- Internal rate of Return Method –Non Discounted Cash flow method- Pay Back period-Accounting Rate of Return Method.

Note: Weightage of Marks – Theory 20% Problem 80%
Book for Study:
1. T.S.Reddy & Y.Hari Prasad Reddy, "Management Accounting", Margham Publications, Chennai-2016.
Books for Reference:
   1. Pillai Bagawathi, "Management Accounting", Sultan Chand & Co, New Delhi-2010.
   2. S.N. Maheswari, "Management Accounting", Sultan Chand & Sons, New Delhi-2015.
   3. Agarwal, "Management Accounting", G.P Publishers, Jaipur-2014.

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA5004	HUMAN RESOURCE MANAGEMENT	5	CC16	5

Objectives: To gain knowledge of basic concepts and techniques on Human Resource Management.

UNIT-I: Nature of Human Resource Management

Nature of Human Resources Management **-** Concept – Characteristics – Objectives – Importance – Functions and Scope- Qualities of Human Resource Manager- Role of Human Resource Manager- Characteristics.

UNIT-II: Recruitment and Selection Process

Human Resource Planning – Objectives – Need and Importance – Job Analysis and Job design – Recruitment and Selection: Process of recruitment – Sources – Steps in selection process – Testing – Interviewing – Placement – Induction – Socialization.

UNIT-III: Employees Training

Employee Training – Need – Importance – Types of Training – Objectives – Methods – Executive development: Objectives and importance – Methods and techniques.

UNIT-IV: Performance Appraisal

Managing Performance and Compensation - Appraisal – Methods – Problems – establishing pay plans – Basics of Compensation – Factors determining the pay rate – Current trends in Compensation – Concept of profit sharing – Fringe benefits.

UNIT-V: Retaining Process

Maintaining and Retaining of Human Resource **-** Concept of transfer – Promotion and Demotion – Absenteeism and Labour turnover – Causes of absenteeism – Effects of absenteeism – Causes of labour turnover – Work Environment – Fatigue – Monotony and Boredom – Causes and Effects.

Book for Study:
1. J.Jayasankar   "Human   Resource   Management",   Margham Publication, Chennai-2016.

Books for Reference:
1. Aswathappa, "Human Resource and Personnel Management", TATA McGraw Hills, New Delhi-2009.
2. Dr.S.Khanka, "Human Resource Management", S.Chand & Company, New Delhi-2015.
3. L M Prasaad, "Human Resource Management", S Chand & Co., New Delhi.2014.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA5005	**MARKETING MANAGEMENT**	**2**	**CC17**	**4**

Objectives: To gain the knowledge of basic concept of Marketing and its techniques.

UNIT-I: Concept and Nature of Marketing

Nature, Scope and Importance of marketing- Evolution of marketing concept- Types of Market- Marketing Mix- Marketing Environment – Macro and Micro Environment.

UNIT-II: Consumer Behaviour

Consumer behaviour – Consumer Buying Motives- Market Segmentation- Types of Market segmentation- Theories of Consumer Behaviour.

UNIT-III: Product

Meaning and importance- product classification- concept of product Mix- Product line and items- Expansion of Product Mix- Positioning the Product- Product Life cycle- Product management- New product development- Product differentiation- Product Deletion.

UNIT-IV: Pricing and Promotion

Significance of pricing in marketing - Factors affecting pricing-objectives of pricing policies- Pricing decision- Kinds of pricing- procedure for price determination- Resale price maintenance-

Nature and importance of promotion- promotion tools- Promotion Mix- Consumer sales promotion- Advertising- Types of advertising- Advertising media and its advantages and disadvantages- Advertising agency – Functions of advertising agency- Personal Selling – Kinds of salesmen- Characteristics of successful salesmen- Selling as a career.

UNIT-V: Distribution

Channels of distribution- Meaning and importance- types of distribution channels- factors affecting distribution of channels- Distribution logistics.

Book for Study:
 1. R.S.N Pillai and Bagavathi, "Modern Marketing", S.Chand & Company, New Delhi-2014.
Books for Reference:
1. Dr.N.Rajannair & Sanjith R.Nair "Marketing", Sultan chand & Sons, New Delhi-2015
2. Philip Kotler, Garry Armstrong "Principles of Marketing", Pearson Education, New Delhi-2013.
3. Dr.L.Natarajan "Marketing", Margham Publication, Chennai-2016.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA5006	FUNDAMENTALS OF ISLAMIC FINANCE	2	CC18	4

Objectives: To enable the students understand, basic concepts, sharia'h principles and guidelines on financial transaction, major prohibition in Islamic finance, Islamic law of contract and the prerequisite conditions for validity of contract, Foundation and Characteristics of Islamic Finance.

UNIT-I: Introduction to Sources of Islamic Law (Shari'ah)

Shariah & Fiqh : Definition and Concept; Sources of Shari'ah: Quran, Sunnah, Ijma, Qiyas; Objectives of Shariah; Concept of Ijtihad and the necessary conditions; Principles of Fiqh: Introduction and importance.

UNIT-II: Major Prohibitions in Islamic Finance

Riba(Interest): Definition and Classification; Gharar (Ambiguity/ Uncertainty): Definition and Classification; Maysir & Qimar (Gambling): Definition and Classification.

UNIT-III: Islamic Law of Contracts

Principles of Islamic Business; Contract: Definition and Classification; Aqd (contract), Wad (Promise), Muwa'adah/ Mu'ahida (Bilateral Promise), Elements of Contract and conditions for its Validity.

UNIT-IV: Classification of Contracts (Unilateral & Bilateral)

Contract of Exchange (Sale Contracts); Contract of Partnership (Mudarabaha, Musharakah); Contract of Trust/ Safe Custody (Wadi'ah, Amanah) Contract of Security (Kafalah, Rahn, Hawalah), Contract of Usufruct utilization (Ijarah), Other Contracts: Wakalah, Jo'alah etc.

UNIT-V: Principles of Islamic Financial System

Islamic Finance: Definition, Concept, Foundation, Features, Objectives; Islamic Finance Vs Conventional Finance; A Brief introduction of Islamic Financial Instruments and Glossary of Islamic Finance Terminologies.

Book for Study:
1. Abdel Fattah M.Farah, "An Introduction to Islamic Banking & Finance"-

Books for Reference:
1. Certified to Islamic banker (CelB) program - Islamic-finance.com.
2. Meezan's Bank's Guide to Islamic Bank.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FASB51	BUSINESS ENVIRONMENT	1	AEC5	2

Objectives: To make the students to understand the various Business Environment and their impact on Business.

UNIT-I: Concept of Business Environment

The concept of business environment- its nature and significance- brief objectives of political- Cultural-Legal-Economic and Social Environment and their impact on business and strategic decision.

UNIT-II: Social and Cultural Environment

Social Environment- Cultural Heritage- Social attitudes- Impact of foreign culture- Cases and communities- Business Ethics-Corporate Governance-Corporate Social responsibilities.

UNIT-III: Legal Environment

Important Acts affecting in India- Indian Contract Act- Indian Companies Act-Income Tax Act- IDRA- Consumer Protection Act(COPRA)- FEMA-SEBI-TRIPS-GATT-WTO.

UNIT- IV: Economic Environment

Economic system and their impact on business- Macro Economic- GDP-Growth rate- Population- Monetary and fiscal Policies- per capita income-Five year planning- Industrial Policy- Pricing and distribution-Liberalisation-Privatisation- Globalisation.

UNIT-V: Financial Environment

Financial System- Commercial Bank- Financial Institution- RBI-Money Market- Capital Market- Stock Exchange-IDBI-IFCI-SIDBI-NABARD-BIFR-Non-Banking financial companies-Financial services like Factoring-Leasing- Merchant Banking.

Note: As a skill Based paper importance given only to the basic concepts and principles.

Book for Study:

1. Sankaran; "Business Environment",Margham Publication, Chennai-2016.

Note: As a skill Based paper importance given only to the basic concepts and principles.

Books for Reference:

1. Cherunilam, Francis, "Business Environment - Text and Cases", Himalaya Publishing House, New Delhi-2014.
2. Aswathappa, K. "Essentials of Business Environment", Himalaya Publishing House, New Delhi-2014.
3. Prof.D.A Mustafa, "Business Environment & Law", A.I.T.B.S Publishers, New Delhi-2010.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA6001	INCOME TAX LAW & PRACTICE – II	5	CC19	5

Objectives: To gain basics of income tax law and practical application calculations and e- filing returns.

UNIT-I: Income from Capital Gains

Basic of Capital Gains – Capital Assets – Meaning – Types of Capital Assets and Gains- Exemptions – Short-term and Long-term Capital Assets – Transfer of Capital Assets – Exemptions – Computation of Short-term Capital Gain – Computation of Long term Capital Gain – Indexed Cost – Exemptions.

UNIT-II: Income under the Income from other sources

Income from Other Sources and its Computation – Specific Incomes and Other Incomes – Permissible Deductions – Specific Disallowances.

UNIT-III: Clubbing of Income, Set-off and carry forward

Clubbing of Income and Set-off of Losses **-** Aggregation of Income– Transfer of Income without Transfer of Assets - Set-off and Carry Forward of Losses – Intra Head and Inter Head Adjustments.

UNIT-IV: Assessment of Individual, Firms and Association of person

Assessment of Individuals, Firms and AOP **-** Deductions from Gross Total Income – Deductions in respect of Certain Payments and Deductions from Section 80C to 80U.

 UNIT-V: Filling of Income Tax Return

Filing of Return of Income, Assessment & Tax Planning **-** procedure for Filing of Return of Income – Time of Filing of Return – PAN – Types of Assessment– Self Assessment – Regular Assessment – Best Judgment Assessment and Re-Assessment – Tax Planning – Meaning, Need and Limitations – Tax Evasion – Tax Avoidance.

Note: Weightage of marks: Theory 40% and Problems 60%

Book for study:
1. Dr.A.Murthy, "Income Tax Law and practice", Vijay Nicole print, Chennai-2017.
   Books for Reference:
1. Gaur and Narang, "Income Tax Law and Practice", Kalyani Publishers, New Delhi-2017.
2. Reddy T S and Hari Prasad Reddy, "Income Tax: Theory, Law and Practice", Margham Publications, Chennai-2017.
3. Vinod.K.Singhania & Monica Singhania, "Students' Guide to Income Tax, Taxmann", New Delhi-2017.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA6002	COST ACCOUNTING - II	5	CC20	5

Objectives: To gain knowledge of basic concepts and techniques of cost accounting.

UNIT-I: Job, Batch & Contract Costing

Job Costing – Definition and Features – Procedure – WIP – Cost Accumulation. Batch Costing – EBQ. Contract Costing – Definition – Features – Work Certified and Uncertified – Incomplete Contract – Escalation Clause – Cost Plus Contract and Contract Account.

UNIT-II: Process Costing

Process Costing – Definition and Features – Job vs. Process Costing – Normal Loss and Abnormal Loss – Abnormal Gain – By Product and Joint Products – Equivalent Production - Process Accounts.

UNIT-III: Operations Cost

Operating or Service Costing: Operating Cost Units – Operating Costing in some Service Industries – Transport Costing – Advantages of Operating Costing in Transport Organization – Costing Procedure in Transport Organization – Costing for Hotels, Hospitals & Cinema Houses.

UNIT-IV: Marginal Costing

Marginal Costing: Definition – Advantages and Limitation – CV Analysis – Contribution – Break Even Analysis and Break Even Point – Margin of Safety – Key Factor – Selection of Product Mix – Changes in Selling Price – Desired Level of Profit.

UNIT-V: Variance Analysis and Standard Costing

Standard Costing: Meaning – Advantages and Limitations – Analysis of Variances – Material Cost Variance, –Labour Cost Variance and Overhead Variance. (Simple Problem Only).

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

Book for Study:

1. T.S.Reddy and Hari Prasad Reddy, "Cost Accounting", Margham Publication, Chennai-2016.

Books for Reference:

1. S.P. Jain and Narang,"Cost Accounting", Kalyani Publishers, New Delhi-2012.
2. T.S.P. Iyengar,"Cost Accounting", Sultan Chand & Sons, New Delhi- 2015.
3. Shukla,Grawal & Gupta "Cost Accounting", S.Chand & Co Pvt ltd,, New Delhi-2013.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA6003	FINANCIAL MANAGEMENT	5	CC21	5

Objectives: To make the students to know the importance functions of finance and to identify the sources of funds required for an organization

UNIT-I: Nature and Scope of Financial Management

Nature and Scope of financial management- Objectives of financial management Functions of financial management-Position and role of finance manager- Functions of financial manager- Time value of money- Risk and return.

UNIT-II: Investment Decisions

Long term investment decisions- the capital budgeting process-Payback period method- Accounting Rate of Return method- Net Present Value (NPV) - Internal rate of return- Profitability index- Decision Tree Method.

UNIT-III: Financing Decisions

Sources of Long term and Short term finance- Estimation and component of Cost of Capital- Cost of Debt- Cost of Equity- Cost of retaining Earning- Weighted Average Cost of Capital- Capital Structure- Theories of Capital Structure- Determinants of Capital Structure.

UNIT-IV: Dividend Decisions

Dividend policy decisions- Types of Dividends- Factors determining Dividend Policy – Theories of Relevance and irrelevance decision- Walter's Model- Gordon's Model- MM approach- Dividend policy in practices.

UNIT-V: Working Capital Decision

Working capital Decision- Concept of Working Capital- Types of Working Capital- Sources of Working Capital- Determinant of Working Capital requirements- Forecasting of Working Capital requirements.

Note: Weightage of marks: Theory 50% and Problems 50%

Book for Study:
1. A. Murhty, "Financial Management", Margham publication-2016
Books for Reference:
1. Shashi K.Gupta, Neeti Gupta,"Financial Management", Kalyani Publishers, New Delhi-2013.
2. Prasana Chandra,"Financial Management-Text & Practices," Tata McGraw hill- New Delhi-2006.

3. I.M Pandey, "Financial Management- Text & Practices,"Vikas Publishing House- New Delhi-2009.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA6004	TALLY & COMPUTER APPLICATIONS (Lab)	5	CC22	5

Objectives: To learn the practical use of the fastest growing Accounting Software and Ms-Office package.

UNIT-I: Introduction of Tally

Introduction to Tally-Advantages of Tally Accounting- Salient features of Tally- General features- Accounting features – Inventory features.

UNIT-II: Basics in Tally

Gate way of Tally- Creation of company-Altering, Deleting and Shutting of Company-Company information-Groups-Sub groups-Creation of Groups-Altering, Deleting of Groups- Creating, Displaying and Altering Multiple groups-Creation of Individual and Group Ledger-Displaying and Altering of Individual and Group Ledgers.

UNIT-III: Voucher Entry and ledgers

Vouchers- Types of Vouchers- Creation and Alteration of Vouchers-Cancellation and Deletion of Vouchers (Excluding Inventory Vouchers)-Passing Entries in Tally- Preparing Ledger Accounts and Trail Balance. Accounting with Inventories- creation of inventory Groups- Creation of Inventory Ledger- inventory voucher entries-Inventory master & reports-Stock summary- Statement of Inventory- BRS.

UNIT-IV: Word Processing and Excel

Word processing with MS Word - Starting MS word – MS word environment –working with word documents – working with text – working with tables – checking spelling and grammar – printing a document. Spreadsheets and MS Excel: Starting MS Excel – MS Excel environment – working with Excel workbook – working with worksheet – Formulas and Functions – Inserting Charts – printing in Excel.

UNIT-V: Power Point Presentation
Making presentation with MS power point- Starting MS power point – MS power point environment – working with power point – working with different views – designing presentation – printing in power point.

Books for Study:
1.   S. Palanivel, Tally - Accounting Software, Margham Publications, Chennai-2015.
2.   A. Zakiuddin Ahmed, Computer Application in Business, Thakur Publishers, Chennai.2014.

Book for Reference:
1. Asok K Nadhani, "Tally ERP 9 Made Simple: Basic Financial Accounting", BPB publication, New Delhi.-2013.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA6005	PRACTICAL AUDITING	2	CC23	4

Objectives: To gain basic knowledge of the principles and practice of auditing.

UNIT-I: Concept of Auditing

Meaning and Definitions of Auditing – Objectives – Types – Advantages and Limitations – Qualities of an Auditor - Accountancy, Auditing and Investigation.

UNIT-II: Internal Control System

Internal Control – Internal Check and Internal Audit – Audit Note Book – Working Papers – Vouching- Vouching of Personal Ledger – Vouching of Impersonal Ledger.

UNIT-III: Verification and Valuation

Verification and Valuations of Assets and Liabilities – Auditor's Position regarding the Valuation and Verification of Assets and Liabilities - Depreciation –Reserves and Provisions.

UNIT-IV: Company Audit

Company Audit – Qualifications and Disqualifications of Auditors Appointment and Removal – Right and Duties – Comptroller of Audit General – Appointments –Functions, Right and Duties – Branch, Joint and Special Audit – Audit Report – Types of Audit.

UNIT-V: Investigation

Investigation – Objectives – Differences between Investigation and Auditing – Points to be noted while conducting an Investigation – Audit of Computerized Accounts – Electronic Audit.

Book for Study:
1. Vengadamani, "Practical Auditing," Margham Publication,Chennai-2016.

Books for Reference:

1. B.N. Tandon, "Practical Auditing", S Chand & Co, New Delhi-2006.
2. A.R Solanki, "Auditing Principles & Techniques", Cyber Tech Publication, New Delhi-2015.
3. Kamal Gupta and Ashok Arora, "Fundamentals of Auditing", TATA McGraw Hills, New Delhi-2002.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FA6006	ISLAMIC BANKING PRODUCTS & SERVICES	2	CC24	4

Objectives: To explain the concepts, theories, the origins and development of Islamic banking products and services; expose the students to a wider range of Islamic financing instruments used by Islamic Banks and Financial institutions.

UNIT-I: Deposit Products in Islamic Banks

Islamic Banks Deposits: Current Account, Saving Account, Investment Deposit Account: General Investment Deposit Account, Special Investment Deposit Account; Deposit Management.

UNIT-II: Card Products in Islamic Banks

Islamic Credit Cards in the market: Bai-al Ina Credit Card Structure, Tawarruq Credit Card Structure, Ijarah Credit Card Structure, Ujrah Credit Card Structure, Kafalah Credit Card Structure; Islamic Covered Card.

UNIT-III: Islamic Modes of Financing - I

Equity Based Products: Musharakah, Mudarabah; Deferred sale Financing – Bai Muajjal & Murabahah; Advance Sale Financing Product – Salam & Parallel Salam.

UNIT-IV: Islamic Modes of Financing - II

Financing Asset under Construction: Istisna & Parallel istisna; Lease Based Product – Ijarah & Ijarah Muntahiyah Bit-Tamleek; Services Based Products: Wakalah (Agency) & Kafalah (Guarantee); Bai- al 'Inah & Twarruq : Financing for liquidity Management.

UNIT-V: Other Miscellaneous Services & Activities

Letters of Credit; Cheque Payment System; Sarf (Foreign Exchange) & Hawalah (Remittance); Bai Istijrar (supply Contract) and Ujrah (fee); Bai-al Dain (Debt Trading); Qard-e Hasanah (Intrest- free Loan); Others.

Book for Study:
1.M. Taqi Usmani, "An Introduction to Islamic Finance".

Books for Reference:
1. Muhammad Ayub, "Understanding Islamic Finance".
2.Mohammed Obaidullah, "Islamic Financial Services".

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5FASB61	COMPANY LAW	1	AEC6	2

Objectives: To impart the basic knowledge of the companies Act among the students.

UNIT-I: Introduction

Meaning- Definition- Characteristics of Company- Types of Company including one person company- Difference between public Vs Private companies- characteristics of Public and Private company- Advantages and disadvantages of public and private companies- Conversion of public company to private company.

UNIT-II: Formation of Companies:

Incorporation of companies- certificate of incorporation- Promoters Functions of promoter- Legal status of Promoter.

UNIT-III: Memorandum and Articles of Association

Memorandum of Association- Contents of Memorandum of Association- Alteration of Memorandum of Association- Articles of Association- Contents of Articles of Association- Alteration of Articles of Association.

UNIT-IV: Capital & Shares

Share Capital – Kinds of share capital- Sources of short term and Long term Capital- Shares- Types of Shares- Preference shares and its types- Debenture- Types of Debentures- Difference between shares and debentures.

UNIT-V: Company meeting and Winding up

Meeting of share holders and board- types of meeting – requisites of valid meeting- Agenda- chairman- proxy- Resolution and its types- Minutes- Voting's- winding up of companies- Methods of winding up and its procedures.

Note: As Skill Based paper importance given only to the basic concepts and principles.

Book for Study:
1.   J.Santhi, "Company Law (As per Companies Act 2013),"Margham Publication, Chennai-2016

Books for Reference:
1. Dr.M.Sreenivasan, "Company Law", Margham Publication, Chennai-2015.
2. N.D. Kapoor, "Elements of Company Law", Sultan Chand & Sons, New Delhi-2010.
3. P.P.S Gonga, "A Text book of Company Law",S.Chand & Sons, New Delhi-2010.

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DEPARTMENT OF COMMERCE [COMP. APPLICATIONS]

SYLLABUS
For
B.Com [COMP.APPLLICATION]

SEMESTERS – V & VI

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA5001	COST ACCOUNTING	5	CC13	5

Objectives
To make the students acquaint with the knowledge of different techniques and methods of costing.

UNIT-I
Cost Accounting: Introduction - Definition - Meaning and Objective - Advantages - Cost Centre and Cost Unit - Comparison of cost accounting with financial accounting - Techniques of costing - Elements of Cost - Classification of Cost – Limitation of cost accounting - Preparation of cost sheet and Tenders.

UNIT - II
Material Management – Purchase procedure – Various stock levels – Economic order quantity – Bin card and stores ledger – Pricing of issues – FIFO - LIFO - and Simple Average and Weighted average methods.

UNIT - III
Labour: Importance of Labour Cost Control - Various methods of wages payments - Calculation of Wages - Methods of Incentive Schemes - Recording Labour Time - Time Card and Job Card - Treatment of 'Over time & "Idle Time' - Labour Turnover

UNIT - IV
Overheads : Definition of Overheads - Meaning and Classification of overhead costs - Allocation and Apportionment - Re-Distribution (Secondary Distribution) - Factory - Administration - Selling and Distribution overheads- Under and Over Absorption of Overheads - Machine hour Rate.

UNIT-V
Methods of Costing - Process Costing – Normal Loss – Abnormal Loss – Abnormal Gain - Operating Costing (Transport) – Job costing.

TEXT BOOK:
1. T.S. Reddy and Y. Hari Prasad Reddy: Cost   Accounting   -   Margham Publications.

REFERENCE BOOKS
1. Jain and Narang   : Cost Accounting -Kalyani Publications
2. S.N.Maheshwari   : Cost and Management Accounting -Sulthan Chand
                                        Publications
3. S.P. Iyangar   : Cost Accounting -Sulthan Chand Publications

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA5002	**INCOME TAX LAW AND PRACITCE – I**	**5**	**CC14**	**5**

Objective: To make the students acquaint with basic knowledge of provisions of income tax.

UNIT-I

Income Tax Act - 1961 - Current Finance Act - Definitions - Agricultural Income - Assesses - Assessment Year - income- person - Previous Year - Residential Status and Incidence of Tax - Exempted Incomes.

UNIT-II

Income - under the head Salaries - Definition - Features - Allowances - Perquisites - Provident Fund - Profit in lieu of salary - Deductions - Computation of salary income.

UNIT-III

Income from House property - Annual Value - Determination - Let out houses - Self Occupied Houses - Computation of Income from House property.

UNIT-IV

Profits and Gains of Business or Profession - Definitions - Chargeability - Admissible deductions - Inadmissible Expenses Computation of Business Income - Computation of Professional Income.

UNIT V

Income Tax Authorities and their powers - Permanent Account Number (PAN).

TEXT BOOK:
A.Murthy **-** Income Tax Law and practice **- Vijay Nicole Imprints (P) ltd.**
REFERENCE BOOKS:
1. Gaur & Narang - Kalyani Publications
2. Bhagavathi Prasad: Income Tax Law and Practice - Sulthan Chand Puplications

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA5003	PRACTICAL AUDITING	5	CC15	5

Objectives: To familiarize students with various aspects of auditing

UNIT-I

Introduction- meaning and object of audit - difference between Auditing and accountancy - kinds of audit - advantages and limitations of Audit - audit programmes and working papers

UNIT –II

Internal control - Meaning and object - Internal check - Meaning and object - Internal control regarding cash purchases - sales - and payment of wages.

UNIT-III

Vouching - meaning - objects - features of good vouching - procedure and importance - vouching of cash transactions - verification of assets and liabilities.

UNIT- 1V

Auditor - Qualification - Appointment - Disqualification - Removal - Duties - Powers. Liabilities and Remuneration.

UNIT-V

Specialized audits - Charitable Institutions - Educational Institutions - Hospital - Hotel.

Text Books:

B.N. Tandon   :Practical Auditing - S. Chand & Sons - New Delhi.

REFERENCE BOOKS:

Dr. Premavathy : Practical Auditing - 2nd Edition - Sri Vishnu Publishing
Co - Chennai - 2003.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA5004	ENTREPRENEUR DEVELOPMENT	5	CC16	5

Objective: To make the students understand the basic concepts of entrepreneurship development.

UNIT-I: CONCEPT OF ENTREPRENEURSHIP
Meaning - characteristics and types of entrepreneurship - Entrepreneur and enterpriser - Functions of entrepreneurs – Desirable traits of successful entrepreneur.

UNIT-II: WOMEN AND RURAL ENTREPRENEURS
Concept of women entrepreneurs - Definition - Problems faced by women entrepreneurs - Remedies to the problems - Rural entrepreneurs - Definition - Problems of rural entrepreneurs - Steps to promote rural entrepreneurs - Small scale entrepreneurs-Organized Retail in agro based products.

UNIT-III: PROJECT AND BUSNIESS PLANNING
Meaning and classification of Projects - Project Ideas - Project Formulation - Feasibility Study Report - Project Selection – Project Report - Project life cycle- Business planning and raising of funds – Market segmentation and USP –Detail Knowledge of product and Customer.

UNIT- IV: FORMS OF OWNERSHIP
Sole Trader – Partnership- Cooperative Societies- Private Ltd. Company and Public Ltd Company - characteristics - merits and demerits-Up scaling of business.

UNIT- V: DEVELOPMENT AND PROMOTION OF ENTREPRENEURS
Entrepreneurship Development Programmes - Assistance by Government and Non - government agencies - Functions of DIC - SIDCO - SIPCOT - IDBI - TIIC and ICICI.

TEXT BOOK:
 Entrepreneurial Development   : N.P. Srinivasan - Margham Publishers.

BOOKS FOR REFERENCE:
1. Entrepreneurial Development : P. Saravanavelan - Sulthan Chand Publications.
2. Entrepreneurial Development : Jaishree Suresh -Sulthan Chand Publications

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA5005	WEB TECHNOLOGY	2	CC17	4

Objectives: To understand the basic concepts of internet and to impart basic knowledge of HTML and Java Script. On successful completion of this subject - the student should be able to master the concepts HTML and Java Script.

UNIT – I Internet Basics

A Brief Introduction to the Internet – The World Wide Web – Web Browser – Web Servers – Uniform Resource Locators –Application of Internet - Internet Services – IP Address - Domain Name System (DNS)

UNIT – II Introduction to HTML

History of HTML- Introduction - HTML Tags- Structure of HTML document- Head Section- Body Section-Basic Commands or Tags in HTML - Lists :Ordered List -Unordered List- Definition List - Creating Table- Linking Documents - Formatting the Link

UNIT – III Images and Frames in HTML

Adding Graphics to HTML documents- Image Attributes - Frames: Frameset Definition – Frame Definition – Nested Framesets – Forms: Forms and their Elements.

UNIT – IV Introduction to Java Script

Introduction - History of JavaScript - Limitations of JavaScript- Uses of JavaScript -Advantages of JavaScript-Java Script Syntax -Embedding JavaScript in HTML file-Using External JavaScript in HTML file-Data Type- Variable-Operators-Expressions

UNIT – V Arrays and Functions in Java Script

Arrays-Conditional Statements- Looping Statements - Functions- Function Definition – Function Calling – return statement - Recursive function- Dialog Box: alert - prompt - confirm

Text Book

1. Open Source Software - P.Rizwan Ahmed - Margham Publication - Chennai - 2015

Reference Book:

1. Raymond Greenlaw - Ellen Hepp - Fundamentals of the INTERNET and the World Wide Web - Second Edition - Tata McGRAW –Hill Edition – 2005

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CAPR51	WEB THECHNOLOGY LAB	2	CC18	4

Objective:

To impart basic knowledge of HTML and Java Script

1. Write a HTML Program to illustrate text formatting tags.
2. Design a web page to display images Using HTML tags.
3. Write a HTML document to print your class Time Table.
4. Write a Java script code to calculate the area of a circle.
5. Write a Java script code that converts the entered text to uppercase
6. Write a Java script function that finds the maximum of three given numbers.
7. Write HTML document with Java script to count the number of vowels in a text typed in a Text Area.
8. Write a JavaScript program to create a simple calculator in Java script.

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CASB51	QUANTITATIVE APTITUDE	1	AEC5	2

Objectives: To make the students acquaint with basic quantitative techniques and arithmetic operations.

Unit I

Numbers - HCF - LCM - Decimal fractions - Simplification - Square roots - cube roots - average - problems in numbers and ages

Unit II

Indices - percentage - profit and loss - ratio and proportion - partnership - chain rule - time and work - pipes and distance

Unit III

Time and distance - problems on trains - boats and streams - aligation - logarithms - area.

Unit IV

Volume and surface area - races and games of skill - calendar - clocks - stocks and shares - permutations and combination - probability.

Unit V

True discount - Banker's discount - Height and distances - Odd man out and series - tabulation - Bar graph - pie chart.

Text book:
R.S. Aggarwal - "Quantitative Aptitude for competitive examinations" - seventh revised edition - S.Chand and Co Ltd - New Delhi -2005.

Reference book:
Barron's Guide for GMAT - Galgotia publications - New Delhi – 2006

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA6001	MANAGEMENT ACCOUNTING	5	CC19	5

Objective: To familiarize the students with the basic principles of management accounting and their applications in managerial decision making.

UNIT - I
Management Accounting - Introduction - Meaning and Definition - Objectives - Management Accounting vs Financial Accounting - Limitations of Management Accounting.

UNIT - II
Funds Flow Analysis: Sources and Uses of Funds - Concept of Flow - Working Capital - Managerial uses of funds flow analysis - Preparation of Funds flow statement - Funds from Operation.

Cash Flow Analysis: Distinction between funds flow and cash flow - Preparation of cash flow statement (as per AS 3) - Cash from operation.

UNIT-III
Ratio Analysis - Utility and Limitations of ratios - Classification of ratios - Financial ratios - Profitability ratios -Turnover ratios or Activity ratios- Proprietary ratios – Preparation of Balance sheet.

UNIT-IV
Marginal Costing - Introduction - Advantages - Limitations - Cost Volume Profit analysis - Fixed Cost, Variable Cost, Contribution, Break-Even Point, Margin of Safety.

UNIT-V

Budgets, Budgeting and Budgetary Control: Concept - nature and objectives of Budgetary control - Advantages and Limitations - Classification of Budgets - Preparation of Budgets - Production Budget, Cash Budget and Flexible Budget.- Steps in budgetary Control.

TEXT BOOKS:

1. Management Accounting – T.S.Reddy & Y.S.Hariprasad Reddy,Margham Publications

REFERENCE BOOKS:

1. Dr.S.N.Maheswari : Principles of Management Accounting, Sulthan Chand Publications

2. R.S.N. Pillai and Bagavathi: Management Accounting, S.Chand Publications

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA6002	INCOMETAX LAW AND PRACTICE –II	5	CC20	5

Objectives: To make the students understand important provisions of income Tax Law and computation of Income Tax.

UNIT-I

Capital gain - definition of Capital Assets - Kinds of Capital Assets - Exempted Capital Gains - Computations of Capital Gains.

UNIT-Il

Income from other Sources - Income Chargeable to Tax - Deductions - Bond Washing Transactions - Computation of Income from other Sources.

UNIT-III

Aggregation of Income - Deemed Incomes - Set off and Carry forward of losses - Deductions from Gross Total Income.

UNIT-IV

Assessment of individuals - Computation of Total Income and Tax Liability.

UNIT-V

Procedure for Assessment - Types of Assessment - Filing of Returns - Advance Payment of Tax - Deduction of Tax at Source.

Text Books:

A.Murthy - Income Tax Law and Practice**, Vijay Nicole Imprints (P) ltd**

BOOKS FOR REFERENCE:

I. **H.C. Mehrotra**: Income Tax Law and Accounts.

2. **Bhagavathi Prasad**: Income Tax Law and Practice.

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA6003	BANKING LAW AND PRACTICE	5	CC20	5

Objectives: To provide basic knowledge on banking law, the functioning of central bank and commercial banks in India.

UNIT-I

Origin of Bank - Banking Regulation Act, 1949 -Definition of Banking, Provisions, relating to Licensing, Opening of branches, Functions of Bank, Inspection - Role of Bank in Economic Development - Central Bank - Role of RBI and its functions.

UNIT - II

Commercial Banks - Functions – Types of Deposits - Lending of Funds, Electronic Fund Transfer - NEFT, RTGS -Electronic Clearing System – Cashless transactions – E-Payment gateways – E-wallets.

UNIT-III

Opening of an account - Types of Deposits - Types of customers (Individuals, Firms, Trusts and Companies) – Importance of Customer relations –KYC Forms - Customer grievances and redressal - Ombudsman.

UNIT – IV

Negotiable Instruments – Features –Promissory Note , Cheque, Demand Draft - Crossing – kinds of crossing - Endorsement – kinds of endorsements .

UNIT V

Material Alteration - consequences - Paying Banker - Right and Duties - statutory Protection - Dishonour of Cheques - Role of Collecting Banker.

TEXTBOOK:

1. Dr.G. Gurusamy: Banking Theory Law and Practice, Vijay Nicolas Imprints (p) Ltd, Chennai, 2005.

BOOK OF REFERENCE:

2. S.N. Maheshwari; Banking Law Theory and Practice, 1st Edition, Kalyani Publishers, New Delhi, 2005.

3. Parameshwaran. R; Indian Banking, 4th Edition, S. Chand and Co, New Delhi, 2005, S. Natarajan

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA6004	MULTIMEDIA THEORY AND PRACTICE	2	CC23	4

Unit I Introduction to Multimedia
Introduction to Multimedia-What is Multimedia-Scope of Multimedia-Digital media that make up Multimedia-Understanding Multimedia-Various type of Multimedia Applications-Interactive Multimedia and non Interactive Multimedia

Unit II Setting up a Multimedia Studio
Introduction –Multimedia hardware evolution-Basic types of multimedia hardware-Multimedia add-on Peripherals-External multimedia equipments-choosing right multimedia peripherals and equipments-Installing tips-Finding the multimedia peripherals installed on your computer-plug and play-A Typical multimedia system configuration-Multimedia upgrade Kits.

Unit III Multimedia Audio
Introduction-digital audio definition-Going digital-Audio Sampling-Audio Sampling Parameters-Digital audio recording pitfalls-Digital audio file sizes- Digital audio file formats

Unit IV Digital Texts
Introduction-Text as a part of Multimedia-Text design basics-Effects of poor design-Parameters that control text design-fonts-Titling-Jaggies and anti-Aliasing-Special effects for titles-Drop shadows-Bevel Effects-Three Dimensional texts-Text animations-Quantitative aspects of content-Hypermedia-Hypertexts-Embed hyperlinks in multimedia projects-Designing a Hypermedia system-Text editing software tools.

Unit V Multimedia Graphics
Introduction-Basic concept of color display-Color depth-Resolution-Multimedia kiosks-Touch screen technology-Composition of touch screen monitors-Presentation display systems-LED Technology-LCD Projection panels-LCD panels-types and specifications-multimedia animation-Two Dimensional Animation-Three Dimension Animations-Multimedia Videos-Role of digital videos in multimedia projects.

Text Book:
Multimedia Magic (Revised and updated second editions) – S. Gokul, BPB PUBLICATIONS.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CA6005	HUMAN RESOURCE MANAGEMENT	2	CC24	4

Objective:To make the students familiarise with the basic concepts of Human Resource Management.

Unit I

Meaning, Nature and scope of HRM – Difference between Personnel Management and HRM – Functions of HRM – Environment of HRM – Recent trends in HRM.

Unit II

Human Resource Planning – Recruitment – Sources of Recruitment – Selection – Methods of Selection – Placement-Job Analysis and Job Description – Outsourcing of HRM Activities – Recruitment procedure of UPSC, DRDO, RRB, TRB,TNPSC.

Unit III

Induction –Meaning of Training and Development - Training Methods – Techniques – Identification of Training needs – Training Methods of Leading MNCs(Yahoo, Pepsi, Hyundai, TCS, Ford)

Unit IV

Performance Appraisal – Need for Appraisal – Methods – Job Evaluation – Wages and Salary Administration – Performance Appraisal in MNCs – Stress Management – Grievance Redressal.

Unit V

Transfer – Promotion and termination of services – Career development – Mentoring – HRM Audit – Nature – Benefits – Scope –Approaches – Fringe benefits in Govt. companies and MNCs.

Text Books:
1. Aswathappa :Human Resource and Personnel Management,Himalaya Publishing House
2. J Jayasankar :Human Resource Management,Sulthan Publications.

BOOK OF REFERENCE:
1. Subba Rao P : HRM and Industrial Relations, Himalaya Publishing House
2. Memoria C B :Personnel Management

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CAPJ61	PROJECT- (COMMERCE) INCLUDING VIVA- VOCE	5	CC22	5

Objectives: To bridge the gap between theory and practice, and acquaint the students with practical aspect of the company management and application of computer.

Supervised Institutional Training shall be integral part of the Course. It is to a be sort of job testing program to bridge the gap between theory and practice. It is designed to create a natural interest in the practical aspects of the Company management so as to stimulate trainee's desire to face its challenges and problems.

The training should be given under supervision and guidance of the Training Officer of the Institution. The details of the training given and the assessment of each student in that regard should be fully documented.

The duration of the training shall be for a period of 30 days during the third year. The training shall broadly relate to [a] Office Management and [b] Computer Application.

The training relating to Office Management may be designed to acquaint the trainees with:
1. Company's activities, organization structure, departments and authority.
2. Office layout,' working conditions, office maintenance, safety and sanitary conditions.
3. Study of the Secretarial service, Communication, Equipments, Postal and Mailing services and equipments.
4. Acquaintance with office machines and equipments and accounting machines
5. Acquaintance with filing department, sales, purchases, sales accounts, salary, administration and personnel departments.

The training pertaining to computer application shall be regarding. The use of computer in the Organization and the effectiveness of the same on the organization.

The following types of organizations may be selected for the training:

1. Public Limited Companies Both Industrial and Commercial
2. Statutory bodies, Public Enterprises and Public Utilities like LI.C, Electricity Board, Housing Board and Chambers of Commerce, Cooperative Societies and Banks.

3. Office Equipment Marketing Organizations.

NOTE:

The paper on Institutional Training shall carry hundred marks and Internal and External Viva- Voce based on a report submitted by the candidate, under the guidance of the faculty member of the college assisted by the training officers of the Institutions providing training.

The report shall be around 50 typed pages, excluding tables, figures, bibliographies and appendices. The report should be evaluated jointly by the INTERNAL and EXTERNAL Examiners and conduct Viva-Voce, A Candidate Failing to secure the minimum for a pass [40%] shall be required to resubmit this report to the department.

The evaluation of project report and Viva-Voce shall be for a maximum of 10 candidates per session. The marks shall consist of Project Report 75 Marks and Viva Voce 25 Marks.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CASB61	E- COMMERCE AND ITS APPLICATIONS	1	AEC6	2

Objectives: To provide the knowledge about commerce through electronic medium & information system.

UNIT I

Electronic Commerce Framework, Traditional Vs. Electronic Business Application, the Anatomy of E-Commerce Applications. Network infrastructure for E-Commerce – Components of the I-way – Global Information Distribution Networks – Public policy issues shaping the I – way. Network Access Equipment

UNIT II

The internet as a Network Infrastructure, Network Security and Firewalls – Client Server Network Security – Firewalls and Network Security – Data and Message Security – Encrypted Documents and Electronic Mail.

UNIT III

Electronic Commerce and World Wide Web, Consumer Oriented E-Commerce, Electronic Payment Systems

UNIT IV

Electronic Data Interchange (EDI), EDI application in business, EDI and E- commerce –
EDI implementation. Intra-organizational Electronic Commerce - Supply Chain Management

UNIT V

Corporate Digital Library – Advertising and marketing on the Internet – E-Commerce Catalogs or Directories- On demand Education and Digital Copyright – Applets, Browsers & Software Agents.

TEXTBOOK:

Frontiers of Electronic Commerce, R. Kalakota and Andrew. B. Whinston, Pearson , 11th Edition , 2011.

REFERENCES:

1. Understanding Electronic Commerce, Daid Kosiur, Microsoft Press, 1997.
2. From EDI to Electronic Commerce, Soka, McGraw Hill, 1995.
3. Electronic Commerce Management, Saily Chan, John Wiley, 1998.

DEPARTMENT OF MATHEMATICS

SYLLABUS
For
B.Sc Mathematics

SEMESTERS – V & VI

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS5001	MODERN ALGEBRA – I	5	CC13	6

Objectives: This course aims to impart emphasis on concepts and technology of the groups and rings at these algebraic structures have applications in Mathematical Physics and Computer Science.

UNIT – I: GROUP THEORY
Definition of a Group – Examples – Subgroups.
Chapter 2: Sections 2.1 to 2.4.

UNIT – II: GROUP THEORY (Contd…)
Counting Principle – Normal Subgroups – Homomorphisms.
Chapter 2: Sections 2.5 to 2.7.

UNIT – III: GROUP THEORY (Contd…)
Automorphisms – Cayley's theorem – Permutation Groups.
Chapter 2: Sections 2.8 to 2.10.

UNIT – IV: RING THEORY
Definition and Examples – Integral Domain – Homomorphism of Rings – Ideal and Quotient Rings.
Chapter 3: Sections 3.1 to 3.4.

UNIT – V: RING THEORY (Contd…)
Prime Ideal and Maximal Ideal – The Field of Quotients of an Integral Domain – Euclidean Rings.
Chapter 3: Sections 3.5 to 3.7.

RECOMMENDED TEXT:

TOPICS IN ALGEBRA, *I.N. Herstein* (1989), 2ⁿᵈEdn, Wiley Eastern Ltd., New Delhi.

REFERENCES:

1. MODERN ALGEBRA, *S. Arumugam*, (2004), Scitech Publications, Chennai.
2. MODERN ALGEBRA, *M.L. Santiago*, (2002), Tata McGraw Hill, New Delhi.
3. MODERN ALGEBRA, *Surjeet Singh and Qazi Zameeruddin*, (1982), Vikas Publishing House Pvt. Ltd., New Delhi.

SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS5002	REAL ANALYSIS	4	CC14	5

Objectives: To understand various limiting behavior of sequences and series. To explore the various limiting processes viz. continuity, uniform continuity, connectedness, completeness and compactness and to enhance the mathematical maturity and to work comfortably with concepts.

UNIT-I: COUNTABILITY AND SEQUENCES
Equivalence – Countability – Definition of Sequence and Subsequence – Limit of a Sequence – Convergent Sequences – Divergent Sequences – Bounded Sequences – Monotone Sequences – Cauchy Sequence.
Chapter 1: Section 1.5.
Chapter 2: Sections 2.1 to 2.6 and 2.10.

UNIT-II: SERIES
Convergence and Divergence – Series with non-negative terms – Alternating Series –Conditional Convergence and Absolute Convergence – Tests for Absolute Convergence.
Chapter 3: Sections 3.1 to 3.4 and 3.6.

UNIT-III: METRIC SPACES AND CONTINUOUS FUNCTIONS ON METRIC SPACES
Metric Spaces – Limits in Metric Spaces – Functions Continuous at a point on the real line – Open Sets – Closed Sets.
Chapter 4: Sections 4.2 and 4.3.
Chapter 5: Sections 5.1, 5.4 and 5.5.

UNIT-IV: CONNECTEDNESS AND COMPLETENESS
Open Sets – Connected Sets – Bounded Sets and Totally Bounded Sets – Complete Metric Spaces.
Chapter 6: Sections 6.1 to 6.4.

UNIT-V: COMPACTNESS
Compact Metric Space – Continuous Functions on Compact Metric Spaces – Continuity of Inverse Functions – Uniform Continuity.
Chapter 6: Sections6.5 to 6.8

RECOMMENDED TEXT:
METHODS OF REAL ANALYSIS, Richard *R. Goldberg*, (2000), Oxford & IBH   Publishing Co., New Delhi.

REFERENCE BOOKS:
1. MATHAMATICAL ANALYSIS, *Tom M. Apostol*, (1974), 2nd Edition, Addison–Wesley, New York.
2. REAL ANALYSIS, *R.G. Bertle and Shebert,* (1976), John Wiley and Sons, New York.
3. MATHEMATICAL ANALYSIS, *S.C. Malik and Savita Arora,* (1991), Wiley Eastern Limited, New Delhi.
4. INTRODUCTION TO REAL ANALYSIS*, Sanjay Arora and Bansi Lal*, (1991), Satya Prakashan, New Delhi.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS5003	STATICS	4	CC14	5

Objectives: This course introduces the students to the basic concepts of forces, moments, couple, friction laws, virtual displacement and work, catenary and the centre of gravity and kinematics. This course stress the development of skill in formation of suitable mathematical models and problem solving techniques.

UNIT - I: PARALLEL FORCES AND MOMENTS
Resultant of parallel forces, Moment of a force, Varignon's theorem of moments, Moment of forces about an axis, Simple problems.
Chapter 2: Sections 1, 2, 3, 4, 5, 7, 8, 9.
Chapter 3: Sections 1, 2, 3, 5, 7, 12.

UNIT - II: COUPLES
Couples, Equilibrium of two couples, Equivalences of two couples, Resultant of coplanar couples, Simple problems.
Chapter 4: Sections 1, 2, 3, 6.

UNIT - III: EQUILIBRIUM OF THREE FORCES ACTING ON A RIGID BODY
Rigid body subject to any three forces, Three coplanar forces, Conditions of equilibrium, Two trigonometric theorems, Simple problems.
Chapter 5: Sections 1, 2, 3, 5.

UNIT - IV: FRICTION
Statical, Dynamical and Limiting friction, Laws of friction, Coefficient of friction, Angle of friction, Cone of friction, Equilibrium of a particle on a rough inclined plane, Equilibrium of a body on a rough inclined plane under a force parallel to the plane, Equilibrium of a body on a rough inclined plane under any force, Simple problems.
Chapter 7: Sections 3, 4, 6, 7, 8, 10, 11, 12.

UNIT - V: CENTRE OF GRAVITY

The centre of gravity of a body is unique, C.G of a thin uniform rod, C.G of a thin plate, C.G of a thin uniform triangular lamina, C.G of a quadrilateral lamina.

CENTRE OF GRAVITY BY INTEGRATION:

C.G of a uniform circular arc subtending an angle 2α at the centre, C.G of a uniform sector of a circle 2α being the central angle, C.G of a uniform solid hemi sphere, C.G of a uniform hollow hemisphere, Simple problems.

Chapter 8: Sections 3, 5, 6, 8, 12, 18.1, 18.2, 18.3, 18.4.

RECOMMENDED TEXT:

STATICS, Dr. *M.K. Venkataraman*, Agasthiar Publication.

REFERENCE BOOK:

MECHANICS, *P. Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam*, S. Chand & Company Ltd.
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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS5004	OPERATIONS RESEARCH – I	4	CC16	5

Objectives: To improve the skill of solving very common problem which one come across in various fields like transportation, game and industries with machines.

UNIT – I: LINEAR PROGRAMMING PROBLEM

Linear programming problem – Mathematical formulation of the problem – Graphical solution method – Simplex method – Simplex Algorithm.

Chapter 2: Sections 2.1 – 2.9.

UNIT – II: TRANSPORTATION PROBLEM

Transportation problem – Mathematical formulation – The transportation table – The transportation Algorithm – Degeneracy in Transportation.

Chapter 3: Sections 3.1 – 3.5.

UNIT – III: ASSIGNMENT PROBLEM

The Assignment problem – The assignment algorithm – Maximization Assignment problem – Travelling Salesman Problem.

Chapter 4: Sections 4.1 – 4.5.

Chapter 5: Section 5.6

UNIT – IV: GAME THEORY

Game theory – Two person zero sum game – The MaxiMin and MiniMax principle – Saddle points – Game without saddle points and Dominance Property.

Chapter 9: Sections 9.11 – 9.18, 9.21.

UNIT – V: SIMULATION

Simulation – Applications – Advantages and Disadvantages – Monte Carlo method.

Chapter 13: Sections 13.1 – 13.7.

RECOMMENDED TEXT:

OPERATIONS RESEARCH, *P.K. Gupta and D.S. Hira,* (1998), S. Chand & Co., New Delhi.

REFERENCES:

1. PROBLEMS IN OPERATIONS RESEARCH, *Kanti Swaroop, P.K. Gupta and Manmohan*, (2002), Sultan Chand & Son.
2. OPERATION RESEARCH, *H.A. Taha,* (2003), Macmillan Publishing Company, New York.
3. OPERATIONS RESEARCH, *V.K. Kapoor*, (1989), Sultan Chand & Sons.
4. PROBLEMS IN OPERATIONS RESEARCH, *P.K. Gupta and D.S. Hira,* (2000), S. Chand & Co., New Delhi.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS5005	GRAPH THEORY	3	CC17	4

Objectives: To study and develop the concepts of graphs, sub graphs, trees, connectivity, Eulerian and Hamiltonian graphs, planar graphs.

UNIT- I: GRAPHS
Graphs, Subgraphs, Degree of a vertex, Isomorphism of graphs, independent sets and coverings.
Chapter 2: Sections 2.1 to 2.6.

UNIT – II: OPERATIONS ON GRAPHS
Adjacency and incidence of matrices, Operations on graphs, degree sequences, graphic sequences, walks, trails, paths.
Chapter 2: Sections 2.8 to 2.9.
Chapter 3: Sections 3.1 to 3.2.
Chapter 4: Section 4.1

UNIT – III: CONNECTEDNESS
Connectedness and components, cut point, bridge, block, Connectivity theorems and simple problems.
Chapter 4: Sections 4.2 to 4.4

UNIT – IV: EULERIAN &HAMILTONIAN GRAPHS AND TREE
Eulerian graphs and Hamiltonian graphs, simple problems; trees, theorems and simple problems.
Chapter 5: Sections 5.1 to 5.2
Chapter 6: Sections 6.1 to 6.2

UNIT – V: PLANAR GRAPH
Planarity, definition and properties, Characterization of planar graph, Thickness, Crossing and Outer planarity.
Chapter 8: Sections 8.1 to 8.3

RECOMMENDED TEXT:

INVITATION TO GRAPH THEORY, *S. Arumugam and S. Ramachandran*, 2011, SCITECH Publications India Pvt Ltd., Chennai – 17.

REFERENCE BOOKS:

1. GRAPH THEORY, *S. Kumaravelu, Susheela Kumaravelu,* Publishers, Nagerkoil.
2. A FIRST COURSE IN GRAPH THEORY, *S.A. Choudham,* Macmillan India Ltd.

3. INTRODUCTION TO GRAPH THEORY, *Robin J. Wilson,* Longman Group Ltd.
4. GRAPH THEORY WITH APPLICATIONS, *J.A Bondy and U.S.R. Murthy,* Macmillan, London.

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MSPR51	SPSS LAB	2	ELECTIVE PRACTICAL	2

Objective: To provide concepts used in routines in SPSS on the following problems.

List of Practical:

1. Mean, Standard deviation, Variance.
2. Bar diagram, Line diagram, Pie chart and Histogram.
3. Co efficient of correlation.
4. Regression equation of X on Y.
5. Regression equation of Y on X.
6. Application of t-test for one sample problem.
7. Application of t-test for two sample problems.
8. Application of t-test for testing the significance of Correlation Coefficient.
9. One-tailed and Two-tailed tests.
10. Application of analysis of variance.

References:

1. SPSS Instruction Manual (Online Edition).
2. SPSS for Beginners, *V. Gupta*, 1999, Published by V J Books Inc (Online Edition).
3. Student Guide to SPSS, *Dan Flynn* (Online Edition).

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SEMESTER – V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MSSB51	QUANTITATIVE APTITUDE	3	SKILL BASED	3

Objective: To introduce concept of mathematics with emphasis on analytical ability and computational skill needed in competitive examinations.

UNIT - I: PROFIT AND LOSS
Cost price – Selling price – Profit and Loss
Chapter 11

UNIT – II: RATIO AND PROPORTION
Ratio – Proportion – Comparison of Ratios – Compounded Ratio – Variations
Chapter 12

UNIT – III: TIME AND WORK
Problem on speed, time and work – Completion of work.
Chapter 15

UNIT – IV: TIME AND DISTANCE
Speed – Time – Distance – Applications.
Chapter 17

UNIT – V: SIMPLE INTEREST AND COMPOUND INTEREST
Simple interest – Compound interest – Effective rate of interest – Annuity – Present value – Future value – Problems.
Chapter 21 and 22

RECOMMENDED TEXT (Content and Treatment as in):

QUANTITATIVE APTITUDE, *R.S. Agarwal*, 2008, S. Chand & Co., New Delhi.

REFERENCES:

1. QUANTITATIVE APPTITUDE FOR COMPETITIVE EXAMINATIONS, Abhigit Guha, Tata McGraw - Hill Pub., Co., Ltd. New Delhi. Third Edition
2. QUANTITATIVE APPTITUDE FOR COMPETITIVE EXAMINATIONS COURSE IN METAL ABILITIES, Edgar Thorpe Tata McGraw - Hill Pub., Co., Ltd. New Delhi. Third Edition

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS6001	MODERN ALGEBRA – II	5	CC18	6

Objectives: To study the Algebraic Structures of Vector Spaces and Linear Transformation.

UNIT - I: VECTOR SPACES
Definition and Examples – Linear dependence and Independence.
Chapter 4: Sections 4.1 – 4.2.

UNIT - II: VECTOR SPACES (Contd…)
Dual Spaces – Inner Product Spaces.
Chapter 4: Sections 4.3 – 4.4.

UNIT- III: LINEAR TRANSFORMATIONS
Algebra of Linear Transformation – Characteristic roots.
Chapter 6: Sections 6.1 – 6.2.

UNIT - IV: LINEAR TRANSFORMATIONS (Contd…)
Matrices – Canonical forms – Triangular forms.
Chapter 6: Sections 6.3 – 6.4.

UNIT - V: LINEAR TRANSFORMATIONS (Contd…)
Trace and Transpose.
Chapter 6: Section 6.8.

RECOMMENDED TEXT:

TOPICS IN ALGEBRA, *I.N. Herstein* (1989), 2nd Edn, Wiley Eastern Ltd., New Delhi.

REFERENCES:

1. MODERN ALGEBRA, *S. Arumugam*, (2004), Scitech Publications, Chennai.
2. MODERN ALGEBRA, *M.L. Santiago*, (2002), Tata McGraw Hill, New Delhi.
3. MODERN ALGEBRA, *Surjeet Singh and Qazi Zameeruddin*, (1982), Vikas Publishing House Pvt. Ltd., New Delhi.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS6002	COMPLEX ANALYSIS	4	CC19	5

Objectives: This course provides a modern treatment of concepts and techniques of complex function theory and the methods to solve problems in Pure and Applied Mathematics.

UNIT – I: COMPLEX NUMBERS AND ANALYTIC FUNCTIONS
Definition – Polar form – Exponential form – Powers and Roots.
Functions of a complex variable – Mappings – Limits, Continuity – Derivatives and Differentiation formula – Cauchy-Riemann Equations – Sufficient conditions for Analytic Functions – Harmonic Functions – Determination of Harmonic Conjugate and Analytic Function.

Chapter 1: Sections 1, 5, 6, 7.
Chapter 2: Sections 9, 10, 11, 14, 15, 16, 17, 18, 19, 20.

UNIT – II: MAPPINGS BY ELEMENTARY FUNCTIONS

Conformal Mapping – The transformations $w = a\,z + b$, $w = \dfrac{1}{z}$, $w = z^2$,

$w = \sqrt{z}$, $w = e^z$, $w = \sin z$, $w = \cos z$ – Bilinear Transformations.
Chapter 7: Sections 64, 65, 66, 68, 69, 70, 71.

UNIT – III: INTEGRALS
Contours – Line Integrals – Cauchy-Goursat Theorem (without proof) – Cauchy's Integral Formula – Derivatives of Analytic Functions – Maximum Modulus Theorem.
Chapter 4: Sections 31, 35, 39, 40, 42.

UNIT – IV: SERIES
Taylor's and Laurent's Theorem – Classification of Singularities – Simple problems.
Chapter 5: Sections 45, 47, 48.

UNIT – V: RESIDUES AND POLES
Residues - Cauchy's Residue Theorem – Simple Problems – Evaluation of real improper integrals, improper integrals involving Sines and Cosines.

Chapter 6: Sections 53, 56, 54, 58, 59.

RECOMMENDED TEXT:

COMPLEX VARIABLES AND APPLICATIONS, *R.V. Churchill and J.W. Brown*, (1990), McGraw Hill International Book Co., Singapore.

REFERENCE BOOKS:

1. COMPLEX ANALYSIS, *P. Duraipandian & Laxmi Duraipandian*, (1976), Emerald Publishers, Chennai.
2. FOUNDATIONS OF COMPLEX ANALYSIS, *S. Ponnusamy*, (2000), Narosa Publishing House, New Delhi.\

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS6003	DYNAMICS	4	CC20	5

Objectives: This course aims to provide models for some real life problems. The students specialize in topics like Simple Harmonic motion, Projectiles, Central Orbits and Moment of inertia. Focus on the mathematical formulation of the physical aspects of the problems. It develops logical deduction and interpretation.

UNIT - I: LAWS OF MOTION
Momentum, Newton's Laws of motion, Distinction between Mass and Weight, Conservation of Linear Momentum, Work, Power, Energy, Kinetic Energy, Potential energy, The principle of conservation of energy, The principle of energy in the case of a freely falling body, Simple problems.
Chapter IV: Sections 4.2, 4.3, 4.10, 4.11, 4.24, 4.30 – 4.36.

UNIT - II: PROJECTILES
Definitions, The path of a projectile is a parabola, Characteristics of the motion of a projectile, Maximum horizontal range for a given velocity, Range on an inclined plane, Simple problems.
Chapter VI: Sections 6.2, 6.4, 6.5, 6.12.

UNIT – III: IMPACT
Impulse, Impulsive force, Impact of two bodies, Fundamental Laws of impact, Direct impact of two smooth spheres, Oblique impact of two smooth spheres, Simple problems.
Chapter VII: Sections 7.1 – 7.4.
Chapter VIII: Sections 8.5, 8.7.

UNIT – IV: SIMPLE HARMONIC MOTION
Simple Harmonic Motion in a Straight line, General solution of the S.H.M equation, Change of origin, Two S.H.M of the same period and in the same straight line, Two S.H.M of the same period in two perpendicular directions, Simple problems.
Chapter X: Sections 10.2, 10.3, 10.5, 10.6, 10.7.

UNIT – V: MOMENT OF INERTIA
Definition, Theorem of Parallel axes, Theorem of Perpendicular axes, Moment of inertia in some particular cases, Simple problems.
Chapter XII: Sections 12.1 – 12.4

RECOMMENDED TEXT:

DYNAMICS, *Dr. M. K. Venkataraman*, Agasthiar Publication,1982.

REFERENCE BOOK:

MECHANICS, *P. Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam,* S. Chand & Company Ltd**.**

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS6004	OPERATIONS RESEARCH – II	4	CC21	5

Objectives: To develop computational skills and logical thinking in formulating industry oriented problems as mathematical problems and finding solutions to these problems.

UNIT – I: REPLACEMENT PROBLEMS
Replacement problems – Introduction – replacement of items that deteriorate with time – replacement of items that fail completely.

Chapter 11 : Sections 11.1, 11.2, 11.2.1,11.2.2,11.3

UNIT – II: NETWORK PROBLEMS
Network scheduling by CPM/PERT – project network diagram – Critical Path Method (CPM) – PERT Computations.

Chapter 15 : Sections 15.1 to 15.6
Chapter 16 :Sections 16.1 to 16.4

UNIT – III: SEQUENCING PROBLEM
Sequencing problem – *n* jobs through 2 machines, *n* jobs through 3 machines – two jobs through *m* machines – (Graphical Method) – *n* jobs through *m* machines.
Chapter 5 :Sections 5.1 to 5.5

UNIT – IV: QUEUING THEORY
Queuing Theory – Basic concepts – Steady state analysis of M/M/1 and M/M/N systems with finite and infinite capacities.

Chapter 10 : Sections 10.1 to 10.6 , 10.6.1 to 10.6.3, 10.6.7 and 10.7

UNIT – V: INVENTORY MODELS
Inventory models – EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate finite production rate with no shortages – Inventory control with Price Breaks.

Chapter 12: Sections 12.1 to 12.7.

RECOMMENDED TEXT:

OPERATIONS RESEARCH, *P.K. Gupta and D.S. Hira* (1998),S. Chand & Co., New Delhi.

REFERENCE BOOKS:
1. OPERATIONS RESEARCH: THEORY AND APPLICATIONS, *J.K. Sharma,* (1998) Macmillan, New Delhi.
2. PROBLEMS IN OPERATIONS RESEARCH, *Kanti Swaroop, P.K. Gupta and Manmohan,* (2002), Sultan Chand & Sons.
3. OPERATIONS RESEARCH, *A. Ravindran, D.T. Philips and J.J. Solberg,* (1987),   John Wiley & Sons, New York.
4. OPERATIONS RESEARCH, *H.A. Taha,* (2003), Macmillan Publishing Company,   New York.
5. OPERATIONS RESEARCH, *P.R. Vittal,* (2003), Margham Publications, Chennai.
6. OPERATIONS RESEARCH, *S.J. Venkatesan,* J.S. Publishers, Cheyyar.

SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MS6005	FUZZY SET THEORY	4	CC22	4

Objectives: This course aims to introduce the idea of Fuzzy sets and the crisp sets and also the concepts of operations on Fuzzy sets including arithmetic operation on intervals.

UNIT - I: FROM CLASSICAL (CRISP) SETS TO FUZZY SETS
Introduction – Crisp sets: An overview – Fuzzy sets – Basic types – Basic concepts – Characteristics – Significance of the paradigm shift.
Chapter 1: Sections 1.1 to 1.5

UNIT - II: FUZZY SETS VERSUS CRISP SETS

Additional properties of α - Cuts – Representation of Fuzzy sets – Extension principle of Fuzzy sets.
Chapter 2: Sections 2.1 to 2.3

UNIT - III: OPERATIONS ON FUZZY SETS

Types of Operation – Fuzzy complements – Fuzzy intersection – t-norms
Chapter 3: Sections 3.1 to 3.3

UNIT - IV: OPERATIONS ON FUZZY SETS

Fuzzy unions – t conforms – Combinations of operations – Aggregation operations.
Chapter 3: Sections 3.4 to 3.6

UNIT - V: FUZZY ARITHMETIC

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Arithmetic operation on Fuzzy numbers
Chapter 4: Sections 4.1 to 4.4

RECOMMENDED TEXT:

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 – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MSPR61	WEB DESIGNING LAB	2	ELECTIVE PRACTICAL	2

Objective: To develop the basic knowledge of Web designing and to make the student to create their own web page with different requirements.

List of Programs:

1. Create a simple page introducing Yourself how old you are. What you do. What are you like and dislike.

2. Create a simple page and link it to another page about your favorite hobby and center something and put a quote on one of your pages.
3. Create a simple calculator using from fields. Have two fields for number entry and one field for the result. Allow the user to be able to use plus, minus, multiply and divide.
4. Create a document and add a link to it. When the user moves over the mouse over the link, it should load the linked document on its own.
5. Create a document that accepts the user's name ina text field form and display the same the next time when the user visits the site informing him that he have accessed the site for the second time and so on.

REFERENCE:

HTML Manual

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SEMESTER – VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5MSSB61	COMPUTATIONAL METHODS	3	SKILL BASED	3

Objectives: To introduce concepts of mathematics with emphasis on analytical ability and computational skill needed in competitive examinations.

UNIT – I: NUMBERS
Numbers – Face value of a digit – Various types of Numbers – Even and Odd Numbers – Prime Numbers – Coprime numbers – H.C.F and L.C.M of numbers.
Chapter 1 and 2.

UNIT- II: PERMUTATIONS AND COMBINATIONS
Definitions of nPr, nCr – Relationship between them – Circular permutation.
Chapter 30.

UNIT - III: PROBLEM ON AGES
Ages – Present ages – Future ages – Age related problems.
Chapter 8.

UNIT - IV: CLOCKS
Clocks – Too Fast – Too Slow.
Chapter 28.

UNIT - V: STOCK AND SHARES
Stock – Captial – Shares – Dividend – Face Value – Market Value – Brokerage.
Chapter 29.

RECOMMENDED TEXT(Content and Treatment as in):

QUANTITATIVE APTITUDE, *R.S. Agarwal*, 2008, S. Chand & Co., New Delhi.

REFERENCE BOOKS:

1. QUANTITATIVE APTITUDE FOR COMPETITIVE EXAMINATIONS, *Abhigit Guha*, Third Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi.
2. COURSE IN MENTAL ABILITIES AND QUANTITATIVE APPTITUDE FOR COMPETITIVE EXAMINATIONS, *Edgar Thorpe,* Second Edition, Tata McGraw - Hill Pub. Co. Ltd., New Delhi.
3. QUANTITATIVE APTITUDE FOR COMPETITIVE EXAMINATIONS, *Trishna's*, Second Edn, Pearson Education Pub. Co. Ltd., New Delhi.

DEPARTMENT OF MATHEMATICS

SYLLABUS
For
M.Sc Mathematics

SEMESTERS – III & IV

SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS3001	COMPLEX ANALYSIS – I	5	PAPER 9	6

Objectives: To study Cauchy integral formula, local properties of analytic functions, general from 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
(18 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
(18 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
(18 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
(18 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
(18 hours)

CONTENT AND TREATMENT AS IN:

COMPLEX ANALYSIS, (Third Edition), *Lars V. Ahlfors,* (2012), 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS3002	TOPOLOGY	5	PAPER 10	6

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 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
(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.

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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS3003	PROBABILITY THEORY	4	PAPER 11	6

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
(18 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
(18 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
(18 hours)

UNIT–IV: SOME PROBABILITY DISTRIBUTIONS

One point, two point, Discrete Distributions: Binomial – Polya – Hypergeometric – Poisson distributions – Continuous Distributions: Uniform – Normal – Gamma – Beta – Cauchy and Laplace distributions.
Chapter 5: Section 5.1 to 5.10
(18 hours)

UNIT–V: LIMIT THEOREMS

Stochastic convergence – Bernoulli law of large numbers – Convergence of sequence of distribution functions – Levy-Cramer Theorems – deMoivre 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
(18 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.

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SEMESTER – III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS3004	FLUID DYNAMICS	4	PAPER 12	6

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
(18 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.
(18 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.
(18 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, irrational imcompressible 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
(18 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 co-efficient of viscosity and Laminar flow – The Navier – Stokes equations of motion of a Viscous fluid.
Chapter 8: Sections 8.1 to 8.9.
(18 hours)

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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MSE301	TENSOR ANALYSIS AND RELATIVITY	4	ELECTIVE 3	6

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 – Cross product of vectors.
Chapter I: I.1 – I.3, I .7 and I.8, Chapter II: II.1 – II.19
(18 hours)

UNIT–II: TENSOR CALCULUS

Riemannian space – Christoffel symbols and their properties.
Chapter III: III.1 and III.2
(18 hours)

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

Covariant Differentiation of Tensors – Riemann–Christoffel Curvature Tensor – Intrinsic Differentiation.
Chapter III: III.3 – III.5
(18 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
(18 hours)

UNIT–V: RELATIVISTIC DYNAMICS

Momentum – Energy – Momentum energy four vector – 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
(18 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), *Donald T. 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MSE302	FUZZY SETS AND THEIR APPLICATIONS	4	ELECTIVE 3	6

Objectives: The course aims to introduce Fuzzy sets and some operations on Fuzzy sets and also construction of Fuzzy sets.

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
(18 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
Chapter3: Sections 3.1 to 3.2
(18 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
(18 hours)

UNIT - IV: FUZZY ARITHMETIC
Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Arithmetic operation on Fuzzy numbers – Lattice of Fuzzy numbers
Chapter 4: Sections 4.1 to 4.5
(18 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
(18 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:

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

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS4001	COMPLEX ANALYSIS II	5	PAPER 13	5

Objectives: To study Riemann Zeta function and normal families, Riemann mapping theorem, Conformal mapping of polygons, Harmonic functions, Elliptic functions and Weistrass 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.
(15 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 – Schwartz Christofel formula – Mapping on a rectangle.
HARMONIC FUNCTIONS: Functions with mean value property – Harnark'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.
(15 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
(15 hours)

UNIT–IV: WEIRSTRASS THEORY
The Weirstrass $\wp$-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
(15 hours)

UNIT–V: ANALYTIC CONTINUATIONS
The Weirstrass 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.
(15 hours)

CONTENT AND TREATMENT AS IN:

COMPLEX ANALYSIS, (Third Edition), *Lars V.Ahlfors,* (2012), 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS4002	FUNCTIONAL ANALYSIS	5	PAPER 14	5

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.
(15 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.

(15 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.

(15 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.

(15 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.

(15 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS4003	MATHEMATICAL STATISTICS	4	PAPER 14	6

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 a statistic – Distribution of the arithmetic mean of independent normally distributed random variables – the χ^2 distribution – the distribution of the statistic $(\bar{X}; S)$ – student t–distribution – Fisher's Z – distribution – Distribution of $\bar{X}$ 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 small samples and large samples χ^2 test – The test of Kolmogorov and smirnov type – the Wald Wolfovitz 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 – Suffiency – Effciency –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 zero – one 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.

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SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MS4004	DIFFERENTIAL GEOMETRY	4	PAPER 14	5

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 – Involutes and evolutes – intrinsic equations – Fundamental existence theorem for space curve – Helices.
Chapter 1: Sections 1 to 9
(15 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
(15 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
        (15 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 3: Sections 1 to 8
(15 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
(15 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MSE401	NUMBER THEORY AND CRYPTOGRAPHY	4	ELECTIVE 4	5

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
(15 hours)

UNIT–II: CRYPTOGRAPHY

Some simple cryptosystems – Enciphering matrices.
CHAPTER III
(15 hours)

UNIT–III: QUADRATIC RESIDUES
Quadratics – Residues and reciprocity.
CHAPTER II
(15 hours)

UNIT–IV: PUBLIC KEY
The idea of Public key Cryptography – RSA – Discrete Law – Knapsack – Zero– Knowledge.
CHAPTER IV : Sections 1 to 4.
(15 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
(15 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.

SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MSE402	ACTUARIAL MATHEMATICS	4	ELECTIVE 4	5

Objectives: To develop working knowledge of real world problems like investments, premium calculation in insurance, profit testing unit-linked polices, pension plan and future projections.

UNIT - I: BASIC FINANCIAL MATHEMATICS
Simple and compound interest – Actuarial notion for financial mathematics.
(15 hours)

UNIT- II: INTRODUCTION TO LIFE CONTINGENCIES
Survival probability – Death probabilities – deterministic modeling.
(15 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.   (15 hours)

UNIT- IV : UNIT LIKED PRODUCTS
Charging structure – Benefit flexibility – Investment flexibility – Unit price
– Market practice.

(15 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.   (15 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, Cambridge.

REFERENCE:
 Fundamentals of Actuarial Mathematics, S. David Promislow, 2nd Edition
2011, Willey Publications.

SEMESTER – IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6MSNM41	MATHEMATICAL SOFTWARE	2	NON MAJOR	4

*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 TOMATLAB 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.*

DEPARTMENT OF PHYSICS

SYLLABUS
For
B.Sc Physics

SEMESTERS – V & VI

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY5001	ELECTRICITY AND ELECTROMAGNETISM	5	CC13	5

Objective: To introduce the laws governing the distribution and propagation of electromagnetic fields created by static and dynamic charge distributions and their interaction with matter

UNIT I - ELECTROSTATICS

Coulomb's law in Vacuum expressed ion vector form- unit of charge (SI system)- Conservation and quantization of charge-calculation of E(r) for simple distributions of charge at rest: monopole, dipole. Work done on a charge in an electrostatic field expressed as a line integral – Electric field as a gradient of scalar field E(r) = - ∇ V – Potential at a point due to uniform charged conducting sphere- Flux of the electric field- Gauss law and its applications for finding electric field- Coulomb's Theorem – Poisson's and Laplace's Equations- Capacitance- Capacitance of a spherical and cylindrical capacitor-energy of a charged capacitor-energy density-loss of energy due to sharing of charges.

UNIT II - MAGNETIC AND CHEMICAL EFFECT OF ELECTRIC CURRENT

Biot and Savart's law –Magnetic field intensity due to a solenoid carrying current – effect of Iron core in solenoid – Helmholtz galvanometer - Moving coil ballistic galvanometer – Theory - Damping correction – Determination of the absolute capacity of a condenser using BG. Faraday's law of electrolysis- Electrical conductivity of an electrolyte- Determination of Specific conductivity of an electrolyte (Kohlrausch Bridge)

UNIT III - ELECTROMAGNETIC INDUCTION*

Faraday's laws of electromagnetic induction – Integral and differential form – Self Induction- Expression for self inductance of a coil- Determination of self-inductance of a coil using Rayleigh's method – Mutual inductance – Expression for mutual inductance- Experimental determination of mutual inductance – Coefficient of coupling – Earth inductor and uses – Search coil – Measurement of intense magnetic field.

UNIT IV - DC AND AC CIRCUITS*

DC Circuit: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitor – Growth and decay in an LCR circuit – Condition for the discharge to be oscillatory- frequency of oscillation.

A C Circuit: Peak, average and RMS values of AC voltage and current – Power factor and current values in an AC circuit containing LCR – series and parallel resonant circuits – Wattless current- Average power consumed in a LCR circuit.

UNIT V –ELECTROMAGNETISM

Displacement current- Magnitude of displacement current- Maxwell's equation- Maxwell's equation in free space- Propagation of electromagnetic wave in a non conducting medium- Hertz experiment- energy density of electromagnetic wave – Poynting's theorem – energy per unit volume- Expression for velocity of electromagnetic wave in free space

Books for Study

1. Duggal and Chhabra, Electricity and Magnetism. (Publisher)
2. M. Narayanamurthy and N. Nagarathnam, Electricity and Magnetism 5th Edition
   National Publishing Co. Meerut.
3. R. Murugeshan – Electricity and Magnetism 9th Edition 2009 S. Chand and Co. New Delhi.
4. Brijlal N. Subramanyan and Jivan Seshan Electricity and Magnetism, Eurasia Publishing House (Pvt) Ltd, New Delhi.

Books for Reference

1. Sehgal D.L. Chopra K.L. sehgal NK – Electricity and Magnetism, Sultan Chand and Sons, New Delhi.
2. David J. Griffiths Introduction to Electrodynamics 2nd Edition 1997 Prentice Hall
   of India Pvt. Ltd. New Delhi.
3. Electricity and Magnetism by K.K. Tewari S. Chand and 3rd Edition 2001.

*Compulsory problem in Section B

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY5002	**ATOMIC PHYSICS**	**5**	CC14	**5**

Objective: To provide an understanding of the basic discharge phenomenon, photoelectric effect, atomic structure and familiarize effect of X-ray with matter.

UNIT I –DISCHARGE PHENOMENON THROUGH GASES

Moving of a charge in transverse electric and magnetic fields – Specific charge of an electron –Thomson's Parabola method –Positive rays–Aston's and Dempster's mass spectrograph.

UNIT II –PHOTOELECTRIC EFFECT

Introduction – Lenard's method of determination of e/m for electrons – Richardson and Compton experiment – Laws of photoelectric emission – Failure of the electromagnetic theory – Einstein's photoelectric Equation – Experimental verification of Einstein's photoelectric Equation– Millikan's experiment – Photoelectric cells – Photoemission cell – Photovoltaic cell –Photo conducting cell – Photo multiplier.

UNIT III - ATOMIC STUCTURE

Bohr and Sommerfeld's atom model– Vector atom model – Quantum numbers associated with the vector atom model–Angular momentum and magnetic momentum–-coupling schemes-LS and JJ coupling – Pauli's Exclusion Principle –Magnetic Dipole moment due to orbital motion of the electron magnetic dipole due to spin Stern and Gerlach Experiment – The selection rules – The selection rule of J-J and L-S – Intensity rule – Fine Structure of sodium D- lines.

UNIT IV - IONIZATION POTENTIAL AND SPLITTING OF ENERGY LEVELS

Excitation and ionization potentials – Frank and Hertz's experiment–Davis and Goucher's method –Zeeman Effect- Larmor's theorem– Lorentz classical theory of normal Zeeman effect –Debye's explanation of normal Zeeman effect- Anomalous Zeeman effect –Theoretical explanation –Lande's 'g' factor and

explanation of splitting of D_1 and D_2 lines of sodium –Paschen Back Effect– Stark effect.

UNIT V–X-RAYS

Introduction – Brag's law – Absorption of X-rays – Characteristic X-ray spectra – Continuous X-ray spectra – Moseley's law – uses of X-rays - Compton effect – experimental verification of Compton Effect.

Books for Study

1. Modern Physics by R. Murugeshan, S Chand &Co., New Delhi-2004
2. Atomic and Nuclear Physics by N.Subramanian and BrijLal, S Chand &Co., New Delhi-2004
3. Atomic Physics by J.B. Rajam (edition-publisher)

Books for Reference

1. Atomic Physics by A.B. Gupta and DipakGhosh - Books and Allied publishers
2. Modern Physics by J.H. Hamilton and yang, McGraw Hill publication 1996
3. Concepts of Modern Physics by A. Beiser, Tata McGraw hill, new Delhi 1997
4. Fundamentals of Physics, 6th edition, by D. Halliday, R. Resnick and Walker, Wiley NY 2001

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY5003	**APPLIED ELECTRONICS**	**5**	**CC15**	**5**

Objective: To provide brief introduction to semiconductor theory and semiconductor devices and enhance the knowledge on working principle of oscillators, Op-Amp, Optoelectronic devices and communication electronics

UNIT I

SEMICONDUCTOR THEORY AND SEMICONDUCTOR DEVICES *

Classification of materials based on energy band theory- Semiconductors-intrinsic and extrinsic semiconductor- Fermi energy level- effect of temperature on Semiconductor-Junction Diode- Zener diode -Transistor construction– Working-characteristics in CE and CB mode.

FET – Characteristics – parameters – MOSFET – Depletion and Enhancement modes – UJT characteristics– UJT relaxation oscillator — SCR characteristics – SCR as half and full wave rectifier.

UNIT II

AMPLIFIERS AND OSCILLATORS
Transistor biasing: Fixed bias – Self bias – Types of Amplifier (Class A, Class B, Class AB and Class C) - Single Stage RC coupled amplifier- frequency response – Feedback amplifier- Voltage gain – negative feedback -Barkhausen criterion – Oscillators: Hartley and Colpitt's Oscillator– Phase Shift Oscillator - Wien's bridge Oscillator – Crystal Oscillator.

UNIT III

WAVESHAPING CIRCUITS AND MULTIVIBRATORS*
Types of wave shaping circuits- Clipping (Positive, negative and biased) - Clamping circuits (Positive and negative) – RC timing circuits- differentiator and integrator- multivibrators – astable, mono stable and bi-stable multivibrators using transistor-Voltage doubler.

UNIT IV

OP-AMP AND OPTO-ELECTRONIC DEVICES
Ideal characteristics of OP-AMP – Inverting and Non inverting amplifier – Voltage follower – Summing amplifier – Differential amplifier – Integrator – Differentiator – Comparator- solving simultaneous equation.
Light emitting diode (LED) – Liquid crystal display (LCD) – Photo diode – Photoconductive cell

UNIT V

RADIO COMMUNICATION

Communication – Modulation –Need for modulation - Amplitude Modulation – Frequency Modulation – Phase Modulation – AM Transmitter -AM detector –FM Transmitter- FM discriminator – Superhetrodyne receiver.

Books for study

1. Basic Electronics by B.L.Theraja, S. Chand &Co. New Delhi
2. A text book in Electrical Technology-BL Theraja, S Chand &Co.
3. Physics of Semiconductor devices by S.M. Sze, (John Wiley, New York, 1982).
4. High speed Semiconductor devices by S.M. Sze (John Wiley, New York, 1996).
5. Applied Electronics –RS Sedha, S. Chand &Co.New Delhi

Books for Reference

1. Integrated Electronics by Tauband Schilling Mc Graw Hill.
2.Physics and Technology of semiconductors by S.M. Sze (John Wiley, New York,
   1990)

<center>*Compulsory problem in Section B</center>

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<center>**SEMESTER V**</center>

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY5004	DIGITAL ELECTRONICS	5	CC16	5

Objectives: To provide an exposure to the wide applications of Sequential and Combinational circuits, memory devices, 555 Timer and AD/DA converters.

Unit I

Number Systems and Codes:

Decimal, binary, octal and hexadecimal systems – Conversion from one code to another - Binary arithmetic: – binary addition – subtraction – multiplication – division - 1's and 2's complements - Binary Codes – 8421 code-Excess-3 code

Logic gates and Logic Families:

AND, OR and NOT gates using diode and transistor – NAND, NOR and Ex-OR – gates - NAND & NOR as universal gates – Logic families: – RTL NOR – DTL NAND – TTL NAND – ECL OR/NOR – CMOS logic – CMOS Inverter – CMOS – NAND and NOR.

Unit-II

Simplification of logic circuits:

Boolean algebra – Simplifications of logic equations using Boolean algebra - De Morgan's theorems and their circuit implementations - Karnaugh map – pairs, quads, octets – 2,3 and 4 variables – Don't care conditions - Sum of product – Product of Sums – NAND-NAND network – NOR-NOR network

Combinational Circuits:

Arithmetic circuits – Half adder – Full adder – Half subtractor – Full subtractor- 4-bit Adder – 4-bit subtractor - Multiplexer – Demultiplexer – Decoder – BCD to Seven Segments Decoder - Encoder

Unit-III

Sequential logic circuits:

Flip-flops – RS Flip-flop – clocked RS Flip-flop – D Flip-flop – JK Flip-flop – JK master slave Flip-flop - T Flip-flop

Shift registers and Counters:

Serial in-serial out – serial in-parallel out – parallel in-serial out – parallel in-parallel out – Asynchronous/Ripple counter - up down counter – Synchronous counter – decade counter

Unit-IV
Memory Devices:
Read only memory – PROM – EPROM – EEPROM – Random access memory – Static RAM – Dynamic RAM – Memory expansion Memory parameters/characteristics

Unit-V
Timers:
555-Timer internal structure – Astable, monostable operations – Schmitt trigger

D/A and A/D converters:
Binary Weighted Resistor D/A converter – R-2R Ladder D/A converter – Counter type A/D converter - Successive Approximation A/D converter – Dual Slope A/D converter.

Books for study
1. Digital Principles and Applications-A.P. Malvino, McGraw Hill International Editions (Fourth Edition)
2. Modern Digital Electronics- R.P.Jain, Tata McGraw Hill Pub. Company (Fourth Edition)
3. Digital Fundamentals-Thomas L. Floyd, Universal Book Stall
4. Introduction to Integrated Electronics-V.Vijayendran, Viswanathan Pub.Chennai.
5. Fundamentals of digital computers- Arul Thalapapathi, Comptek Publishers, Chennai

Book for Reference
1. Digital Electronics with Practical Approach- G.N Shinde, Shivani Pub. Nanded
2. Digital electronics: An Introduction to Theory and Practice – William H. Gothmann, Prentice Hall of India.
3. Digital Integrated electronics- Herbert Taub and Donald Schilling, Mc. Hraw Hill.
4. Fundametal of Digital electronics and Microprocessors, 2 nd revised and enlarged Ed.- Anokh Singh and A. K Chhabra, S Chand& Co, Ltd., New Delhi

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PYSB51	MAINTENANCE AND SERVICING OF HOME APPLIANCES	1	AEC5	2

Objective: This paper aims to impart the awareness about safety, practical knowledge in maintenance and repair of electrical and electronic Home Appliances

UNIT-I

Transformer and Classification of transformers - Continuity testing - Switch – Types of Switches - Fuse - Battery for Inverter – Battery types – Checking battery acid level – Power supply for Battery charger - Principle of inverter – Inverter circuit – Inverter Installation - Common faults and Troubleshooting

UNIT-II

Automatic electric iron – Bimetal and adjustable Thermostats – Troubleshooting in an automatic iron – Ceiling fan – Construction – Regulator – General faults and remedy – Table fan –Construction – Servicing – Fluorescent lamps – Electronic Ballast – LED lamp

UNIT - III

Semi-Automatic Washing Machine – Control panel – washing machine wiring – trouble shooting – Microwave oven – working – various parts of microwave oven – trouble shooting – Induction stove –working - trouble shooting – Reverse Osmosis – Principle -working and troubleshooting

UNIT -IV

Power supply of Personal Computers – Power supply outputs –Troubleshooting – Personal computers: Monitor – Key board – Mouse – Computer cables – Printers - Cellular Phone Basics-Cell Phone components-Cell Phone battery charger-Subscriber Identity Module (SIM) - Cell Phone Display – Blue tooth

UNIT – V

Refrigerator – Principle –Various parts of a refrigerator - working – circuit diagram – Common fault findings – Air-condition – principle - working – circuit diagram – Troubleshooting – Electric Water heater – Storage and Solar type

Books for study

1. Repair of Home Appliance, National Instructional Media Institute, Chennai, CIT Campus , Chennai 600 032
2. Repair & Maintenance of Washing Machine and Micro Oven, National Instructional Media Institute, Chennai, CIT Campus , Chennai 600 032
3. Basic Electronics- Repair & Maintenance of power supply, Inverter & UPS, National Instructional Media Institute, Chennai, CIT Campus , Chennai 600 032

Book for Reference

1. Modern Power Inverter, compiled by Manahar Loti, BPB Puplications, New Delhi.
2. Uninterrupted power supply, compiled by Manahar Loti , BPB Puplications, New Delhi

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PYPR51	MAIN PHYSICS PRACTICAL V	2	CC17	4

List of Experiments (Any Twelve)

1. Young's modulus by Koenig's method (Non Uniform bending)
2. Bifilar Pendulum.
3. Newton's rings – R_1, R_2 and μ of a convex lens
4. Field along the axis of a coil- Deflection Magnetometer.
5. Carey Foster`s Bridge-temperature Coefficient.
6. Spectrometer i –i′ curve
7. Spectrometer-Prism- Determination of Cauchy`s constants.
8. Spectrometer - Dispersive power of a prism
9. Potentiometer – Calibration of High Range Voltmeter
10. Potentiometer – Conversion of milliammeter into a Voltmeter
11. Internal resistance of a cell-BG
12. Comparison of Capacitances- BG
13. Characteristics of Transistor CE mode
14. Hartley Oscillator
15. FET Characteristics.

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SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PYPR52	**PRACTICAL VI ELECTRONIC EXPERIMENTS I**	**2**	**CC18**	**4**

List of Experiments (Any Twelve)

1. Logic gates using Discrete components

2. NAND as Universal gate

3. NOR as Universal gate

4. Karnaugh map reduction and logic circuit implementation

5. Verification of Demorgan`s theorems

6. Construction of Inverter, Non-Inverter, Adder, Subtractor using OP-AMP

7. Half Adder and Full Adder.

8. Half Subtractor And Full Subtractor

9. Study of R-S, JK and D flip-flop using NAND gate

10. Construction of Phase shift Oscillator using Transistor

11. Construction of Wien's bridge Oscillator using Transistor

12. Study of integrator and differentiator using Op-Amp 741

13. 8-Bit Addition & Subtraction using Microprocessor 8085

14. 8-Bit Multiplication & Division using Microprocessor 8085

15. Selection of largest and smallest element from an array.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY6001	**NUCLEAR AND PARTICLE PHYSICS**	5	CC19	5

Objective: To provide brief introduction to the various nuclear models and the experiments data supporting the model and provide an introduction to nuclear interaction and nuclear reaction.

UNIT 1: GENERAL PROPERTIES OF NUCLEI

Nuclear size, charge, mass-determination of nuclear radius-mirror nucleus method-mass defect and binding energy-packing fraction - nuclear spin - magnetic dipole moment – electric quadrupole moment-nuclear models-liquid drop model-Weizacker semi empirical mass formula- shell model and magic numbers-nuclear forces-meson theory of nuclear force (qualitative).

UNIT 2: RADIOACTIVITY

Natural radioactivity-law of disintegration-half life and mean life period-units of radioactivity-transient and secular equilibrium-radiocarbon dating-age of earth - alpha rays characteristics-Geiger Nuttal law - α-ray spectra-Gamow's theory of α-decay (qualitative study)- beta rays-characteristics-beta ray spectra-neutrino hypothesis-violation of parity conservation experimental verification with Co^{60}-gamma rays and internal conversion-nuclear isomerism.

UNIT 3: RADIATION DETECTORS AND PARTICLE ACCELERATORS

Ionisation chamber - G.M. Counter-quenching and resolving time-scintillation counter-photo multiplier tube – thermo luminescence – Linear accelerator-Cyclotron-synchrocyclotron, Betatron.

UNIT 4: NUCLEAR REACTIONS

Conservation laws - nuclear reaction Kinematics-Q-value-threshold energy – artificial radioactivity-radio isotopes and its uses-classification of neutrons-nuclear fission-chain reaction -critical mass and size-nuclear reactor-breeder reactor – trans uranic elements-nuclear fusion-thermonuclear reactions-sources of stellar energy.

UNIT 5: ELEMENTARY PARTICLES

Classification of elementary particles fundamental interaction-elementary particle quantum numbers - isospin and strangeness - conservation laws and symmetry-basic ideas about quark-quark model.

Books for study:
1. Atomic and Nuclear Physics by N. Subrahmanyam and Brijlal, S Chand & Co., New Delhi(1996).
2. Nuclear Physics by Tayal D.C., Himalaya Publishing House, Mumbai(2006).
3. Nuclear Physics by R.C.Sharma, K.Nath & Co., Meerut (2000)
4. Nuclear Physics by Irving Kaplan, Narosa Publishing house, New Delhi.

Books for Reference:
1. Nuclear Physics by R.R.Roy and B.P.Nigam, New Age International (P) Ltd., New Delhi (1997).
2. Fundamentals of Elementary Particle Physics by Longo, Mc Graw-Hill.
3. Nuclei and Particles by Serge., W.A. Benjamin, USA
4. Elements of Nuclear Physics by ML Pandya and RPS Yadav, Kedarnath Ram Nath, Meerut

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY6002	QUANTUM MECHANICS & MATHEMATICAL PHYSICS	5	CC20	5

Objective: *To provide an understanding of fundamental principle of quantum mechanics and provide an insight into vector analysis, matrices, special function and differential equations which form the back bone of all higher physics and to apply these techniques to solve Physics problems*

UNIT I - WAVE MECHANICS

Matter waves – de Broglie wavelength – Construction of wave packet - Wave velocity and Group velocity – Heisenberg's Uncertainty principle – proof of Uncertainty principle for one dimensional wave packet – Postulates of wave mechanics – operator formalism - Properties of wave functions - Eigen functions – Eigen values – expectation values.

UNIT II - SCHROEDINGER EQUATIONS AND ITS APPLICATIONS

Schroedinger equation – time dependent and time independent - application of Schrodinger equations – Particle in a one dimensional box- Linear Harmonic Oscillator – zero point energy — Barrier penetration and tunneling effect – Spherical polar coordinate - Hydrogen atom.

UNIT III - MATRICES

Definitions – Symmetric, Skew symmetric, Hermitian & skew Hermitian matrix – Matrix multiplication – Properties – Inverse of a matrix – Solution of simultaneous equations.

Linear equations– Characteristics equation and roots and Eigen values – Cayley 's – Hamilton theorem – Inverse of matrix .

UNIT IV – VECTOR ANALYSIS

Product of the two vector- scalar or dot product- vector or cross product- work done by a force- vector moment or torque of a force- Definition of grad, div and curl- Line integral- surface integral – volume integral- Gauss- Divergence theorem- Stoke's theorem- Green's theorem (All the three statement and proof)

UNIT V - SPECIAL FUNCTIONS AND DIFFERENTIAL EQUATIONS

Beta and gamma functions – problems – Relation between beta and gamma functions – Bessel's differential equations – Legendre's differential equations – Hermite's differential equations – Laguerre's differential equations – series solutions – Dirac delta functions – Properties.

Books for Study

1. Quantum Mechanics by V.Devanathan, Narosa, Chennai,2005
2. Modern physics by Murugan, Kiruthiga, sivaprasath S Chand & Co[2007]
3. Quantum Mechanics by V K Thangappan,Willey Eastern
4. A Text Book of Quantum Mechanics by P M Mathews and Venkatesan, McGraw Hill
5. Mathematics Physics by Sathya Prakash
6. Mechanics and Mathematical methods By Murugeshan,S Chand Publishing & Co, New Delhi,
7. Mathematical Physics by H.K.Dass, S.Chand Copmpany, New Delhi,

Books for Reference

1. Mathematical Physics by B D Gupta
2. Quantum Mechanics by Ghatak and Loganathan,McMillan
3. Basic quantum mechanics by A Ghatak, McMillan India [2002]

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY6003	NUMERICAL METHODS AND FUNDAMENTALS OF "C"	5	CC21	5

Objective: To expose the students to the foundation of various numerical methods and to introduce the learner to the basics of 'C' Programming.

UNIT I - SIMULTANIOUS LINEAR ALGEBRAIC EQUATIONS

Gauss elimination method – Gauss- Jordan method –Gauss- Siedel - Gauss Jacobi – Interaction method- Computation of inverse of a matrix using Gauss elimination method – Eigen values and Eigen vectors

UNIT II - NUMERICAL DIFFERENTIATION AND INTEGRATION

Numerical integration by Trapezoidal and Simpson 1/3 and 3/8 rules – Romberg's method –Double integration using trapezoidal and Simpson's rules – Runge – Kutta method for solving second and fourth order equations.

UNIT III- INTERPOLATION AND APPROXIMATION

Lagrange's interpolation formula for unequal intervals- Lagrange's Inverse interpolation formula- Newton's Divided Difference formula- Newton's Forward interpolation formula- Newton's Backward interpolation formula.

UNIT IV - C FUNDAMENTALS

C fundamentals –character set – identifiers and keywords - data types – constant variable –declaration – expression –statement –arithmetic, relational, logical, assignment, conditional and common operators- library functions.

UNIT V – SIMPLE PROGRAMS

Data input/output functions- simple C programs (addition, subtraction, multiplication and comparison) – flow of control –control structure, break and continue, go to statement.

Books for Study and Reference:
1. Venkatraman M.K (1977) Numerical methods in Science and Engineering, national publishing company- Chennai.
2. Shastry SS Introductory methods of numerical methods – Prentice Hall Ltd
3. Sankara Rao K Numerical methods for Scientist and engineers 3rd edition Print ail Hall of India Privati Ltd
4. Veerarsan. T and Ramachandran T,Numerical methods with Programming in C Tata Mc Gran Hall publishing Co Ltd
5. E.Balagurusamy, Programming in C
6. Yashwant Kanithkar, Let us C

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PY6004	MICROPROCESSOR AND ITS APPLICATIONS – 8085	5	CC22	5

*Objective***:** ***To introduce the student to understand the architecture, functioning, programming and interfacing technique of microprocessor 8085***

UNIT – I

Microprocessor architecture and Interrupts

Microprocessors – Architecture of 8085 – Functions of different pins of 8085 – Bus organization and timings: buses – buffer – address bus, data bus, multiplexing address/data bus and control & status signals – ALU – registers in 8085 – flags– 8085 -interrupt – interrupt priorities.

UNIT –II
Programming model of 8085

Classification of instructions and format – 8-bit data transfer, arithmetic, logical and branch instructions – Addressing modes –16 bit data transfer and memory related instructions – stack and subroutine instructions- comparison of stack and subroutine instructions – Logical rotate and compare instructions – RIM and SIM interrupt instructions – static and dynamic debugging of a program.

UNIT – III
Time delay and Instruction timings

Generation of time delay -time delay using one and pair of registers– delay routines and delay calculations.

Instruction timings of 8085 –T-states -timing diagram for memory read and memory write cycles- instructions cycle, machine cycle- WAIT state- timing diagram for data transfer instructions

UNIT – IV
Interfacing

I/O devices :Interfacing concepts – peripheral Input instruction – interfacing input port interfacing using octal latch - peripheral Output instruction and interfacing Output port interfacing using octal latch – interface of LED output display for binary data –Memory mapped I/O –difference between direct I/O and memory mapped I/O –

Memory interface: 2K X 8, 4K x 16 ROM and RAM interface.

UNIT – V
Peripheral devices and microprocessor applications

Concepts of Interfacing - interfacing of programmable peripheral device 8255 – LED Interfacing, seven segment display interface - D/A interfacing with 8085- ADC A interfacing with 8085- interfacing of temperature controller with 8085– Direct memory access (DMA).

Book for study:
1. Microprocessor Architecture, Programming and applications with the 8085 – R.S. Goankar, 3rd Edn. Prentice Hall.
2. Fundamental of Microprocessor – 8085 – Architecture, programming and interfacing – V. Vijayendra, S. Viswanathan, Pvt., Ltd. 2003.

Books for reference:
1. Digital computer electronics: an introduction to microcomputers – Malvino, 2nd Edn., Tata McGraw Hill.
2. Fundamentals of Microprocessors and microcomputers – B. Ram.
3. Computer system architecture – Moris Mano, 3rd Edn., Prentice Hall India.
4. Introduction to microprocessors: software, hardware, programming – Lance A. Leventha, Prentice Hall India.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PYSB61	TELEVISION MAINTENANCE & TROUBLESHOOTING	2	AEC6	1

*Objectives***:** *To provide an understanding of the various sections in Television and impart knowledge of servicing techniques adopted in various Television system*

UNIT-I

Resistors: colour coding and types of resistors - Capacitors: fixed and variable - inductors – Printed circuit board (PCB) – servicing technique of PCB – Servicing instruments: Analog & Digital Multimeter – Cathode Ray Oscilloscope – Video pattern generator.

UNIT-II

Low voltage power supply – Switch Mode Power Supply (SMPS) – Repairing procedure of low voltage and SMPS power supply – Merits and demerits of SMPS - Block diagram of monochrome TV receiver – Function of each section – RF Tuner – VHF Tuner and function of various blocks.

UNIT-III

Monochrome Picture tube construction and working principle – Control circuit of a Picture Tube – Precaution in handling Picture Tube – Yoke assembly – EHT transformer - Horizontal and Vertical Scanning – Simple and Interlaced Scanning – Composite Video Signal – Blanking pulses – Equalizing pulses.

UNIT-IV

Colour picture Tube: Principle, construction and working – Adjustments for Colour Picture Tube - Compatibility – Three Colour Theory – Mixing of Colours – Luminance Signal (Y) - NTSC Colour TV system – PAL Colour TV system – SECAM system

UNIT-V

Television Antenna – Resonance antennas and their Characteristics – Antenna Parameters – Yagi-Uda Antenna and Design – Satellite Communication System – Digital Satellite receiver - Cable TV: Signal sources for Cable TV- Cable Signal Distribution

Books for Study:

1. Modern Television Practice - R.R. Gulati, New Age International (P) Limited, Publishers, New Delhi.
2. Television Engineering and Video Systems Second Edition - RG Gupta, Tata McGraw Hill Education Private Limited New Delhi.
3. Television and Video Engineering – J Rangarajan, Charulatha Publications, Chennai.

Books for Reference:

1. Basic television theory & Servicing – Paul B Zbar, petter W One, Tata McGraw Hill Education Private Limited New Delhi.
2. Modern television circuit – S.K Gupta, BPB Publication, New Delhi

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5PYPR61	MAIN PHYSICS PRACTICAL VII	2	CC23	4

List of Experiments (Any Twelve)

1. Young's modulus – Koenig's method – uniform bending
2. Field along the axis of the coil-vibration magnetometer.
3. Carey Faster`s Bridge- Resistance and specific resistance.
4. Potentiometer – EMF of a thermocouple
5. Conversion of milliammeter into Ammeter-Potentiometer.
6. Spectrometer-Diffraction of grating-Normal incidence.
7. Spectrometer - Dispersive power of a grating
8. Spectrometer – Narrow Angled Prism
9. BG – comparison of emf of a cells
10. BG – Absolute capacitance of a capacitor
11. Characteristic of transistor CB Mode.
12. Single stage RC Coupled Amplifier-Frequency response
13. Colpitt`s Oscillator(Solid State)
14. Kundt`s Tube.
15. UJT Characteristic & Relaxation Oscillator

SEMESTER VI
(CORE PRACTICAL PAPER)

COURSE CODE	COURSE TITLE	CREDIT	HRS/ WEEK
U5PYPR62	PRACTICAL VIII ELECTRONIC EXPERIMENTS II	2	4

List of Experiments (Any twelve)

1. 4 Bit Binary Adder and Subtractor

2. 4 Bit Binary Counter.

3. BCD Counter.

4. Shift Registers

5. Study of Multiplexer and Demultiplexer

6. Study of Up/down counter

7. Astable multivibrator using Timer- 555

8. BCD to seven segment decoder (Common anode and Common cathode)

9. Ring counter and Johnson's counter

10. BCD TO HEXA Conversion

11. HEXA to BCD conversion.

12. Binary to ASCII and ASCII to Binary conversion

13. ASCII to BCD conversion and BCD to ASCII conversion.

14. Ramp Wave Form Generation

15. Square Wave Form Generation

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DEPARTMENT OF PHYSICS

SYLLABUS
For
M.Sc Physics

SEMESTERS – III & IV

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PY3001	CONDENSED MATTER PHYSICS – I	5	PAPER 9	6

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- Point and 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 –Umkalapp 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 – Kroning-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 REFERNCE:

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. Iabch 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

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PY3002	NUCLEAR AND PARTICLE PHYSICS	5	PAPER 10	6

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

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PY3003	CRYSTAL PHYSICS AND CRYSTALLOGRAPHY	4	PAPER 11	6

Objective: *This paper aims to give an understanding of the Crystal Structure, Properties and Refinement Techniques.*

UNIT- I: 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- II: Diffraction Techniques

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- III: 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- IV: 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

UNIT-V: **Melt and Vapor Growth techniques**

Growth from melt- Bridgman, Czochralski, zone melting – Verneuil techniques- Physica vapor deposition – flux growth – chemical vapor deposition – chemical vapor transport – hydrothermal growth – Epitaxial growth.

Book for study:
1. D. Velmurugan , Elementary Crystallography ,MJP publisher, Chennai
2. Santhanaraghavan P. and Ramasamy P., crystal growth process and methods, Kumbakonam, KRU Publication 2000.

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.

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYE301	FUNDAMENTAL OF NANO SCIENCE	4	ELECTIVE PAPER 3	6

Objective: To introduce to the rapidly developing field of nanoscience and technology with special focus on fabrication techniques, properties of nanostructures and applications of nanomaterials

Unit 1: Background to Nanoscience and technology
Definition – History of nanotechnology – Context of nanotechnology: Scientific revolution, Advantages of Nanoscience and Technology – Scaling Laws: Scaling in Mechanics, Optics and Biology.

Unit 2: Nucleation
Influence of nucleation rate on the size of the crystals – Macroscopic to microscopic crystals and nanocrystals - Large surface to volume ratio, top-down and bottom-up approaches – Self assembly process: Mechanism and examples.

Unit 3: Types of Nanostructures

Definition of a Nano system – Types of Nanocrystals – One Dimensional (1D) – Two Dimensional (2D) – Three Dimensional (3D) nanostructured materials – Quantum dots - Quantum wire – Core/Shell structures.

Unit 4: Nanomaterials and properties

Carbon Nanotubes (CNT): Types, Synthesis and Growth Mechanism – Semiconducting nanoparticles: Excitons, Optical properties – Types of Magnetic Materials – Mechanical properties of Nanomaterials – Structural Properties – Nanoparticles in Biological system - DNA and RNA – Lipids.

Unit 5: Applications of Nanomaterials

Nanoelectronics: Coulomb Blockade, Single electron transistor (SET) – Spintronics: – Giant Magneto Resistance, Spin Valve, Magnetic Tunnel Junction (MTJ) Spin Field Transistor (SFET) – Photovoltaic Solar Cell – Fuel Cell – Medical applications.

Books for study

1. Jeremy Ramsden, *Essential of Naotechnology* Jeremy Ramsden and Ventus Publications ApS, 2009.
2. Ben Rogers , Jesse Adams , Sumita Pennathur, Nanotechnology – Understing of Small Systems, CRC Press, Taylor & Francis Group, 2015
3. Sulabha K. Kulkarni, Nanotechnology: Principles and Practices, Third Edition, Capital Publishing Company, 2006.
4. M. Wilson, K. Kannangara, G Smith, M. Simmons, B. Raguse, *Nanotechnology: Basicscience and Emerging technologies*, Overseas Press India Pvt Ltd, New Delhi, First Edition, 2005.

Books for References:

1. C.N.R.Rao, A.Muller, A.K.Cheetham (Eds), *The chemistry of nanomaterials: Synthesis, properties and applications*, Wiley VCH Verlag Gmbh&Co, Weinheim, 2004.
2. Kenneth J. Klabunde (Eds), *Nanoscale Materials Science*, John Wiley & Sons, InC, 2001.
3. C.S.S.R.Kumar, J.Hormes, C.Leuschner, *Nanofabrication towards biomedical applications,* Wiley –VCH Verlag GmbH & Co, Weinheim, 2004.
4. W. Rainer, *Nano Electronics and information Technology*, Wiley, 2003.
5. K.E.Drexler, *Nano systems*, Wiley, 1992.
6. G.Cao, *Naostructures and Nanomaterials: Synthesis, properties and applications*, Imperical College Press, 2004.

SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYE302	EMBEDDED SYSTEM	4	ELECTIVE PAPER 3	6

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

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SEMESTER III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYPR31	GENERAL EXPERIMENTS II	4	PAPER 12	6

(Any 10 out of the given 15)

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 Quincke'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.

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PY4001	CONDENSED MATTER PHYSICS – II	5	PAPER 13	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 – Langevian 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 antiferomagnetism – 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.

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PY4002	MICROPROCESSOR AND ITS APPLICATIONS	5	PAPER 14	5

Objective: The students are exposed to the wide applications of microprocessors like 8085, 8086 and interfacing them.

UNIT-I: 8085 Microprocessor

Introduction to Microcomputer-Memory- ROM- RAM- The system Bus and Bus Structure- Registers-Multiplexer- De multiplexer-Pin out configurations of 8085 – Internal Architecture and Flags- Interrupts of 8085-INTR and INTA – RST 5.5 , RST 6.5, RST 7.5 and TRAP- RIM and SIM interrupt instructions.

UNIT- II: Instruction Set and Assembly Language Programs of 8085

Classification of instructions and format – 8-bit data transfer, arithmetic, logical – special instruction and branch instructions –- stack and subroutine

instructions - Logical rotate and compare instructions –I/O and Machine control instruction - Addressing modes.

8 bit addition- subtraction- Multiplication and division- 8-bit code conversion: Binary to BCD, BCD to binary, binary to ASCII, ASCII to binary, BCD to ASCII and ASCII to BCD.

UNIT- III: Interfacing

Memory interface- Basic- 2K X 8 EPROM , 4K x 8 ROM and 2K X 8 RAM interface - programmable peripheral interfacing device 8255 – Block diagram-control word-BSR mode

Interfacing 8255 to 8085-Interfacing 8-bit D/A and successive approximation A/D converters-Interface to 8085.

UNIT – IV: 8086 Microprocessor – Architecture and Interrupts

Introduction — Pin configuration – Minimum mode and maximum-mode system — Internal Architecture of the 8086/8088.

INTERRUPTS IN 8086 MICROPROCESSOR: Types of interrupts – Interrupt Address PointerTable – Interrupt related instructions — External hardware interrupt interface —— Software interrupt – Non-Maskable interrupt — Internal interrupt functions.

UNIT- V: Programming – Software Model of the 8086 and Interfacing

Instruction set – Data transfer instructions – arithmetic, logic, shift, rotate instructions – compare, jump instructions – Subroutines – handling instructions – loop and string instructions – Addressing modes — Assembler and Assembler Directives – Assembler Macros -MASEM Programs.

Interfacing static RAM to 8086 (Minimum system mode interface)-2K, 8K ,64K word ROM interface – Maximum system mode interface - -Dynamic RAM – DMA.

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. Dougles V. Hall: Microprocessors & Digital Systems –McGraw-Hill Book Company.
3. Stwart M.Asser: 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.

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYE401	SYNTHESIS AND CHARACTERIZATION OF NANOMATERIALS	4	ELECTIVE PAPER 4	5

Objective: To provide an introduction to the relationship between nucleation and growth and familiarize characterizations of various techniques.

Unit I: SYNTHESIS - PHYSICAL APPROACHES

Mechanical Methods: High Energy Ball Milling, Melt Mixing – Vapor deposition: Physical vapour deposition, Ionized Cluster Beam deposition, Laser ablation – Sputter deposition: DC and RF sputtering – Chemical vapour deposition (CVD) – Ion beam implantation –Molecular Beam epitaxy (MBE).

Unit II: SYNTHESIS - CHEMICAL AND BIOLOGICAL APPROACHES

Synthesis of metal and semiconductor nanoparticles by colloidal route – Langmuir Blodgett (LB) method – Sol gel method – Hydrothermal synthesis – Synthesis using micro reactor –Synthesis using microorganisms –Synthesis using plant extract – Synthesis of nanoparticles by using templates and DNA.

UNIT- III: NANOLITHOGRAPHY

Introduction – Lithography using photons – Lithography using particle beams – Scanning Probe Lithography – Soft Lithography.

UNIT- IV: CHARACTERIZATION TECHNIQUES I

Basics of X-Ray diffraction: Diffraction from different types of samples, Crystal structure factor, Diffraction from nanoparticles – Working of Optical absorption spectrometer – Working of Fourier Transform Infra red Spectrometer – Raman Spectroscopy – Photoluminescence spectrometer – X-ray and Ultra photoelectron spectroscopes.

UNIT- V: CHARACTERIZATION TECHNIQUES II

Basics of electron microcopy – Working of Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM) – Scanning Probe and Tunnelling Microscopes –Working of Atomic Force Microscope (AFM).

Books for study:
1. Sulabha K. Kulkarni, Nanotechnology: Principles and Practices, Third Edition, Capital Publishing Company, 2006.

Books for 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. Nanotechnology: Principle and Practices – Sulabha K. Kulkarni, Capital Publishing company, New Delhi (2006)

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EMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYE402	**DIGITAL COMMUNICATIONS**	**4**	**ELECTIVE 4**	**5**

Objective: *To expose the students to the principles and working of digital communication systems using different techniques using digital instrumentation.*

UNIT-I: Elements of Digital Communication Systems:

Elements of Digital Communication Systems: Model of Digital Communication Systems - Digital Representation of Analog Signal - Certain issues in Digital Transmission - Advantages of Digital Communication Systems - Bandwidth-S/N tradeoff - Hartley Shannon Law - Sampling Theorem

UNIT-II: Pulse Code Modulation:

Pulse Code Modulation: PCM Generation and Reconstruction - Quantization noise - Non uniform Quantization and Companding – DPCM - Adaptive DPCM - DM and Adaptive DM – Noise in PCM and DM.

UNIT -III: Digital Modulation Techniques:

Digital Modulation Techniques: Introduction – ASK - ASK Modulator, Coherent ASK Detector - Non-Coherent ASK Detector - FSK, Bandwidth and Frequency Spectrum of FSK - Non coherent FSK Detector - Coherent FSK Detector - FSK Detection Using PLL – BPSK - Coherent PSK Detection - QPSK, Differential PSK.

UNIT- IV: Baseband transmission and Optimal Reception of Digital Signal:

Baseband transmission and Optimal Reception of Digital Signal: Pulse shaping for optimum transmissions - A Baseband Signal Receiver - Probability of Error. Optimum Receiver - optima of Coherent Reception - Signal Space Representation and Probability of error – eye diagrams Cross talk.

UNIT -V: Information Theory:
Information Theory: Information and entropy - conditional entropy and redundancy- Shannon Fano coding - Mutual Information - Information loss due to noise - source codings - Huffman Code - variable length coding - Source coding to Increase average Information per bit Lossy source coding.

Books for Study:

1. Principles of communication systems - Herbert Taub. Donald L Schiling, Goutam
    Sana, 3rd Edition, McGraw-Hill,2008.
2. Digital and Analog Communicator Systems - Sam Shanmugam, John Wiley, 2005.

Books for Reference:

1. Digital Communications - John G. Proakis . Masoud salehi – 5th Edition,
    McGraw- Hill, 2008.
2. Digital Communication - Simon Haykin, Jon Wiley, 2005.
3. Digital Communications - Ian A. Glover, Peter M. Grant, Edition,
    Pearson Edu.,2008.
4. Communication Systems-B.P. Lathi, BS Publication, 2006.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYNM41	BIO-MEDICAL INSTRUMENTATION	4	NON MAJOR PAPER	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 Thermisters, 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 II [nd] 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.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYPR41	MICROPROCESSOR EXPERIMENTS & COMPUTER PROGRAMMING (C Programming)	4	NON MAJOR PAPER	6

(Any 15 out of the given 20)
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.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6PYPJ41	PROJECT	2	PROJECT PAPER	4

COURSE WORK

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.

3. The project will comprise of the following:

    a. Study of background material
    b. Collection of data, procurement and fabrication of experimental set up and
    c. Writing of computer programs if needed.
    d. 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.

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.

DEPARTMENT OF CHEMISTRY

SYLLABUS
For
B.Sc Chemistry

SEMESTERS – V & VI

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH5001	INORGANIC CHEMISTRY- I	5	CC13	5

Objectives :
    1. To understand the principle of gravimetry.
    2. To give students a firm grounding in coordination chemistry.
    3. To study about the halogens and related compounds.
    4. To explore the use of You-tube lectures and online tools.

UNIT-I :   **15 HOURS**
1.1   Principles of gravimetric analysis - Characteristics of precipitating agents - choice of precipitants - conditions of precipitation – specific and selective precipitants - DMG, cupferron, salicylaldehyde, ethylenediamine - use of sequestering agents - co-precipitation – post precipitation - differences - reduction of error - peptisation - precipitation from homogeneous solution - calculation in gravimetric methods - use of gravimetic factor.

1.2 Thermoanalytical methods - principles involved in thermogravimetric analysis and differential thermal analysis - characteristics of TGA and DTA -thermograms – factors affecting TGA and DTA curves - discussion of various components of the instrument with block diagrams - applications of thermogravimetry - applications of DTA – (CaC_2O_4. $2H_2O$ & $CuSO_4$. $5H_2O$)Thermometric titration, Electrogravimetry - principle and applications. You tube lectures on thermogravimetric analysis.

UNIT-II: COORDINATION COMPOUNDS   **15 HOURS**

2.1 Definition of terms used - classification of ligands - chelation and effect of chelation applications of EDTA - coordination number and stereochemistry of complexes - nomenclature. Detection and structure determination of complexes.

2.2 Bridged (or) polynuclear complexes – inter metallic complexes - Isomerism in complexes – ionization isomerism, hydrate isomerism, linkage isomerism, ligand isomerism, coordination isomerism, polymerization isomerism, geometrical and optical isomerism in 4 and 6 coordinate complexes.

UNIT-III :   **15 HOURS**
3.1 Werner theory - EAN rule - theory of bonding - valence bond theory - hybridization - geometry and magnetic properties - failure of VBT

3.2 Crystal field theory - spectrochemical series - splitting of d - orbitals in octahedral and tetrahedral complexes - crystal field stabilization energy - calculation of CFSE in octahedral and tetrahedral complexes.

3.3 Low spin and high spin complexes-explanation of magnetic properties, colour and geometry using CFT.

UNIT-IV :   **15 HOURS**

4.1 Comparison of VBT and CFT. Application of coordination compounds in qualitative and quantitative analysis - Detection of potassium ion, separation of Cu and Cd ions, Estimation of Ni using DMG and Al using oxine.

4.2 Pi-acceptor ligands - bonding, hybridization, structures and properties of mono nuclear carbonyl complexes of Ni, Cr, Fe, Co & Mn - compounds of P and As acceptor ligands.

UNIT-V :   **15 HOURS**

5.1 Halogens -comparative study of F, Cl, Br, and I - comparison of reactivity's F and O - exceptional properties of fluorine.

5.2 Oxy acids of halogens –preparation, properties and its structure. Interhalogen compounds- pseudohalogens – basic properties of halogens- positive iodine – evidences.

<u>*Reference Books:*</u>
1. Inorganic chemistry - P.L. Soni - Sultan Chand
2. Inorganic chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia – Vallabh Publications
3. Selected topics in inorganic chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications
4. Inorganic chemistry - J.E. Huheey, Harper and Collins - NY IV edition Concise Inorganic chemistry - J.D. Lee - III edition - Von Nostrand
5. Industrial chemistry - B.K Sharma - Goel Publications
6. Industrial chemistry R.K. Das - Kalyani Publications, New Delhi
7. Coordination chemistry - S.F.A. Kettle - ELBS
8. Coordination chemistry - K. Burger - Butterworthy
9. Vogel's handbook of quantitative inorganic analysis - Longman.
10. Text book of qualitative inorganic analysis - A.I. Vogel - III edition
11. Source book on atomic energy –Samuel Glasstone, Van Nostrand Co.,
12. Nuclear and radiochemistry –Frielander and Kennedy John wiley and sons
13. Nuclear chemistry - H.J. Arnikar - Wiley Eastern Co.,
14. Advanced Inorganic chemistry - Cotton and Wilkinson - V Edition – Wiley and Sons

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH5002	**ORGANIC CHEMISTRY - I**	**5**	**CC14**	**5**

Objective:

1. To effectively impart knowledge about Carbohydrate chemistry, Stereochemistry, Heterocyclic chemistry, polynuclear hydrocarbons and dyes.
2. To make the students more inquisitive in learning the mechanistic details in Organic Chemistry through the teaching of the named reactions
3. To learn the synthetic applications of certain organic compounds
4. To explore to use multimedia tools in organic structural analysis.

UNIT- I   15 HOURS
1.1. Carbohydrates : classifications - reactions of glucose and fructose - osazone formation, mutarotation and its mechanism – structural elucidation of glucose and fructose - pyranose and furanose forms.
1.2 Determination of ring size - Haworth projection formula - configuration of glucose and fructose - epimerization – chain lengthening and chain shortening of aldoses - inter conversion of aldoses and ketoses
1.3 Disaccharides and poly saccharides: reactions and Structural elucidation of sucrose and maltose. Structural elucidation and properties of cellulose

UNIT- II   15 HOURS
2.1 Stereoisomerism : definition - classification into optical and geometrical isomerism. Projection formulae : Fischer, Flying Wedge, Sawhorse and Newmann projection formulae - rotation of optical isomers - Cahn - Ingold - Prelog rules - D, L notations R, S notation of optical isomers with one and two asymmetric carbon atoms - Optical activities in compounds not containing asymmetric carbon atoms : biphenyls, allenes and spiranes
2.2. Geometrical isomerism : cis - trans, syn - anti and E, Z notations - geometrical isomerism in maleic and fumaric acids and unsymmetrical ketoximes - methods of distinguishing geometrical isomers using melting points, dipole moment, solubility, dehydration, cyclisation, heat of hydrogenation and combustion.
2.3 Conformational analysis : introduction of terms - conformers, configuration, dihedral angle, torsional strain, conformational analysis of ethane and n-butane including energy diagrams - conformers of cyclohexane - axial and equitorial bonds - ring flipping - conformers of mono and 1,2-,1,3- and 1,4-dimethylcyclohexane.

UNIT- III   15 HOURS

3.1 Carbonyl polarization - reactivity of carbonyl group - acidity of alpha hydrogen; Malonic, acetoacetic and cyano acetic esters - Characteristic reactions of active methylene group - synthetic uses of malonic, acetoacetic and cyano acetic esters.

3.2. Tautomerism: definition - keto-enol tautomerism - identification, acid and base catalyzed mechanisms, evidences - amido-imidol, nitro-acinitro tautomerisms

3.3 Diazo methane and diazo acetic ester - preparations, structure and synthetic uses.

UNIT- IV   15 HOURS

4.1 Heterocyclic compounds - Huckel's rule - Preparation, properties and uses of furan, pyrrole, and thiophene.

4.2 Preparation, properties and uses of pyridine and piperidine. Methods of opening of heterocyclic rings - oxidation, reduction, Hoffman's exhaustive methylation, Van Braun's methods.Comparative study of basicity of pyrrole, pyridine and piperidine with aromatic and aliphatic amines.

4.3 Synthesis and reactions of quinoline, isoquinoline and indole with special reference to Skraup, Bischler Napieralskii and Fischer Indole syntheses

UNIT- V   15 HOURS

5.1 polynuclear hydrocarbons - synthesis, properties and uses of naphthalene, anthracene and phenanthrene - structural elucidation of naphthalene - chemistry of naphthaquinones.

5.2 Dyes - Theory of colour and constitution - classification according to the structure and method of application. Preparation and uses of 1) Azo dye - methyl orange and congo red 2) Triphenyl methane dye - Malachite green 3) Phthalein dye - phenolphthalein and flourescein 4) Vat dye - Indigo 5) anthraquinione dye – Alizarin

5.3 Mechanism of aldol, Perkin and benzoin condensations Knoevenagel, Claisen, Wittig, Cannizaro, Reformatsky and Michael reactions.

Reference Books:
1. Organic Chemistry - R. T. Morrison and Boyd - Pearson Education
2. Organic Chemistry - I. L Finar - Volume I and II - Pearson Education
3. Text Book of Organic Chemistry - P.L.Soni - Sultan Chand
4. Advanced Organic Chemistry - Bahl and ArunBahl - S. Chand
5. Stereochemistry, conformations and mechanisms - Kalsi - New Age
6. Organic Chemistry of Natural Products - Volume I and II- O.P. Agarwal – GOEL Publishing House
7. A guide book to mechanism in Organic Chemistry - Peter Skyes – Pearson Education

8. Stereo Chemistry of Organic Compounds - D. Nasipuri - New Age
9. Chemistry of Natural Products - GurdeepChatwal- Himalaya Publishing House
10. Reactions and Reagents - O.P. Agarwal- GOEL Publishing House
11. Organic reaction mechanisms - GurdeepChatwal- Himalaya Publishing House
12. A text book of Organic Chemistry K.S.Tewari,N.K.Vishol,S.N.Mehrotra- Vikas Publishing House
13. Organic Chemistry- M.K.Jain and S.C.Sharma-ShobanLal and Nagin Chand
14. Reaction, Mechanism and Structure- Jerry March- John Wiley and Sons
15. Organic Chemistry –Bruice - Pearson Education
16. Organic Reaction and Mechanism by Ahluwalia.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH5003	PHYSICAL CHEMISTRY - I	5	CC15	5

Objectives

1. To study about the solutions and colligative properties
2. To know about Chemical Equilibrium.
3. To study phase rule.
4. To promote interest in surface chemistry, catalysis & chemical kinetics.

UNIT-I   **15 HOURS**

1.1 Solutions of gases in liquids - Henry's law - solution of liquids in liquids - Raoult's law - vapour pressure of ideal solutions - activity of a component in an ideal solution - Thermodynamics of ideal solutions – Free energy change of mixing for an ideal solution - volume change and enthalpy changes of an ideal solution - vapour pressures of real or non-ideal solutions - vapour pressure - composition and Boiling point-composition curves of completely miscible binary solutions-Fractional distillation of binary liquid solutions.

1.2 Azeotropic mixtures - Distillation of immiscible liquids - solubility of partially miscible liquids - phenol water system - CST and effect of impurities on CST.

UNIT-II: Colligate properties and chemical equilibrium: 15 HOURS

2.1 Lowering of vapour pressure - osmosis and osmotic pressure - relation between osmotic pressure and vapour pressure lowering of an ideal solution - theories of semipermeability - reverse osmosis - elevation of boiling point - depression of freezing point - derivations and determination – vant Hoff factor.

2.2 Chemical equilibrium: law of mass action - law of Chemical equilibrium- thermodynamic derivation of law of Chemical equilibrium – Vant Hoff reaction isotherm - standard free energy change - and its relation with equilibrium constant - temperature dependence of equilibrium constants - Vant Hoff isochore - Le Chatelier principle.

UNIT-III: Phase Equilibria   15 HOURS

3.1 Gibb's phase rule - statement and definition of terms - Application to one component systems - Water and sulphur system - Reduced phase rule - Two component systems - simple eutectic system - lead - silver system - Freezing mixtures .

3.2 Thermal analysis and cooling curves - compound formation with congruent melting point - Zn-Mg system, Ferric chloride - water system – compound formation with incongruent melting point Na-K system

UNIT- IV: Surface Chemistry   15 HOURS

4.1 Adsorption - Physisorption and Chemisorptions - Applications of adsorption - Adsorption of gases by solids - Freundlich adsorption isotherm - Langmuir's theory of adsorption - BET theory of multilayer adsorption - determination of surface area - adsorption isotherms.

4.2. General characteristics of catalytic reactions, Acid-base catalysis- Enzyme catalysis Mechanism and kinetics of enzyme catalyzed reactions - Michaelis-Menten equation - Effect of temperature on enzyme catalysis - Heterogeneous catalysis - Surface reactions- kinetics of surface reactions.

UNIT-V: Chemical Kinetics   15 HOURS

5.1 The rate equation - order &molecularity of a reaction - first order reactions - second order reactions - third order reactions - zero order reactions – Half life time of a reaction - methods of determining order of a reaction – order and molecularity of simple reactions - experimental methods in the study of kinetics of reaction - volumetry, manometry, polarimetry , and colorimetry - effect of temperature on reaction rates - concept of activation energy - energy barrier -Effect of catalyst.

5.2 Collision theory and derivation of rate constant for bimolecular reactions - theory of absolute reaction rates - thermodynamic derivation for the rate constant for a bimolecular reaction from it - comparison of collision theory and ARRT - significance of entropy , enthalpy and free energy of activation.

Reference Books:

1. Principles of physical chemistry - B.R. Puri and Sharma - shobanlalnagin Chand & Co.,
2. Text Book of physical chemistry - P.L. Soni - Sultan Chand.
3. Physical chemistry - Negi and Anand - New Age.
4. Physical chemistry - Kundu and Jain - S. Chand.
5. Physical chemistry - K.L kapoor - Macmillan - 4 volumes
6. Elements of physical chemistry - Glasstone and Lewis - Macmillan.
7. Text book of physical chemistry - S.Glasstone, Macmilan.
8. Fundamentals of physical chemistry - maron and Landor - Colier - Macmillan.
9. Physical chemistry - G.W. Castellan - Narosa publishing house.
10. Physical chemistry - Walter J. Moore - Orient Longman.
    Numerical problems on physical chemistry Gashal, Books and Allied (P) Ltd.,
11. Universal General Chemistry, C.N.R. Rao, Macmillan.
12. Group theory and its chemical applications - P.K.Bhattacharya – Himalaya publishing House.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH5004	LEATHER CHEMISTRY & WATER TREATMENT	5	CC16	5

Objective: To learn about Leather and various methods of Treatment and analysis of water.

UNIT-I

1.1 Introduction - Constituents of Animal Skin - Preparing skins and hides – Cleaning and soaking - Liming and degreasing - Manufacture of Leather –

1.2 Leather Tanning -Vegetable Tanning - Chrome Tanning and Mineral Tanning - Dyeing and Fatliquoring - Leather finishing - oil tanning - by products.

UNIT-II

2.1 Tannery effluents - Pollution and its control - Water pollution and Air pollution.

2.2 Waste management - primary, secondary - tertiary treatment- pollution prevention.

UNIT-III

3.1 Introduction – characteristics of water – alkalinity – hardness – unit of hardness – Total solids – Oxidation – transparency – Silica content.

3.2 Purification of water for drinking purpose – portability of water – clarification – coagulation – contact & electro chemical coagulation – sterilization & disinfestation of water – precipitation – aeration – ionization – Chlorination.

UNIT-IV

4.1 Water softening methods – Clark's process – lime soda process – modified lime soda process – permutit or zeolite process – Ion exchange process – demineralization of water.

4.2 Determination of hardness of water – Titration method – complexometric method Using EDTA – expressing hardness – equivalents of calcium carbonate – problems To determine temporary & permanent hardness.

UNIT-V

5.1 Analysis of chemical substances affecting health – NH_3, Nitrate, Nitrite, cyanide, sulphate, sulphide, chloride, fluoride – measurement of toxic chemical substances – analysis of chemical substances indicative of pollution – Dissolved oxygen – Bio Chemical oxygen demand (BOD) – Chemical oxygen demand (COD)

5.2 Bacteriological examination of water – total count test – E-coli test – E.coli index – most probable number method – Biological examination of water – physical examination of water – radioactivity of water – methods of removing radioactivity from water.

Reference Books:-

1. Industrial chemistry (including chemical – engineering) – B.K Sharma – Goel
2. Publishing house, Meerut.

3. Pollution control in process industries – S.P Mahajan – Tata Megraw – hill
4. Publishing company Ltd., New Delhi.
5. Water pollution and management – C.K Varashney – wiley Eastern Ltd.,
6. Chennai-20.
7. Industrial chemistry by B.K. Sharma. Goel Publishing House, Meerut.
8. Applied chemistry by K.Bagavathi - Sundari, MJP Publishers.
9. Fundamental concept of Applied chemistry by Jayashree Ghosh, S.Chand& Company Ltd.,
10. Chemical treatment of hides a leather by J. Partridge Noyes, Park Ridge,N.J
11. Agricultural Chemistry Vol. I & Vol. II edited by B.A. Yagodin– NewCentury books (P) Ltd.,
12. The nature and properties of soils - IX Edition - Nyle.C.Bready - S.Chandand Company Ltd.,
13. Soils and soil fertility - Louis M.Thompson - and Frederick. R.Troch- TataMc. Graw hill.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CHPR51	PRACTICAL – V: GRAVIMETRIC ESTIMATION – I	2	CC17	4

Objective:
To learn gravimetric estimation techniques.

1. Estimation of barium as barium sulphate.
2. Estimation of barium as barium chromate.
3. Estimation of lead as lead chromate.
4. Estimation of lead as lead sulphate

Marks Distribution: 75 marks

1 .Record   10marks
2. Experimental work   35marks
3. Accuracy/ Result   25marks
4. Viva Voce   05marks

Reference Books:
1. Text book of Practical Inorganic Chemistry by Vogel.
2. Qualitative Inorganic Analysis by V.V. Ramanujam.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CHPR52	PRACTICAL – VI: PHYSICAL CHEMISTRY PRACTICAL - I	2	CC18	4

Objectives:

To study the kinetics of a reaction.

1. Study of Kinetics of first order reaction using hydrolysis of methyl acetate ester in the presence of acid used as a catalyst.
2. Determination of the transition temperature of the given salt hydrates,
   $Na_2S_2O_3.5H_2O$, $CH_3COONa.3H_2O$, $SrCl_2.6H_2O$, $MnCl_2.4H_2O$.
3. Determination of molecular weight of a given unknown solute by Rast's method using Naphthalene or Diphenyl as solvent.
4. a) Determination of cell constant using 0.1N and 0.01N KCl solution.
   b) Determination of equivalent conductance of two different strong electrolytes.
5. Determination of Concentration of a given unknown sodium chloride solution by using phenol sodium chloride system. (Effect of impurity).

Marks Distribution: 75 marks

1. Record	10marks
2. Procedure	10marks
3. Viva Voce	05marks
4. Experiment	50marks (Expt. 25 + Manipulation 25)

Reference Books:
1. Basic principles of Practical chemistry by V. Venkatesaran.
2. Basic principles of Practical chemistry by R. Veeraswamy.
3. Basic principles of Practical chemistry by A.R. kulandaivelu

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CHSBP5	PRACTICAL VII: ORGANIC CHEMISTRY PRACTICAL - I	1	AEC5	2

Objective:
1. To understand the reactivity of the functional groups.
2. To learn the recrystallization techniques.
3. To gain firsthand knowledge by visiting industry.

I. *Analysis of organic compounds containing one functional group and Characterization with a derivative.*
   Reactions of the following functional groups:
   - Carboxylic acid (mono and di),
   - Phenol
   - Ester
   - Aldehyde
   - Ketone
   - Carbohydrate
   - Primary Amine
   - Amide
   - Nitro compound
   - Diamide
   - Anilide

Marks Distribution: 75 marks

1. Record	10marks	
2. Procedure	15marks	
3. Aliphatic / Aromatic	06marks	
4. Saturated/Unsaturated	06marks	
5. Element present/ absent	12marks	
6. Functional Group	12marks	
7. Derivative	09marks	
8. Viva Voce	05marks	

Reference Books:
1. Vogel's text book of chemical analysis.
2. Practical chemistry - A.O. Thomas - Scientific book center, Cannanore.
3. Practical chemistry-S. Sundaram - 3 Volumes - S. Viswanthan.
4. Vogel's text book of practical organic chemistry – Longmann.

VI SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH6001	**INORGANIC CHEMISTRY II**	**5**	**CC19**	**5**

Objectives :

1. To impart knowledge about radioactivity and nuclear chemistry.
2. To understand the metallic bond and bio-inorganic chemistry.
3. To learn about d and f block elements.
4. To provide knowledge about the industrial chemistry.

UNIT-I: NUCLEAR CHEMISTRY   15 HOURS
1.1 Introduction - composition of nucleus - nuclear forces operating between the nucleons - n/p ratio, curves, stability belts – isotopes, isobars, isotones and isomers, packing fraction.
1.2 Nuclear binding energy - Mass defect - simple calculations involving mass defect and binding energy per nucleon - magic numbers - liquid drop model - shell model (elementary).

UNIT-II :   15 HOURS
2.1 Natural radioactivity - Detection and measurement of radioactivity - radioactive series including neptunium series - group displacement law - Rate of disintegration and half - life period - Average life period.

2.2 Artificial radioactivity - induced radioactivity - uses of radioisotopes - hazards of radiations - nuclear fission - nuclear energy - nuclear reactors-nuclear fusion - thermo nuclear reactions - sun and stars as a source of energy.

UNIT-III: 15 HOURS
3.1 Metallic bond - theories - electron pool theory - valence bond theory - MO theory - semiconductors –Intrinsic and extrinsic and p type semiconductors.

3.2 Bioinorganic chemistry - Biological aspects of Fe, Zn, Mg, Co and Mo- Role of Na, K, Ca, and P - Biological functions and toxicity of some elements.

UNIT-IV: 15 HOURS
4.1 Chemistry of d block elements - characteristics of d block elements - variable valency - magnetic properties and colour - comparative study of Ti, V, Cr, Mn and Fe group metals - occurrence, oxidation states, magnetic properties and colour - preparation and uses of ammonium molybdate, V_2O_5 and UF_6

4.2 Chemistry of f block elements - comparative account of lanthanides and actinides, occurrence, elements, oxidation states, magnetic properties, colour and spectra - lanthanide contraction - causes, consequences and uses -comparison between 3d and 4f block elements - comparison between lanthanides and actinides.

UNIT-V: 15 HOURS

5.1 Industrial chemistry - Fuel gases - calorific value - composition and sources of water gas, semi water gas, carburreted water gas, producer gas, oil gas, natural gas, LPG and bio gas.

5.2 - Manufacture of cement - Composition and setting of cement - examples for pigments - constituents of paints and their functions - type of glasses - manufacture of glass.

Reference Books:

1. Inorganic chemistry - P.L. Soni - Sultan Chand.
2. Inorganic chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia – Vallabh Publications.
3. Selected topics in inorganic chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications .
4. Inorganic chemistry - J.E. Huheey, Harper and Collins - NY IV edition .
5. Concise Inorganic chemistry - J.D. Lee - III edition - Von Nostrand
6. Industrial chemistry - B.K Sharma - Goel Publications .
7. Industrial chemistry R.K. Das - Kalyani Publications, New Delhi.
8. Coordination chemistry - S.F.A. Kettle - ELBS .
9. Coordination chemistry - K. Burger - Butterworthy .
10. Vogel's handbook of quantitative inorganic enalysis - Longman.
11. Text book of qualitative inorganic analysis - A.I. Vogel - III edition .
12. Source book on atomic energy - Van Nostrand Co.,.
13. Nuclear and radiochemistry - John wiley and sons .
14. Nuclear chemistry - H.J. Arnikar - Wiley Eastern Co., - II edition (1987).
15. Advanced Inorganic chemistry - Cotton and Wilkinson - V Edition Wiley and Sons

VI SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH6002	ORGANIC CHEMISTRY II	5	CC20	5

Objectives:
1. To understand the basic concepts of organic photochemistry and Molecular Rearrangements.
2. To kindle interest in students in learning bio-organic chemistry through theintroduction of topics such as Proteins, Nucleic acids, Terpenes, Alkaloids.
3. To assign the spectra using simple organic molecules.

UNIT- I   15 HOURS
1.1 Nucleic acids: Nucleoside, nucleotide, degradation of nucleotide chain - structure of nucleic acids functions of nucleic acids - RNA and DNA - elementary idea about protein synthesis

1.2 Synthesis of pyrimidine and purine bases - guanine, adenine, uracil, cytosine and thymine.

1.3 Terpenes - isoprene rule –structural elucidation of menthol and α-terpeniol.

UNIT- II   15 HOURS
2.1 Vitamins : Classification - structural elucidation of pyridoxine.

2.2 Antibiotics : Classification and structural elucidation of streptomycin.

2.3. Alkaloids : General methods of isolation and structural elucidation of piperine and nicotine

UNIT-III   15 HOURS
3.1 Amino acids : Classification of amino acids - preparations and properties of alpha amino acids - with special reference to Gabriel phthalimide synthesis, Strecker synthesis, Erlenmeyer synthesis-zwitter ion , isoelectric point, General Reaction and properties of proteins.

3.2 Poly peptides and proteins:. Classification of proteins based on physical and chemical properties and physiological functions -peptide synthesis- Bergman synthesis.

3.3 Primary structure of proteins - end group analysis - Akabori method, reduction method, Edman method, Sanger's method, secondary

structure of protein - helical and sheet structures - denaturation of proteins.

UNIT- IV   **15 HOURS**

4.1 UV, IR, NMR and Mass spectra basic principles. Spectral interpretation of simple organic molecules such as ethanol, benzaldehyde, 2-methyl propene, vinyl chloride, aniline, phenol, benzoic acid, Cinnamic acid and methyl propanoate.

UNIT- V   **15 HOURS**

5.1 Organic photochemistry : Types of photochemical reactions- photo dissociation- gas phase photolysis - isomerisation- cyclisation- dimerisation and oxetane formation.

5.2 Norrish-I and II reactions. Barton reaction- photo - Fries rearrangement -photochemical formation of smog- photochemistry of vision.

5.3 Molecular rearrangements: Classification - anionotropic and cationotropic, inter molecular and intra molecular rearrangements .- Pinacol-pinocolone, Benzilic acid, Cope, oxy Cope, Beckmann, Hoffmann, Curtius, Baeyer-Villiger, Wolff, Claisen (sigmatropic) and Fries (Two mechanisms) rearrangements.

Reference Books:

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson Education
2. Organic Chemistry - I. L Finar - Volume I and II - Pearson Education
3. Text Book of Organic Chemistry - P.L.Soni - Sultan Chand
4. Advanced Organic Chemistry - Bahl and ArunBahl - S. Chand
5. Stereochemistry, conformations and mechanisms - Kalsi - New Age
6. Organic Chemistry of Natural Products - Volume I and II- O.P. Agarwal – GOEL Publishing House
7. A guide book to mechanism in Organic Chemistry - Peter Skyes – Pearson Education
8. Stereo Chemistry of Organic Compounds - D. Nasipuri - New Age
9. Chemistry of Natural Products – Gurdeep Chatwal- Himalaya Publishing House
10. Reactions and Reagents - O.P. Agarwal- GOEL Publishing House
11. Organic reaction mechanisms – Gurdeep Chatwal- Himalaya Publishing House
12. A text book of Organic Chemistry K.S.Tewari,N.K.Vishol,S.N.Mehrotra-Vikas Publishing House
13. Organic Chemistry- M.K.Jain and S.C.Sharma-ShobanLal and Nagin Chand
14. Reaction, Mechanism and Structure- Jerry March- John Wiley and Sons
15. Organic Chemistry - Bruice - Pearson Education

VI SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH6003	PHYSICAL CHEMISTRY - II	5	CC21	5

Objectives

1. To study photo chemistry and laser.
2. To learn about Electro chemistry and its applications.

UNIT- I   15 HOURS
1.1 Laws of photochemistry –Jablonski diagram - Non radiative transitions – IC – ISC – Radiative transitions - Fluorescence and phosphorescence -primary and secondary reactions - Kinetics of hydrogen - bromine reaction.

1.2 Photosynthesis-photosentisation - chemiluminescence - Lasers - uses of lasers.

UNIT-II: Electrochemistry   15 HOURS
2.1 Introduction: Metallic and Electrolytic conductors – Specific – Equivalent - Molar Conductance – Variation of Specific and Equivalent conductance with dilution - Transport number and its determination by Hittorff's and moving boundary method - effect of temperature and concentration on ionicmobility and ionic conductance - Kohlrausch's law and its applications, salthydrolysis and pH of a salt solution, buffer action and explanation

2.2 Applications of conductivity measurements - degree of hydrolysis, solubility product and conductometric titrations.

UNIT-III   15 HOURS
3.1. Theory of strong electrolytes - Debye - Huckel - Onsager theory - verification of Onsager equation - Wein effect and Debye Falkenhagen effect -ionic strength - activity and activity coefficients of strong electrolytes.

3.2 Galvanic cells - reversible and irreversible electrodes and cells -standard cell - emf and its measurement - types of electrodes – Gas electrode – Metal - Metal ion electrode – Metal Metal insoluble salt electrode – Redox electrode – Glass electrode - electrodereactions - electrode potentials - reference electrodes - Standard electrodepotentials. Derivation of Nernst equation for electrode potential and cell emf.- sign conventions.

UNIT-IV   15 HOURS

4.1 Electrochemical series and its applications - formation of cells - electrode and cell reactions - cell emf - chemical cells and concentration cellswith and without transference - examples and derivation of expressions for their emfs - liquid junction potential and its significance.

4.2 Applications of emf measurement - calculation of ΔG, ΔH, ΔS andequilibrium constant Determination of pH using quinhydrone and glasselectrodes - potentiometric titrations.

UNIT-V   15 HOURS

5.1 Polarization - decomposition potential over voltage - storage cells -lead acid battery - mechanism of discharging and recharging - fuel cells.

5.2 Polarography - principle - concentration polarization – droppingmercury electrode - advantages and disadvantages - convection, migration and diffusion currents - Ilkovic equation (derivation not required) and significance -current voltage curve - oxygen wave -polarography as ananalytical tool in quantitative and qualitative analysis.

Reference Books::

1. Principles of physical chemistry - B.R. Puri and Sharma - shobanlalnagin Chand & Co.,
2. Text Book of physical chemistry - P.L. Soni - Sultan Chand.
3. Physical chemistry - Negi and Anand - New Age.
4. Physical chemistry - Kundu and Jain - S. Chand.
5. Physical chemistry - K.L kapoor - Macmillan - 4 volumes
6. Elements of physical chemistry - Glasstone and Lewis - Macmillan.
7. Text book of physical chemistry - S.Glasstone, Macmilan.
8. Fundamentals of physical chemistry - maron and Landor - Colier - Macmillan.
9. Physical chemistry - G.W. Castellan - Narosa publishing house.
10. Physical chemistry - Walter J. Moore - Orient Longman.
11. Numerical problems on physical chemistry Gashal, Books and Allied (P)Ltd.,
12. Universal General Chemistry, C.N.R. Rao, Macmillan.
13. Group theory and its chemical applications - P.K.Bhattacharya – Himalaya publishing House.

VI SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CH6004	PHARMACEUTICAL & ANALYTICAL CHEMISTRY	5	CC22	5

Objective:
1. To effectively impart knowledge about - various diseases and their treatment.
2. To know about the different types of drugs.
3. To impart knowledge about different spectroscopy techniques.

UNIT- I   15 HOURS
1.1 Definition of the following terms: drug, pharmachophore, pharmacology, pharmacopia, bacteria, virus, chemotherapy and vaccine

1.2 Drugs affecting CNS - Definition, distinction and examples for tranquilizers, sedatives, hypnotics, psychedelic drugs – LSD (Lysergic Acid) Hashish- their effects.

1.3 Anaesthetics - definition-local and general - volatile nitrous oxide, ether, Chloroform, cyclo propane- trichloroethylene - uses and disadvantages.

UNIT – II   15 HOURS
2.1 Antibacterials: Sulpha drugs-examples and actions-protonsil, sulphathiazole, sulphafurazole Antibiotics-definition and action of penicillin, streptomycin, chloramphenicol, - SAR of chloramphenicol only.

2.2 Antiseptics and disinfectants - definition and distinction-phenolic compounds ,chloro compounds, and cationic surfactants.

2.3 Analgesics, Antipyretics and anti-inflammatory agents: Definition and actions - narcotic and non narcotic- morphine and its derivatives, pethidine and methodone- salicylic derivative, paracetamol, ibuprofen – disadvantages and uses

UNIT- III   15 HOURS
3.1 Causes and treatment of cancer – AIDS, AZT (Azidothymidine) and DDC (Di deoxy cytosine).

3.2 Causes, symptoms and drug for jaundice, cholera and malaria. First aid for accidents - antidotes for poisoning.

3.3 Causes, detection and control of anaemia and diabetes. Diagnostic test for sugar, salt and cholesterol in serum and urine.

UNIT IV   15 HOURS

4.1 **UV - Visible spectroscopy** - Absorption laws. Calculations involving Beer Lamberts Law – instrumentation, photo colorimeter and spectrophotometer-block diagrams with description of components - theory and types of electronic transitions - chromophore and auxochromes - Absorption bands and intensity - factors governing absorption maximum and intensity.

4.2 **H^{1}NMR spectroscopy**: Principle of Nuclear Magnetic Resonance - basic instrumentation- shielding mechanism - chemical shift - number of signals - spin-spin coupling and coupling constants - splitting of signals.

4.3 H^{1}NMR spectrum of simple organic compounds such as ethyl bromide, 1,1,2-tribromoethane, ethanol, acetaldehyde.

UNIT V   15 HOURS

5.1. **Infra-red spectroscopy**: molecular vibrations - Hooke's law - vibrational frequencies - factors affecting vibrational frequencies - instrumentation - block diagram - source - monochromator - cell sampling techniques - detector and recorders.

1.2 **Raman spectroscopy**: Rayleigh and Raman scattering – Stokes and Antistokes lines - instrumentation - block diagram - differences between IR and Raman spectroscopy - mutual exclusion principle - applications.

1.3 **Mass spectroscopy**: basic principles of mass spectrum – molecular ion peak - base peak - isotopic peak - meta stable peak - factors influencing the fragmentation - nitrogen rule - ring rule - determination of molecular formulae with examples – instrumentation

Reference Books:

1. A text book of Pharmaceutical chemistry - Jayashree Ghosh - S. Chand
2. Pharmaceutical Chemistry - S. Lakshmi Sultan Chand
3. Pharmacology and Pharmatherapeutics - R.S. Satoskar - popular prakashan - Vol.I and II.
4. Medicinal Chemistry - AsutoshKar - New Age
5. A text book of Synthetic drugs - O.D. Tyagi - Ammol publications.
6. Elements of analytical chemistry - R. Gopalan, P.S. Subramanian, K. Rengarajan - S. Chand and sons (1997).
7. Fundamentals of analytical chemistry - D.A. Skoog and D.M. West - Holt Reinhard and Winston Publication - IV Edition (1982).
8. Principles of instrumental methods of analysis - D.A. Skoog and Saunders - College publications - III edition (1985).

9. Analytical chemistry - S.M. Khopkar - New Age International.
10. Instrumental methods of chemical analysis - Chatwal - Anand - Himalaya Publishing house - (2000).
11. Analytical chemistry - R.Gopalan - Sultan Chand
12. Analytical Chemistry S.Usharani, Macmillan.

VI SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CHPR61	PRACTICAL VIII GRAVIMETRIC ESTIMATION – II	2	CC23	4

Objective:
To learn gravimetric estimation techniques.

  a. Estimation of calcium as calcium oxalate monohydrate.

  b. Estimation of sulphate as barium sulphate.

  c. Estimation of Nickel as Nickel dimethyl glyoxime.

  d. Estimation of Magnesium as Magnesium oxinate.

Marks Distribution: 75 marks

1 .Record   10marks
2. Execution of work   35marks
3. Accuracy/ Result   25marks
4. Viva Voce   05marks

Reference Books:
1. Text books of Practical Inorganic Chemistry by A.I. Vogel.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CHPR62	PRACTICAL- IX: PHYSICAL CHEMISTRY PRACTICAL - II	2	CC24	4

Objectives:

To learn thermometric experiments and conductivities.
a) Determination of UCST and UCSC of phenol-water system.
b) Conductometric titration of a strong acid and a strong base.
c) Partition Co-efficient of Iodine between water and CCI4.
d) Determination of Equilibrium constant between KI and Iodine.
e) Study of Zero order kinetics by using Iodination of Acetone.

Marks Distribution: 75 marks

1 . Record   10marks
2. Procedure   10marks
3. Viva Voce   05marks
4. Experiment   50marks (Expt. 25 + Manipulation 25)

Reference Books:

1. Basic principles of Practical chemistry by V. Venkatesaran.
2. Basic principles of Practical chemistry by R. Veeraswamy.
3. Basic principles of Practical chemistry by A.R. kulandaivelu.

VI SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CHSBP6	PRACTICAL X: ORGANIC CHEMISTRY PRACTICAL - II	1	AEC6	2

Objective:

1. To learn the skills of preparative methods.
2. To learn the determination of boiling points of liquids.
 3. **Organic Preparations**

Acylation
a. Acetylation of salicylic acid or aniline.
b. Benzoylation of aniline or phenol.

Nitration
a. Preparation of m-dinitrobenzene
b. Preparation of p- nitroacetanilide

Halogenation
a. Preparation of p-bromoacetanilide

        b.   Preparation of 2,4,6-tribromophenol

Diazotization / coupling
        a.   Preparation of methyl orange.
        b.   Preparation of benzoic acid from toluene

Hydrolysis:
        a.   Hydrolysis of ethyl benzoate (or) methyl salicylate

   4. Determination of boiling point of Water, Ethanol, Benzene, Acetic Acid and Toluene.

Marks Distribution: 75 marks

1. **Record**	**10marks**	
2. Procedure	**15marks**	
3. Preparation	**25marks**	
4. Recrystallisation	**05marks**	
5. Boiling point	**15marks**	
6. Viva Voce	**05marsk**	

Reference Books:
1. Vogel's text book of chemical analysis.
2. Practical chemistry - A.O. Thomas - Scientific book center, Cannanore.
3. Practical chemistry-S. Sundaram - 3 Volumes - S. Viswanthan.
4. Vogel's text book of practical organic chemistry – Longman.
5. Practical Organic Chemistry by Gnanaprakasam.
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DEPARTMENT OF CHEMISTRY

SYLLABUS
For
M.Sc Chemistry

SEMESTERS – III & IV

III SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CH3001	INORGANIC CHEMISTRY – III	5	PAPER 9	6

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 – Fluxinol isomerism

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 [Zeigler-Natta catalyst], cyclooligomerisation of olefins and acetylenes [Reppe`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. Workstation and Cloud computing.

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.

Drawing of structure using free softwares (Chemdraw, Chemsketch, Molden and Facio - scope), saving and reading formats and conversions (OpenBabel). Construction of z matrix of some simple molecules such as water, formaldehyde, methane and ethane.

UNIT V
COMPUTATIONAL CHEMISTRY –II

Quantitative Structure Activity Relationship –Significance with Hammet-Taft equation. Elucidation with an example using Molecular Descriptors like Log P, Polarizability, Dipole moment, Surface Area, MESP, HOMO, LUMO, Mulliken and Lowden Charges. Ramachandran Plot- Torsional Angles, Phi & Psi and their significance.

Drug Designing basics – Modeling a drug and predicting mechanism of action of drug – Docking concept (basics) and its significance, Lipinski Rule. Online drug-likeness portal using 'Molinspiration'.

Predicting Molecular Geometry, conformers and optimization. Input formats to include, Cartesian coordinates and unique coordinates, Smiles, mol, pdb, out, gjf and punch files. Quantum Chemical Descriptors, Fukui Function, Calculation of Chemical Potential, Electron Affinity, Hardness and Softness, and other properties (using 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.

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III SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CH3002	ORGANIC CHEMISTRY - III	5	PAPER 10	6

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 – Fischer 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 – ^{1}H NMR – chemical shift and coupling constant – factors influencing proton chemical shift and vicinal proton – proton coupling constant – ^{1}H 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 of molecular 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 (cytocine 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 – Divinyl cyclo propane rearrangement – Pericyclic reactions – classification – orbital symmetry – Woodward Hoffman rules – Analysis of electrocyclic, cyclo addition and sigmatropic reactions – correlation diagrams for 1,3 butadiene – cyclobutene system. Inter conversion of 1,3,5 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 10pi electrons – Annulenes C_{12}-C_{18} (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. Chapmann, 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CH3003	PHYSICAL CHEMISTRY – III	4	PAPER 11	6

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 spectroscopyand itsapplications.

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 –Onsagarequation .

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

Kinetics of polymerization (Ionic and Addition)-kinetics of copolymerization- Mechanism of Polymerization- Chain Initiation-Propagation – Termination-Transfer –Inhibition and Retardation. Molecular weight of polymers, M_w, M_n Determination of Molecular weight of polymers - Osmometry, Viscometry, Ultracentrifuge.
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,QuantumChemistry,WileyEastern,New Delhi,1992.
2. M.W.Hanna,Quantum Mechanics In Chemistry,W.A.Benjamin Inc.London,1965.
3. S.Glasstone,Introduction To Electrochemistry,Affliated 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.Billmeyar,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,AcademicPress,New York,1973.
8. G.Odian Principles Of Polymerization,McGraw Hill Book Company,New York,1973.
9. Caringtion 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,MenloPark,California.
2. A.K.Chandra,Introductory Quantum Chemistry,TataMcgraw Hill.
3. J.M.Murrell,S.F.A.Kettle and J.M.Tedder,The Chemical Bond,Wiley,1985.
4. D.A.McQuarrie,QuantumChemistry,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 1and 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.

III SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHPR31	PRACTICAL VII INORGANIC PRACTICAL - I	4	PAPER 12	6

OBJECTIVE

i) To gain the practical skill in inorganic estimations.
ii) To learn the preparation methods in inorganic Chemistry

I QUANTITATIVE ANALYSIS

1. Estimation of Copper volumetrically and Nickel gravimetrically .
2. Estimation of Copper volumetrically and Zinc gravimetrically.

II PREPARATIONS

1) Tetrammine copper (II) sulphate
2) Potassium tetrachlorocuprate(II)
3) Tris (ethylenediammine) Cobalt (III) chloride
4) Hexammine Cobalt (III) chloride

SCHEME

EXPERIMENT   40 Marks
PREPARATION   15 Marks
RECORD   10 Marks
VIVA VOCE   10 Marks
Total   75 Marks

RECOMMENDED BOOKS

1. Vogel's Text book of Quantitative Inorganic Analysis.

III SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHEP31	PRACTICAL VIII: CONDUCTOMETRIC TITRATIONS & ORGANIC ESTIMATIONS	4	ELECTIVE PAPER 3	6

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 ($\lambda\alpha$) 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 thecalculation of molecular data and identification of functional groups.

ORGANIC ESTIMATIONS:

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

Total Marks: 100 (External 75 + Internal 25)

External marks distribution

Spectra (5+5)	=	10
Practical	=	40
Procedure	=	05
Record	=	10
Viva-voce	=	10

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III SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHEP32	PRACTICAL IX: INDUSTRIAL CHEMISTRY PRACTICALS	4	PAPER 9	6

Objectives:-

To compare the experimental and standard values of certain commercial substances.

To check the purity of same samples.

1. Estimation of total hardness of water using EDTA.
2. Determination of Iodine value of an oil by Hanus method.
3. Estimation of Ascorbic acid (Vitamin C).
4. Determination of saponification value of an oil.
5. Determination of percentage purify of washing soda.
6. Estimation of available chlorine in bleaching powder.
7. Determination of percentage of calcium in lime stone.
8. Determination of acid value of an edible oil.

SCHEME

EXPERIMENT	55 Marks
RECORD	10 Marks
VIVA VOCE	10 Marks
Total	75 Marks

TEXT BOOKS AND REFERENCES:

1. Venkateswaran V., Veeraswamy R., Kulandivelu A.R. Basic principles of practical chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons (1997).

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IV SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CH4001	INORGANIC CHEMISTRY – IV	5	PAPER 13	5

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 nanoscience.

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, fine 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 – McConnel`s equation. Kramer`s theorem, ESR of transition metal complexes of Copper, Manganese and Vanadium 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 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, Reeindhod, 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. Aruldhas - Molecular Structure and Spectroscopy - Prantice Hall.
7. N. Greenwood and A. Earnshaw - Chemistry of Elements pergamon, NY, 1984.4.
8. G.T. Seaborg, J. J. Katz - The Chemistry of Acitinide 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. ManasiKarkare - Nanotechnology, Fundamentals and Applications, I.K international,Royal Society of Chemistry, 2nd edition, 2005.
12. Geoffry.AOzin, 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.
14. S.F.A. Kettle - Spectral interpretation
15. T. Pradeep - NANO - The essentials: Understanding nanoscience and nanotechnology

IV SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CH4002	ORGANIC CHEMISTRY – IV	5	PAPER 14	5

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-NH$_2$ and R-COOH). Uses of the following reagents: DCC, Trimethylsilyliodide, 1, 3-Dithiane (umpolung), diisobutylaluminimumhydride (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 heterocycles containing 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 reation, 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, VolII 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 Abrahim white. McGraw Hill Int. (7th Edition)
5. Biochemistry by LubertStryer, 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 Syntheis, 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.

17. Organic Chemistry – Reactions and Mechanisms by Balaji rao-Vishal Publications.
18. Instrumental methods of Chemical Analysis by H. Kaur- Pragati Pragasam Publications, Meerut.

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IV SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CH4003	PHYSICAL CHEMISTRY - IV	4	PAPER 15	6

OBJECTIVE: To study the electrochemical kinetics, over potential, corrosions and fuel cells. To study statisticalthermodynamics, 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.

Corrosition and passivation of metals – Pourbaix diagram – Evan's diagram – fuell cells – electrodeposition- principle and applications- electrochemical inorganic reactions of technological interest.

UNIT II – STATISTICAL THEMODYNAMICS - 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(Eienstein's and Debye's) ortho and para hydrogen.

UNIT III – STATISTICAL THEMODYNAMICS - 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, – photovoltaic and photogalvanic cells, photoelectrochemical cells, photo assisted electrolysis of water, aspects of solar energy conversion and storage.

TEXT BOOKS
1. S.Glasstone,Introduction To Electrochemistry,Affliated 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,Statisticaltheromdynamics,WileyEaster,New Delhi,1990.
5. R.Hasee,Thermodynamics Of Irreversible Process,Addition Wesley,Reading,Mass,1969.
6. N.J.Turro,Modern Molecular Photochemistry,Benjamin,Cumming,Menlo Park,California,1978.
7. K.K.RohatgiMukherjee,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.NReddy,Electrochemistry,Vols 1and 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,ElectrochemistryPrinciples,Methods And Applications,Oup,Oxford,1993.

5. Dole,Themodyanamics,PrenticeHall,New York,1954.
6. B.J.McClenlland,StatisticalThermodyanamics,Chapman And Hall,London,1973.
7. I.Prigogine,Introduction To Themodyanamics Of Irreversible Process,Interscience,New York,1961.
8. N.O.Smith,Elementary Statistical Thermodyanamics,A Problem Approach,PlenumPress,New York,1961.
9. Cleyde,PhysicalChemistry,SchaumSeries,McGraw Hill,1976.
10. Seans,StatisticalThermodyanamics,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

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IV SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHPR41	PRACTICALS – X: ORGANIC CHEMISTRY PRACTICAL - II	4	PAPER 16	5

OBJECTIVE: To learn the preparative techniques of Organic compounds and interpretation of spectra.

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 alchol
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	:	10 marks
Total	:	75 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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHEP41	PRACTICAL – XI: ESTIMATION OF METAL IONS AND SPECTRAL INTERPRETATIONS	4	ELECTIVE PAPER 4	5

OBJECTIVE:

i) To learn the estimation of metal ions in solution mixture.
ii) To impart the knowledge about illustration of spectra of inorganic compounds

I. ESTIMATION OF METAL IONS

1. Estimation of Ferric ion volumetrically and Magnesium ion Gravemetrically

2. Estimation of Ferric ion volumetrically and Nickle ion Gravemetrically

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 CIF_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 $FeSO_4$ $7H_2O$

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	10 Marks
Total	75 Marks

RECOMMENDED BOOK

1. Vogel's Text book of Quantitative Inorganic Analysis

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IV SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHEP42	PRACTICAL – XII: PREPARATION OF DOMESTIC PRODUCTS	4	ELECTIVE PAPER 4	5

OBJECTIVES:-

➢ To develop self employment skills.
➢ To become entrepreneur.

1. Preparation of Detergent washing powder.
2. Preparation of Utensils cleaning powder.
3. Preparation of Normal shampoo.
4. Preparation of Polyvinyl alcohol adhesive.
5. Preparation of Room freshner.
6. Preparation of Liquid blue.
7. Preparation of Pain relieving balm.
8. Preparation of Jasmine perfume liquid.
9. Preparation of Tooth powder.
10. Preparation of Face powder.
11. Preparation of White phenol.

12. Preparation of automobile decarboniser.
13. Preparation of Tooth paste.
14. Preparation of Talcum powder.

SCHEME

EXPERIMENT   55 Marks
RECORD   10 Marks
VIVA VOCE   <u>10 Marks</u>
Total   <u>75 Marks</u>

TEXT BOOKS AND REFERENCES:

1. Venkateswaran V., Veeraswamy R., Kulandivelu A.R. Basic principles of practical chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons (1997).

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IV SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CHNMP4	PRACTICAL – XIII: POTENTIOMETRY AND SPECTRAL INTERPRETATION	2	NON MAJOR PAPER	4

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 (KCI+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 ¼, 1/3, 1/2, 2/3 and ¾ 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

DEPARTMENT OF BIOCHEMISTRY

SYLLABUS
For
B.Sc Biochemistry

SEMESTERS – V & VI

V SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI5001	ENZYMOLOGY	5	CC13	5

Objectives
- ✓ To understand the various classes of enzymes and enzyme kinetics.
- ✓ To study the industrial applications of some enzymes in industries.

UNIT- I INTRODUCTION & CLASSIFICATION 15 Hrs

Discovery, nomenclature and classification of enzymes. Active site, induced fit theory, lock and key mechanism, enzyme specificity (stereo-, reaction and substrate specificity). A brief account of non-protein enzymes-ribozymes and DNA enzymes.

UNIT-II ENZYME KINETICS 15 Hrs

Activation energy. Factors affecting enzyme activity - substrate concentration, temperature, pH and activators. Michaelis-Menten equation, Km, Vmax and Lineweaver Burk plot. Enzyme activity, specific activity. Enzyme units-katal, IU and turnover number. Ping-pong, bi-bi mechanism.

UNIT- III ENZYME CATALYSIS AND INHIBITION 15 Hrs

Mechanism of enzyme action- general acid-base catalysis, electrostatic catalysis, covalent catalysis, Enzyme inhibition- reversible inhibition, competitive, uncompetitive, noncompetitive, and allosteric inhibition (only concepts).

UNIT- IV COENZYMES & ISOENZYMES 15 Hrs

Coenzymes- prosthetic group, classification- vitamin and non-vitamin coenzymes. Structures and functions of NAD^+, $NADP^+$, FMN, FAD and coenzyme Q. Isoenzymes- isozymes of LDH, diagnostic importance of LDH.

UNIT- V ENZYMES IN INDUSTRIES 15 Hrs

Industrial uses of amylase, protease, glucose isomerase, cellulase, pectinase, catalase. Immobilization of enzymes- methods, advantages and applications.

TEXT BOOK:

1. Enzymes – Trevor Palmer, First edition, Affiliated East-West Press Pvt. Ltd., 2004.

REFERENCES:

1. Biochemistry- U Satyanarayan and U Chakarapani 4th edition, Elsevier publisher, 2013.
2. Lehninger Principles of Biochemistry- D.L. Nelson and M.M. Cox, 6th illustrated edition, Macmillan Worth Publishers, 2013.

V SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI5002	GENETICS AND MOLECULAR BIOLOGY	5	CC14	5

Objectives
- ✓ To understand genetic inheritance.
- ✓ To study about gene expression, repair and mutation.

UNIT-I- GENETICS 15 Hrs

Mendelian genetics: Mendel's laws of inheritance – mono hybrid experiments, law of dominance, law of segregation, phenotype, genotype, alleles, homozygous, heterozygous, test cross, back cross, di hybrid experiments - law of independent assortment and law of incomplete dominance.

UNIT-II- REPLICATION 15 Hrs

DNA as genetic material, Types of replication, evidence for semi conservative replication. Replication in prokaryotes, DNA polymerases I, II, III, topoisomerases, Okazaki fragments, DNA ligases and inhibitors of replication. Reverse transcriptase, retroviruses. Highly repetitive, moderately repetitive and unique DNA sequences, Satellite DNA.

UNIT-III- TRANSCRIPTION 15 Hrs

Prokaryotic transcription, RNA polymerases, role of sigma factor, initiation, elongation and termination. (Rho - dependent and independent). Inhibitors of transcription, rRNA and tRNA modification.

UNIT-IV- TRANSLATION 15 Hrs

Genetic code - definition, deciphering and salient features of genetic code, composition of ribosomes, structure of t-RNA, coding and non-coding strands of DNA Translational activation of amino acids, initiation, elongation and termination of protein synthesis in prokaryotes. Inhibitors of protein synthesis. Brief account of post translational modification of proteins.

UNIT – V- GENE- MUTATION, REPAIR AND REGULATION15 Hrs

Gene mutation types - point mutation, transition mutation, transversion mutation, frame shift mutation, insertion and deletion mutation.
DNA repair mechanism - excision repair, SOS and UV repair. Prokaryotic gene regulation - Operon, Lac operon, positive and negative control.

TEXTBOOK:
1. Biochemistry- U Satyanarayan and U Chakarapani 4th edition, Elsevier publisher, 2013.

REFERENCES:
1. Lehinger's Principle of Biochemistry- David L Nelson and Michael M Cox, 5th edition, Freeman Publishers, 2008.
2. Harper's Illustrated Biochemistry –David A Bender et al., 30th Editions McGrawHill, 2015
3. Lippincott's illustrated Biochemistry Denise R Ferrier 6[th]Edition, Lippincott's Publication, 2013
4. Cell and Molecular Biology Nalini Chander and Susan Viselli, Review Lippincott's Publication, 2010
5. Genes VIII. Benjamin Lewin, Oxford Univ press, 2004.
6. Molecular Biology - David Freifielder 2nd Edition, Narosha, publication 2004.
7. Molecular Cell Biology – Harvey Lodish, 5nd Edition ,Freeman Publication, 2003
8. Cell and Molecular Biology - N.Y Karp. 3rd Edition, John Wiley and Sons, 2002.

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V SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI5003	HUMAN ANATOMY AND PHYSIOLOGY	5	CC15	5

Objective: To understand the anatomy and physiology of vital human organs.

UNIT – I SKELETAL & MUSCULAR SYSTEM   15 Hours
Types of human tissues- Muscle, Nervous, Epithelial and Connective tissues. Classification of Muscles - Skeletal, Cardiac and Smooth muscles, Structure of skeletal muscle, Mechanism of muscle contraction. Neuromuscular junction. Homeostasis.

UNIT – II DIGESTIVE & RESPIRATORY SYSTEM   15 Hours
Secretions of digestive tract, Digestion, absorption and assimilation of carbohydrates, proteins, and fats. Functional anatomy of respiratory tract, Structure of respiratory unit, Mechanism of respiration. Transport and exchange of respiratory gases between lungs and tissues.

UNIT – III CARDIOVASCULAR SYSTEM   15 Hours
Composition and functions of blood, Mechanism of blood coagulation, Types of blood circulation, Function of arteries, veins and capillaries. Structure and function of heart, cardiac cycle.

UNIT – IV EXCRETORY & REPRODUCTIVE SYSTEM   15 Hours

Structure and functions of kidney. Structure of nephron. Dialysis. Mechanism of urine formation. Structure and functions of the male and female reproductive organs, Physiology of pregnancy and lactation.

UNIT – V ENDOCRINE & NERVOUS SYSTEM   15 Hours

Brief outline of various endocrine glands and their secretions, physiological role of hormones. Classification of nervous system. Structure and functions of neuron, neuroanatomy of brain and spinal cord.

TEXTBOOK:

1. Essentials of Medical Physiology. K Sembulingam, Prema Sembulingam. Fourth Edition. Jaypee Publications, 2003.

REFERENCES:

1. Human Physiology – Chatterjee, C.C, Volume I & II. 11th edition, (1992) Medical agency allied, Calcutta.
2. Text Book of Medical Physiology, A.C. Guyton 10th edition. 2015.
3. Review of Medical Physiology, William. F. Ganong, 14th edition, A Lange Medical book.

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V SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI5004	MEDICAL LABORATORY TECHNOLOGY	5	CC16	5

Objectives
- ✓ To understand the basic concepts of setting up and running of a medical laboratory.
- ✓ To understand, analysis of urine, stool, blood, CSF, sputum, amniotic fluid, culturing and testing of microbes.

UNIT-I: LABORATORY CARE AND INSTRUMENTATION

15 HOURS

Environmental Health and Safety, Good laboratory practices, Code of conduct for laboratory personnel - safety measures in the laboratory-chemical and reagents, labeling, storage and usage. First aid in laboratory accidents - precautions and first aid equipment. Reporting laboratory tests and keeping records- documentation. General approach to quality control, quality control of quantitative data.

UNIT-II: URINE ANALYSIS AND STOOL EXAMINATION

15 HOURS

Composition, collection, preservation, gross examination, interfering factors, chemical examination. Significance of sugar, protein, ketone bodies, bile pigments, blood, uric acid in urine. Creatinine/protein ratio, 24 hour urine. Pregnancy test & interpretation.

Specimen collection- inspection of faeces- odour, pH, Interfering substance. Test for occult blood, faecal fat.

UNIT-III: CLINICAL HEMATOLOG 15 HOURS

Plebotomy - Anticoagulant, preservation, Estimation of Hb, PCV,WBC, RBC, Platelets, ESR. Clotting time, bleeding time - normal value, clinical interpretation. Anemia, types of anemia.

UNIT-IV: BODY FLUIDS AND BLOOD BANKING 15 HOURS

Cerebrospinal fluid and amniotic fluid, semen analysis, sputum examination - Interpretation. Blood grouping- ABO system, Rh typing, Blood transfusion, cross matching, blood transfusion and its complications.

UNIT-V: MEDICAL MICROBIOLOGY 15 HOURS

Culturing of organisms from various specimens. Culture media and antibiotic sensitivity test (pus, urine, Stool, sputum, throat swab, gram staining, Zielh –Neilson staining (TB, Lapra bacilli). Safety procedure in microbiological techniques.

TEXTBOOK:

1. Medical Laboratory Technology – Kanai L. Mukherjee, 10th reprint, Tata McGraw Hill Publication and Co. Ltd., Vol, I, II, III, 2002.
2. Medical Laboratory Science- J. Ochei & A. Kolhatkar, Tata McGraw Hill Publication and Co. Ltd., 2000.

REFERENCES:

1. Practical Clinical Biochemistry - Harold Varley, 5th edition, William Heinemann Medical Books Ltd., London, 1980.
2. Medical Laboratory Technology – V.H. Talib
3. Medical lab technology - Ramnik Sood, Jaypee Brothers, Medical Publishers (P) Ltd, New Delhi.
4. Medical Laboratory Science- J. Ochie and A. Kolhatkar, Tata Mcgraw - Hill Publishing Company Limited, New Delhi.

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BIPR51	PRACTICAL V: COLORIMETRIC ANALYSIS AND ELECTROPHORESIS	2	CC17	4

Objectives
- ✓ To understand the principles, protocol and calculation of each experiment.
- ✓ They should know the preparations of all the reagent. Estimations should be done individually.

I. COLORIMETRIC ESTIMATION
1. Estimation of Creatinine by Jaffe's method.
2. Estimation of Urea by Diacetyl monoxime method.
3. Estimation of Protein by Lowry's method.
4. Estimation of Glucose by O- Toluidine method.
5. Estimation of Glucose by Folin-Wu Method.
6. Estimation of Cholesterol by Zak's method.
7. Estimation of Bilirubin by Somoguii method.

II. AUTO-ANALYSER
1. Estimation of the above parameters by auto-analyser- demonstration.

III. ELECTROPHORETIC TECHNIQUES
1. Separation of proteins by SDS – PAGE.
2. Separation of nucleic acid by Agarose Gel Electrophoresis.

TEXTBOOK:
1. Medical Laboratory Technology – Kanai L. Mukherjee, 10th reprint, Tata McGraw Hill Publication and Co. Ltd., Vol, I, II, III, 2002.
2. Medical Laboratory Science- J. Ochei & A. Kolhatkar, Tata McGraw Hill Publication and Co. Ltd., 2000.

REFERENCES:
1. Practical Clinical Biochemistry - Harold Varley, 5th edition, William Heinemann Medical Books Ltd., London, 1980.

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BIPR52	PRACTICAL- VI: MEDICAL LABORATORY TECHNOLOGY PRACTICAL I	2	CC18	4

Objectives
- ✓ Student should be trained in principles, protocol and calculation of each experiment.
- ✓ Student should be trained in the collection of blood and preparation of blood films.
- ✓ They should know the preparations of all the reagent. Estimations should be done individually.

I.   HAEMATOLOGY
1. Estimation of Hemoglobin by Shali's method.
2. Total RBC count.
3. Total WBC count.
4. Differential WBC count.
5. Determination of PCV.
6. Determination of ESR.
7. Blood grouping.
8. Determination of clotting time.
9. Determination of bleeding time.

II.   CELL COUNTER
Determination of some haematological parameters using cell counter- demonstration.

TEXTBOOK:
1. Medical Laboratory Technology – Kanai L. Mukherjee, 10th reprint, Tata McGraw Hill Publication and Co. Ltd., Vol, I, II, III, 2002.
2. Medical Laboratory Science- J. Ochei & A. Kolhatkar, Tata McGraw Hill Publication and Co. Ltd., 2000.

REFERENCES:
1.   Practical Clinical Biochemistry - Harold Varley, 5th edition, William Heinemann Medical Books Ltd., London, 1980.

SEMESTER V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BISB51	BIOTECHNOLOGY – I	1	AEC5	2

Objectives
- ✓ To understand the tools, techniques of genetic engineering.
- ✓ To study the applications of genetic engineering

UNIT – I GENETIC ENGENEERING ENZYMOLOGY   6 HRS
Biotechnology- definition and scope: types and branches of biotechnology. Genetic engineering tools – brief account of restriction endo nucleases, exonuclease, SI nucleases, DNA ligases, alkaline phosphatase, reverse transcriptase, DNA polymerase, poly nucleotide kinase, and terminal transferase. Uses of linkers and adapters in genetic engineering.

UNIT – II VECTORS   6HRS
Cloning vectors: Plasmid (PBR^{322}, PUC^{19}), Phage (Phage λ), Cosmid, Yeast artificial chromosome, Shuttle vector and Expression vectors.

UNIT – III GENE TRANSFER METHODS   6HRS
Methods of gene transfer – transformation, transfection, transduction, electroporation, micro injection, Biolistics, Episome fusion.

UNIT – IV SCREENING METHODS   6HRS
Method for screening – insertional inactivation, Blue white selection, and colony hybridization. Gene amplification by PCR- Applications

UNIT – V APPLICATION   6HRS
Genetic engineering for human welfare – production of insulin, growth hormone, human interferon, Tissue plasminogen activator (TPA).

TEXTBOOKS:
1. Biotechnology – U. Satyanarayana, Books and Allied Limited, 2013.

REFERENCES:
2. Recombinant DNA - James D. Watson, Michael Gilman, Jan A Witkowski, Mark Zolller, 2nd Edition Freeman W H &Company, 2003.
3. Recombinant DNA – genes and genomes-a short course James D. Watson, Richard M Meyers, Amy A Caudy, Jan A Witkowski, 3rd Edition, Cold Spring Harbor Laboratory Press &Company 2007.
4. Molecular biotechnology – principle and application of recombinant DNA Bernard, R. Glick Jack, J. Pasternak, 3rd edition, Library of Congress cataloging in publication data,2003.

5. Elements of Biotechnology - P.K.Gupta 2nd Edition Rastogi publication, New Delhi, 2016.
6. Concept in Biotechnology - D. Balasubraniam et al., Universal press India 1996.
7. A text book of Biotechnology – R. C. Dubey, S. Chand & co, 1993.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI6001	INTERMEDIARY METABOLISM	5	CC19	5

Objectives
  ✓ To understand various metabolic pathways along with the structures and enzymes involved.

UNIT - I   METABOLISM & RESPIRATORY CHAIN   15 HOURS
Metabolic pathways, anabolism, catabolism, amphibolism. High energy compounds, structure and role of ATP, GTP. Respiratory chain, oxidative phosphorylation and substrate level phosphorylation.

UNIT -II   METABOLISM OF CARBOHYDRATES   15 HOURS
Glycolysis, oxidation of pyruvate, TCA cycle, Gluconeogenesis, HMP shunt, Glycogenesis, Glycogenolysis (key enzymes and regulation).

UNIT -III   METABOLISM OF LIPIDS   15 HOURS
Biosynthesis of fatty acids, cholesterol & their regulation. Degradation of fatty acids by β-oxidation and formation of ketone bodies.

UNIT -IV   METABOLISM OF AMINO ACIDS   15 HOURS
Oxidative & non-oxidative deamination, decarboxylations and transamination of amino acids. Urea cycle, biosynthesis of creatine & creatinine.

UNIT -V   METABOLISM OF NUCLEOTIDES   15 HOURS
Biosynthesis of purine and pyrimidine nucleotides (both *de novo* and salvage pathways). Degradation of purine and pyrimidine nucleotides. Ureotelic and uricotelic systems.

TEXTBOOK:
Harper's Illustrated Biochemistry, R.K. Murray, etal, 29th edition, Mc Graw Hill Professional, 2012.

REFERENCES:
1. Biochemistry, D. Voet, J.G. Voet, 4th edition, John Wiley & Sons, 2010.
2. Fundamentals of Biochemistry, D. Voet, J.G. Voet, C.W. Pratt, 5th edition, Wiley, 2016.
3. Lehninger Principles of Biochemistry- D.L. Nelson and M.M. Cox, 6th Illustrated edition, Macmillan Worth Publishers, 2013.
4. Biochemistry- U Satyanarayan and U Chakarapani 4th edition, Elsevier publisher, 2013.

V SEMESTER

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI6002	CLINICAL BIOCHEMISTRY	5	CC20	5

Objectives:
- ✓ To understand the basic concepts of clinical biochemistry, diseases related to metabolism, organ function test and importance of enzymes in diagnosis.

UNIT-I: BASIC CONCEPTS OF CLINICAL BIOCHEMISTRY 15 HOURS

A brief review of units and abbreviations used in expressing concentrations and standard solutions. Biochemical analytes and their normal ranges. Specimen collection and processing (Blood, urine, faeces). Anti-coagulant preservatives for blood and urine. Transport of specimens.

UNIT-II: DISEASES RELATED TO CARBOHYDRATE AND LIPID METABOLISM 15 HOURS

Regulation of blood sugar, Glycosuria - types of glycosuria. Oral glucose tolerance test in normal and diabetic condition. Hb A1C, Diabetes mellitus and Diabetic insipidus – hypoglycemia hyperglycemia and its treatment. Ketonemia, Ketonuria, diabetic ketosis. Complications, treatment and management of Diabetes mellitus.

Lipid and lipoproteins: Classifications, composition, mode of action - Cholesterol. Factors affecting blood cholesterol level. Dyslipoproteinemias, atheroscelorosis- risk factor and causes. Fatty liver.

UNIT-III: INBORN ERRORS OF METABOLISM 15 HOURS

Introduction - clinical importance, phenylketonuria, cystinuria, alkaptonuria, Fanconi's syndrome, galactosemia, albinism, tyrosinemia, and hemophilia.

UNIT-IV: ORGAN FUNCTION TEST 15 HOURS

Renal function test: Clearance test(Urea, Creatinine, Inulin), PAH test, Concentration and dilution test.

Gastric function test: Collection of gastric contents, examination of gastric residuum, FTM, stimulation test, tubeless gastric analysis. Liver function test: jaundice - types, differential diagnosis. Icteric index, Vandenberg test, Plasma protein changes, Prothrombin Time.

UNIT-V CLINICAL ENZYMOLOGY 15 HOURS

Functional and non- Functional plasma enzymes. Isoenzymes with examples. Enzyme patterns in acute pancreatitis, liver damage, bone disorder, myocardial infarction and muscle wasting.

TEXTBOOK:
1. Clinical Chemistry- M.N. Chatterjee & R. Chawla, 2nd edition, Jaypee Brothers Medical Publishers (P) Ltd., 2010.

REFERENCES:

1. Clinical chemistry in diagnosis and treatment - Philip D. Mayne, 6th edition.ELBS/Arnold, New Delhi,1994.
2. Text book of biochemistry with Clinical correlations, Devlin, 3rd edition, A.John Wiley- Liss Inc. 2002.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI6003	IMMUNOLOGY	5	CC21	5

Objectives:
  ✓ To understand the organization of the immune system, how it functions and certain diseases related to its malfunctions.

UNIT-I- INTRODUCTION & ORGANIZATION OF IMMUNE SYSTEM   15 HOURS

Introduction to immunology: Primary and secondary Lymphoid organs, Types of Immunity (Innate and acquired immunity), Innate immunity – mechanical factors, chemical factors, biological factors, and other factors. Cells of immunity – NK cells, LAK, Macrophages, Neutrophils and Eosinophils. Determinants of innate immunity. Acquired immunity – humoral and cell mediated.

UNIT-II- ANTIGEN & ANTIBODIES   15 HOURS

Antigens: Definition, criteria for antigenicity, Epitope, Haptens. Classification of antigen based on chemical nature, mode of action, and antigenic determinant. Antibodies: Paratope, Basic Structure, Classes, Subclasses of Immunoglobins, biological functions.

UNIT-III- COMPLEMENT SYSTEM   15 HOURS

Complement: Definition, components, activation, pathways of activation – Classical and Alternative pathway. Biological activities of complement components. Deficiency of complement system. Transplantation- graft and its types, mechanism of allograft rejection.

UNIT-IV- HYPERSENSITIVITY   15 HOURS

Hypersensitivity – types (anaphylactic, antibody dependent cytotoxic, immune complex mediated, cell mediated delayed hypersensitivity)- definitions, mechanisms. Grave's disease.

UNIT-V- IMMUNOLOGICAL TEST   15 HOURS

Antigen Antibody Reaction, Agglutination test and its type, Precipitation, Complement fixation test, immuno assays using labelled reagents- immunofluorescence, ELISA, RIA. Commonly used immunological test – Widal test, VDRL, Hepatitis B, Rheumatoid Arthritis.

TEXT BOOKS:

Immunology – A Short Textbook. Md Akram Hussain. 2nd Edition, Jaypee Brothers Medical Publishers (P) Ltd., NewDelhi, 2003.

REFERENCES:

1. Essential Immunology- Roitt. I.M, Blacewell, Scientific Publishers, 1988.
2. Immunology- Kuby Richard. A. Goldsby, Thomas. J.Kint, Barbara. A. Osborne, 4th Edition, W.H. Freeman and Company, New York, 2000.
3. Basic and Clinical Immunology- Stites D.P. Stobo, J.D. Fundanberg. H.A and Wells. J.V, 6th edition Los Atlas Lange, 1990.
4. Immunology- Charles. A. Janeway. J.R. Paul Travels, 4th edition, Black well Scientific Publishers, 1994.

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BI6004	NUTRITIONAL BIOCHEMISTRY & DIETETICS	5	CC22	5

Objectives:
- ✓ To understand the importance of food in health
- ✓ To study disease management with help of diet

UNIT – I: INTRODUCTION TO NUTRITION

15 HOURS

Definition of foods and nutrition. Functions of food and its relation to nutritional and clinical health, Basic food groups: Energy giving foods, body building foods and protective foods. Essential nutrients, RDA for average Indian, analysis of food composition, food habits, food fads and fallacies.

UNIT – II: NUTRITIVE AND CALORIFIC VALUE OF FOOD

15 HOURS

Definition and unit of energy – Kcal. Estimation of energy of food stuffs by Bomb calorimeter, calorific, physiological value and RQ of food stuffs. Body mass index (BMI), Basic metabolic rate (BMR), its measurements and influencing factors, SDA of food. Nutritive value of protein, essential amino acids.

UNIT-III: BALANCED DIET FORMULATION

15 HOURS

Assessment of nutritional status. Nutrition at various stages of growth and development: Diets for infants. Children, adolescent, pregnant women,

lactating mothers and older persons. RDA for average Indian. Protein nutritional Nitrogen balance, quality of food proteins and requirements. Protein malnutrition (Kwashiorkor) and under nutrition (marasmus) and their preventive, curative measures.

UNIT-IV: DISEASE MANAGEMENT WITH DIET

15HOURS

Nutritional therapy during Obesity, diabetes, anemia, peptic ulcer, constipation, jaundice, high blood pressure, low blood pressure, and atherosclerosis. Vitamin deficiency diseases, Deficiency and disorder of trace elements.

UNIT-V: FOOD HYGIENE AND HEALTH

15 HOURS

Food toxins, bacterial food poisoning, chemical food poisoning. Food adulteration and types. Food preservation – methods, food spoilage, types of spoilage in canned food. Food additives – preservatives, food colours – natural and synthetic.

TEXTBOOK:
1. Food Science – B. Srilakshmi , 6th edition, New Age International Publishers ,2015.
2. Essential of Food and Nutrition –M.S. Swaminathan, 2nd edition, Bangalore print and publication, 1985.

REFERENCES:
1. Food science and Nutrition – Sunetra Roday1st edition ,Oxford Publication, 2012.
2. Modern nutrition in health and disease –A.catharine Ross et al., 11th edition, Lippincott publication, 2012.
3. Modern nutrition in health and disease –Maurice. E. Shills et al., 10th edition, Lippincott publication, 2006.
4. Food and Nutrition – facts and figures- L.C.Gupta, Kusum Gupta and Abhishek Gupta, 6th edition, Jaypee publishers 2006.
5. Clinical dietetics and nutrition - E.P. Antia.1st edition QUP India Publisher, 1998
6. Normal and therapeutic nutrition - Corinne H Robinson Marilyn R Lawler et al ., 1st edition Mac Millan USA Publisher, 1990
7. Foundation of normal and therapeutic nutrition –T. Randall Lankford et al., 1st edition Willey Medical publication, 1986
8. Human Nutrition and Dietetics - Davidson and Passamore, Eastwood 8th edition alpha 2 omega books , UK, 1986

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BIPR61	PRACTICAL VII: ENZYMOLOGY AND CHROMATOGRAPHY	2	CC23	4

Objectives:

 ✓ To understand the principles of enzyme assays their clinical significance.
 ✓ To understand the basic principles of paper, thin layer and column chromatography.
 ✓ They should know the preparations of all the reagent. Estimations should be done individually.

I. ENZYME ASSAYS

1. Effect of pH on salivary amylase.
2. Effect of temperature on salivary amylase.
3. Effect of substrate concentration on salivary amylase.
4. Assay of activity of alkaline phosphatase in serum.
5. Assay of serum Aspartate Transaminases (SGOT).
6. Assay of serum Alanine Transaminase (SGPT),

II .CHROMATOGRAPHIC TECHNIQUES

1. Separation and detection of amino acids by Paper chromatography.
2. Separation and detection of sugars by Paper chromatography.
3. Separation of plant pigments by column chromatography.
4. Separation of proteins by column chromatography.
5. Separation of amino acids by thin layer chromatography.
6. Separation of lipids by thin layer chromatography.

TEXTBOOK:

1. Medical Laboratory Technology – Kanai L. Mukherjee, 10th reprint, Tata McGraw Hill Publication and Co. Ltd., Vol, I, II, III, 2002.
2. Medical Laboratory Science- J. Ochei & A. Kolhatkar, Tata McGraw Hill Publication and Co. Ltd., 2000.

REFERENCES:

1. Practical Clinical Biochemistry - Harold Varley, 5th edition, William Heinemann Medical Books Ltd., London, 1980.

SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BIPR62	PRACTICAL VIII: MEDICAL LABORATORY TECHNOLOGY PRACTICAL- II	2	CC24	4

Objectives

✓ To understand the basic concepts related to microbial culture, staining and testing for antibiotic sensitivity.

✓ To understand the collection and analysis of urine under normal and pathological conditions.

I. MICROBIOLOGY

1. Sterilization & disinfection,
2. Media preparation,
3. Culture
4. Gram staining,
5. Antibiotic sensitivity testing

II. URINE ANALYSIS

1. Collection and preservation of urine samples

2. Qualitative analysis of urine for normal and pathological conditions.

III. URINE ANALYSER

Qualitative analysis of urine for normal and pathological conditions using urine analyser- demonstration.

TEXTBOOK:

1. Medical Laboratory Technology – Kanai L. Mukherjee, 10th reprint, Tata McGraw Hill Publication and Co. Ltd., Vol, I, II, III, 2002.
2. Medical Laboratory Science- J. Ochei & A. Kolhatkar, Tata McGraw Hill Publication and Co. Ltd., 2000.

REFERENCES:

1. Practical Clinical Biochemistry - Harold Varley, 5th edition, William Heinemann Medical Books Ltd., London, 1980.

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SEMESTER VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BISB61	BIOTECHNOLOGY – II	1	AEC6	2

Objectives:
- ✓ To study about plant and animal tissue culture and its application
- ✓ To understand transgenic plants and transgenic animals

UNIT – I TISSUE CULTURE EQUIPMENTS   6HRS

Equipment and requirements for plant & animal cell culture - laminar flow, CO_2 incubator, sterilization of glassware, shakers, fermentors, centrifuge, inverted microscope, culture room. Risks in tissue culture laboratory and safety regulations.

UNIT – II PLANT TISSUE CULTURE   6HRS

Plant tissue culture – totipotency, explants, callus, Dedifferentiation, Media, composition, nutrients, growth regulators, initiation. Explants culture, Callus culture, organogenesis, root, shoot culture and suspension culture, somatic embryogenesis, somoclonal variation protoplast culture.

UNIT – III MAMMALIAN CELL CULTURE   6HRS

Mammalian cell culture – cell line, cell viability, media – natural media, pH and buffer system, oxygen, synthetic media, substrate for cell culture, composition of nutrients. Suspension culture, Immobilized culture, somatic cell fusion.

UNIT – IV TRANSGENIC PLANTS   6HRS

Transgenic Plants-Gene transfer method using agro bacterium, Herbicide resistance, male infertility, virus resistance, insect, pest resistance, stress resistance, disease resistant plant.

UNIT – V TRANSGENIC ANIMALS   6HRS

Transgenic animals –Gene transfer -Transfection method, transgenic sheep, transgenic fish, transgenic cattle, Dolly.

TEXTBOOKS:
1. Biotechnology – U. Satyanarayana, Books and Allied Limited, 2013.

REFERENCES:
1. Recombinant DNA - James D. Watson, Michael Gilman, Jan A Witkowski, Mark Zolltler, 2nd Edition Freeman W H &Company, 2003.
2. Recombinant DNA – genes and genomes-a short course James D. Watson, Richard M Meyers, Amy A Caudy, Jan A Witkowski, 3rd Edition, Cold Spring Harbor Laboratory Press &Company 2007.

3.   Elements of Biotechnology - P.K.Gupta 2nd Edition Rastogi publication, New Delhi, 2016.
4.   Concept in Biotechnology - D. Balasubraniam et al., Universal press India 1996.
5.   A text book of Biotechnology – R. C. Dubey, S. Chand & co, 1993.

DEPARTMENT OF BIOCHEMISTRY

SYLLABUS
For
M.Sc Biochemistry

SEMESTERS – III & IV

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BI3001	MOLECULAR ENDOCRINOLOGY	5	PAPER 9	6

Objectives
- To understand the endocrine system and their secretions
- To understand the hormone, and the function of hormones in human system

UNIT – I: CLASSIFICATION AND MECHANISM   15 hrs

Endocrine glands, hormones as chemical messengers, stimulus for hormone release: change in homeostasis, sensory stimulus and others. Hormones-Structures, Receptor type, Regulation of biosynthesis and release (including feedback mechanism). Physiological and Biochemical actions, &Pathophysiology (hyper & hypo secretion).Concept of second messengers like adenylatecyclase system, G-protein, cAMP, cGMP, Ca^{+2}, diacylglycerol, protein kinase C pathway and inositol-tri-phosphate.Basic mechanism of action of Peptide and Steroid hormones.

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

Anterior Pituitary hormones- structure, physiological and biochemical actions of Growth hormone, Prolactin, Proopiomelanocortin peptide family, Luteinizing hormone, Follicle-stimulating hormone, Thyroid-Stimulating Hormone; Posterior Pituitary: Vasopressin, Oxytocin.
Hypothalamic Hormones - Corticotropin-releasing hormone, Thyroid releasing hormone, Gonadotropin-releasing hormone, Prolactin-releasing hormone, Growth hormone–releasing hormone.

UNIT – IV THYROID, PARATHYROID, PANCREATIC& GI HORMONES   15 hrs
Hormones of Thyroid - Structure, synthesis, biochemical and physiologic actions of thyroxine, T3, T4. Pathophysiology – Hypo and hyperthyroidism.

Hormones of Parathyroid - Structure, synthesis, biochemical and Physiologic actions of parathyroid hormone, pathophysiology – Hypo and hyper parathyroidism. Regulation of synthesis and secretion of thyroxine and PTH.

Hormones of Pancreas- Structure, synthesis, biochemical and physiologic actions of Insulin, Glucagon.

Hormones of GI tract: Gastrin , Secretin, Cholecystokinin, Gastric inhibitory polypeptide, Ghrelin.

UNIT – V: ADRENAL AND REPRODUCTIVE HORMONES   15 hrs

Hormones of the Adrenal gland – chemical nature & functions of Adrenal medullary & Cortex hormones. Epinephrine and NorEpinephrine.

Hormones of the testis and ovaries - cortisol, aldosterone, testosterone, estrogens, progesterone and calcitriol, ovarian cycle and role of hormones.Clinical disorders of hypo and hyper secretion of hormones.

Text Books

1. Harper's Biochemistry by R.K. Murray et al. McGraw –Hill Medical, 25th edition 1999.
2. Text book of Biochemistry (with clinical correlation) by Thomas M. Devlin, John Wiley & sons, 7th edition 2010.
3. Willaim'sText book of Endocrinology by Wilson and Foster, 13th edition W.B. Saunders Co publications 2016.
4. Fundamentals of Biochemistry, J.L. Jain, S. Chand publications revised edition, 2004.

References

1. Greenspan's Basic and Clinical Endocrinology, David G. Gardner, 9th edition Mcgraw Hill education publications, 2011.
2. Endocrine Physiology, Patricia Molinam 4th edition Mcgraw Hill education publications, 2013.
3. Endocrinology Mac E. Harley 5th edition, Prentice Hall publications 1999.
4. Harrison's Endocrinology J. Larry Jameson 4th edition Mcgraw Hill education publications, 2016.
5. An introduction to Behavioral endocrinology Randy J. Nelson 4th edition Sinauer associated 2011.
6. Biochemistry, Agarwal, GOBL publications, 1999.
7. Fundamentals of Biochemistry, Donald Voet, Judith G. Voet, Charlott W. Pratt, upgrade edition John Willey & Sons. Inc.
8. Biochemistry, LubertStryer, 4th edition, W.H. Freeman & Co, 1995.
9. Mammalian Biochemistry – White Handler Smith.
10. Basic & Clinical Endocrinology – Francis Sreenspan, Gordon J. Strewler Prentice – Hall International Inc. 5th ed., 1997.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BI3002	CLINICAL BIOCHEMISTRY	5	PAPER 10	6

Objectives
- To give all students, regardless of their background, a comprehensive understanding of the principles of clinical biochemistry.
- Understanding the principles and applications of clinical biochemistry in diagnosis.

UNIT – I SPECIMEN COLLECTION AND ANALYSIS   20hrs

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.

UNIT – II DISORDERS OF CARBOHYDRATES AND LIPID METABOLISM   20hrs

Disorders of carbohydrate metabolism – blood sugar levels, hyper and hypoglycemia, regulation of blood glucose, renal threshold, diabetes mellitus-etiologic classification and diagnostic criteria, glucose tolerance test, Hb A1c, 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. Disorders of lipid metabolism - Hyper cholesterolemia, Hypocholestremic agents, lipidosis and hypolipoproteinemas, Taysach's disease, Niemann pick disease, Xanthomatoses, Gaucher's disease, Fatty liver, Obesity, Atherosclerosis, Risk factors.

UNIT – III DISORDERS OF PROTEIN METABOLISM   20hrs

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.Haemoglobinopathies – Sickle cell anemia, thalassemia and erythrocyte enzyme disorders. Phenylketonuria, Tyrosinosis, Alkaptonuria, Maple syrup urine disease, Hartnup disease, Homocystinuria, Albinism, Disorders of Urea Cycle.Bense Jones protein.

UNIT – IV HEPATIC, RENAL AND GASTRIC FUNCTION TESTS
15 hrs

Liver - structure and functions of liver, diseases of liver, hepatitis, cirrhosis, alcoholic liver disease, hepatic tumor, liver function tests. Kidney – structure and function, Acute and chronic renal failure, urinary tract obstruction and analysis of urinary calculi, kidney function tests. 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.Leschnyhan syndrome, Immuno deficiency diseases associated with defects in Purine nucleotide metabolism, Gout, Oraticaciduria and Xanthinuria.

Text books

1. Text book of Medical Biochemistry, 7th edition M.N. Chatterjee and RaneShinde, Japee Brothers medical publisher Pvt Ltd, 2008.
2. Text book of Biochemistry with clinical correlation, Thomas M. Devlin, 3rd edition, A. JohnWiley-Liss Inc. Publication, 2002.
3. Practical Clinical Biochemistry, Harold Varley, 4thedition, CBS Publication and Distributors Pvt Ltd, New Delhi, 2005.
4. Principles of Internal Medicine, Harrison T.R. Fauci, Braunwald, Isselbacher14th edition, MC-GrawHill, New york. Volume I and II.
5. Tietz Fundamentals of Clinical Chemistry- 5th edition C.A. Burtis, E.R. Ashwood (eds) Saunders WB Co.

References

1. Clinical chemistry in diagnosis and treatment 6th edition – Philip D. Mayne, ELBS/Arnold, N. Delhi, 1994.
2. Clinical chemistry in diagnosis and treatment, Joan F.Zilva, PR Pannall, Liyods – Luke (medical books ltd., Lon)
3. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd., Vol.I,II,III.
4. Medical Laboratory Science, Theory and Practice J. Ochei and A. Kolhatkar, Tata McGraw - Hill.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIPR31	PRACTICAL – V ANALYSIS OF URINE	4	PAPER 11	6

Objectives: 75 Hrs

- Urinalysis involves checking the appearance, concentration and content of urine. Abnormal urinalysis results may point to a disease or illness.
- Urinalysis is used to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes.

1. Collection, Preservationand Transportation of Urine
2. Physical analysis of Urine
3. Microscopic analysis of urine
4. Estimation of true acidity of Urine
5. Estimation of protein in urine by Biuret method
6. Qualitative chemical analysis of urine for normal and abnormal constituents
7. Determination of specific gravity of Urine
8. Estimation of Urea
9. Estimation of Creatinine
10. Estimation of Uric Acid
11. Estimation of Phosphorus
12. Urea clearance test
13. Creatinine clearance
14. Analysis of urine using urine analyzer

Text Books

1. Text book of Medical Biochemistry – 4thEdition, MN. Chatterjee, Rana Shine, Jaypee Publications.
2. Text book of Clinical chemistry –Teitz.
3. Medical Laboratory technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and Co.Ltd.,Vol.I,II,III.

References

4. Practical Clinical Biochemistry- Harold Varley, CBS, NewDelhi.
5. Experimental procedures n Life Sciences by Dr.S.Rajan&Mrs.R.Selvi Christy. Anjaana Book House.
6. Medical Laboratory Science, Theory and Practice J. Ochei& A. Kolhatkar, Tata McGraw - Hill.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIPR32	PRACTICAL – VI CLINICAL ENZYMOLOGY	4	PAPER 12	6

Objectives: **75 Hrs**

Learning the techniques concerned with clinically important enzyme detection in blood.

1. Assay of Acid Phosphatase Activity
2. Assay of Alkaline Phosphatase Activity
3. Assay of Alkaline Aminotransferase Activity (SGOT)
4. Assay of Aspartate Aminotransferase Activity (SGPT)
5. Assay of Lactate dehydrogenase
6. Assay of creatinephospho kinase
7. Assay of Lipase
8. Assay of Amylase
9. Assay of Cholinestarase
10. Assay ofSuperoxide dismutase& Catalase

Text Books

1. Laboratory manual in Biochemistry – Jayaraman
2. Biochemical methods – S.Sadasivan and Manickam
3. Practical clinical Biochemistry – Harold Varley, CBS, New Delhi.
4. Medical Laboratory technology – kanai L. Mukherjee, Tata McGraw Hill Publication and Co. ltd., vol. I, II, III.

References

1. Clinical Laboratory-methods and diagnosis, Vol-I Grad Wohl.
2. Judith Ann Lewis, Illustrated guide to diagnostic tests-students version, Springhouse Corporation, Pennsylvenia, 1994.
3. Practical Clinical Biochemistry, Harold Varley, 4th edition, CBS Publication and Distributors Pvt Ltd, New Delhi, 2005.
4. Tietz Fundamentals of Clinical Chemistry- 5th edition C.A. Burtis, E.R. Ashwood (eds) Saunders WB Co.
5. Interpretation of Diagnostic Test – A Synopsis,Jacques Wallach, 5th Edition, Little brown and company 1992
6. Clinical Chemistry and diagnosis and treatment, Joan Zilva and Pannall P.R., PG Publishing Pvt Ltd
7. Experimental Biochemistry: A Student Companion, BeeduSasidharRao& Vijay Deshpande (ed), I.K International Pvt. LTD, New Delhi.
8. Introductory Practical Biochemistry, S. K. Sawhney&Randhir Singh (eds) Narosa Publishing House, New Delhi.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIE301	ECOLOGY, EVOLUTION AND BIODIVERSITY	4	ELECTIVE PAPER 3	6

Objectives:
- ✓ To study about the fundamental processes that cause or prevent adaptive evolution, speciation and extinction.
- ✓ To understand the concepts of species, populations, communities, ecosystems and biomes
- ✓ To study about the ecosystem and roles in an ecosystem
- ✓ To study about environmental issues, ecological basis, ecological evolutionary & biodiversity consequences.

UNIT – I ECOLOGY & ECOSYSTEM   15 Hrs

Ecology – Environment - atmosphere, hydrosphere, lithosphere, concept of ecosystem, biotic and abiotic components and function habitat, niche, energy flow, food chain, food web, ecological pyramids.Biogeochemical cycle Carbon,Nitrogen,Phosphorus, primary production and decomposition; structure and function of terrestrial -forest, grassland and aquatic - fresh water, marine, eustarine.Ecological succession:Types; mechanisms; changes involved in succession; concept of climax.

UNIT – II EVOLUTION   15 Hrs

Lamarck; Darwin–concepts of variation, adaptation, struggle, fitness and natural selection; Mendelism; Spontaneity of mutations; The evolutionary synthesis. The evolutionary time scale; Eras, periods and epoch; Major events in the evolutionary time scale.extinctions,coextinctions.

UNIT – IIIEVOLUTION OF PROKARYOTES AND EUKARYOTES
                                                  15 Hrs

Concept of Oparin and Haldane, Experiment of Miller.Evolution of prokaryotes – origin of prokaryotes, unicellular bacterial evolution, origin of Eukaryotes, endosymbiosis, Margulisendosymbiont theory of evolution, evolution of mitosis, evolution of sex, evolution of meiosis and fertilization.

UNIT – IVPOPULATION GENETICS   15 Hrs

Population genetics – Populations, Gene pool, Gene frequency; Hardy-Weinberg Law; concepts and rate of change in gene frequency through natural selection, migration and random genetic drift; Adaptive radiation; Isolating mechanisms; Speciation; Allopatricity and Sympatricity; Convergent evolution; Sexual selection; Co-evolution.

UNIT – V BIODIVERSITY   15 Hrs

Biodiversity – definition, levels and threats.Endemic and endangered species of India.Methods of taxonomy - Concepts of species and hierarchical taxa, biological nomenclature, classical & quantitative methods of taxonomy of plants, animals and microorganisms.Outline classification of plants, animals & microorganisms- Important criteria used for classification in each taxon. Classification of plants, animals and microorganisms.Evolutionary relationships among taxa.

Text Books
1. An introduction of Biodiversity Prithipalsingh, Ane's Student edition, 2007.
2. Grzimek'sEncylcopedia of Evolution Dr. H.C. Bernhard Grzimek, Van Nostrand Reinhold publication, 1976.
3. Essential environmental studies by S.P. Mishra S.N. PanueyAne books Pvt Ltd 2011.
4. Text Book of Ecology Eugene P.Oodum.
5. Ecology Environment and Pollution by A.Balasubramanian.
6. Evolution adaptation & ecology – Sanjibchattopadhyay
7. Cell biology, genetics, ecology, evolution – P.S. Verma& V.K. Agarwal – S. Chand Publication

References
1. Biodiversity of Microbial Life – Staley Reysenbach.
2. Glimpses of Biodiversity – B.Bhosetti
3. Evolution, adaption and Ethology, Sanjibchattopadhyay, Books and Allied Pvt Ltd.
4. Text book of Environmental Studies A. Joseph Thatheyus, Norasa publications, 2011.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIE302	PHARMOCOLOGY AND TOXICOLOGY	4	ELECTIVE 3	6

OBJECTIVE:

The course provides basic insight into principles of pharmacology and toxicology. It also highlights the pharmacodynamics and pharmacokinetics aspect of drugs in general. The emphasis will be on evaluation of toxicity and mechanism of toxicity of xenobiotics.

UNIT I: GENERAL PHARMACOLOGY AND TOXICOLOGY
15 hrs

Nature and source of drugs, routes of drug administration and their advantages, definitions and scope of toxicology.Introduction to ecotoxicology.

UNIT II: MECHANISM OF TOXICITY   15 hrs

Formation of ultimate toxicant of xenobiotics and its interaction with target molecules.

UNIT III: PHARMACODYNAMICS AND PHARMACOKINETICS
15 hrs

Mechanism of drug action, receptors and receptors subtypes, Dose response relationship and combined effect of drugs. Concept of LD50, LC50, TD50 and therapeutic index.

Membrane transport, absorption, distribution of xenobiotics.Brief introduction to biotransformation, Phase- I reactions including oxidations, hydrolysis, reductions and phase II conjugation reactions and excretion of drugs.

UNIT IV: INTRODUCTION AND CLASSIFICATION OF THE DRUGS   15 hrs

Central and autonomic nervous system, neurotoxic agents.Cardiovascular system and cardiotoxic agents.Kidney and nephrotoxic agents.

UNIT V: INTRODUCTION AND CLASSIFICATION   OF DRUGS
15 hrs

Anti-inflammatory and analgesic drugs and their related toxicity.Endocrine drugs, Antimicrobial chemotherapeutic drugs

Text books

1. Essentials of Medical Pharmacology, Tripathi KD, 7th Edition, Jaypee Brothers, 2010.
2. Pharmacology and Pharmacotherapeutics, Satoskar R.S., Bhandarkar S.D. and Rege N.N., 21st Edition, Popular PrakashanPvt Ltd, 2010.
3. Quintessence of Medical Pharmacology, Chaudhary S.K., 3rd Revised Edition, Central Book Agency Pvt. Ltd., 2010.
4. Principles of Pharmacology, Sharma H.L. and Sharma K.K., 2nd Edition, Paras Medical, 2011.

References

1. The Pharmacological Basis of Therapeutics, Brunton L.L., Chanbner B.A., and Knollmann B.C., Goodman and Gilman's 12th Edition, McGraw-Hill Professional, 2010.
2. Basic and Clinical Pharmacology, Katzung B.G., Masters S.B. and Trevor A.J., 12th Edition, McGraw-Hill, 2011.
3. Pharmacology, Rang H.P., M.M. Dale, J.M. Ritter., Flower R.J. and Henderson G., 7th illustrated Edition, Elsevier Science Health Science Division, 2011.
4. Modern Pharmacology with Clinical Applications Craig C.R. and Stitzel R.E., 6th Edition, Lippincott Williams and Wilkins, 2003.
5. Lipponcott's Illustrated Reviews: Pharmacology, Harvey R.A., Clark M.A., Finkel R, Jose A.R. and Whalen K, 5th Edition, Lippincott Williams and Wilkins, 2011.
6. Essentials of Pharmacotherapeutics, Barar F.S.K., 6th Revised Edition, S.Chand& Co. Ltd, 2011.
7. Pharmacotherapy: A Pathophysiologic Approach, DiPiro J, Talbert R.L., Yee G., Matzke G., Wells B. and Posey L.M., 8th Edition, McGraw-Hill Medical, 2011.

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BI4001	GENETICS AND MOLECULAR BIOLOGY	5	PAPER XIII	5

Objectives:

- ✓ The major objective of the paper is to envisage thorough knowledge in genetics, genome organizations in organisms and their developmental aspects.
- ✓ To understand the basis of molecular biology
- ✓ To understand the genetic mutation and repair processes

UNIT – I MENDELIAN GENETICS   20 hrs

Mendel's Experiments – principle of segregation - phenotype, genotype, alleles, homologues, heterologous, monohybrid experiment, law of dominance, codominance, incomplete dominance, back cross, test cross. Principle of independent assortment – dihybrid experiments, multiple alleles.

UNIT – II REPLICATION OF DNA   20 hrs

Structure of DNA, gene, chromosome, Watson and Crick's model for DNA replication - experimental evidence for semiconservative replication – Messelson and Stahl experiment. Enzymes and proteins of DNA replication - Primer, primase, Primosome, DNA Topoisomerase, DNA helicases, single strand DNA binding protein, DNA ligase, DNA polymerase, endonucleases, exonucleases, Reverse transcriptase, telomerase. Eukaryotic DNA replication – Initiation, elongation –leading strand synthesis, lagging strand synthesis, Okasaki fragments, termination.Inhibitors of replication, repetitive DNA, Satellite DNA.

UNIT – III TRANSCRIPTION   15 hrs

Transcription – structure of RNAs, eukaryotic transcription - Enzymes of transcription - RNA polymerase, promoter, enhancers, repressors, regulatory elements, initiation, elongation, termination, inhibitors of transcription. Post-transcriptional modification of mRNA in eukaryotes – RNA splicing.

UNIT – IV GENETIC CODE AND TRANSLATION   15 hrs

Genetic code –deciphering of the genetic code, codon, anticodon, Woobble hypothesis, salient features of genetic code. Translation – formation of aminoacyl-tRNA, initiation, elongation, termination, regulation, post-translational modification in eukaryotes. Inhibitors of protein synthesis.Protein translocation – signal peptide, Endoplasmic and

mitochondrial translocation of protein.Gene expression – Lac operon, tryptophan operon.

UNIT – V MUTAGENESIS, DNA DAMAGE AND REPAIR   20 hrs
Mutations – physical and chemical mutagens, types of mutations - point mutations and frameshift mutations, nonsense and missense mutation.
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. Principles and Techniques of Biochemistry and Molecular Biology, 7th edition Keith Wilson and John Walker, Cambridge University Press-New Delhi, 2010.
2. Molecular Biology by David Freifelder Published by Jones & Bartlett Publishers 2004.
3. Genes VIII. by Benjamin M Lewin. New York : Oxford University Press 2004.
4. Genes VII by Benjamin Lewin 7th Edition, Publisher: Oxford University Press, 2000.
5. Instant Notes in Molecular Biology 2nd edition P.C. Turner, A.G. McLennan, A.D. Bates, M. R. H. White, Published by Bios Scientific Publishers Ltd 2000.
6. Cell biology and Genetics - P.S. Verma and V.K.Agarwal, S. Chand publication
7. Concepts of Genetics, by William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino (Author) 11th Edition, 1997.
8. Genetics - ManjuyadavIst Edition, Discovery publishing House 2003.

References
1. Lehninger Principles of Biochemistry 6th Edition by David L. Nelson, Michael M. Cox, New York: W.H. Freeman 2008.
2. Molecular Biology by Robert F. Weaver Hardcover, Third Edition Published March 19th 2004 by McGraw-Hill Science/Engineering/Math.
3. Cell and molecular biology concepts and experiments (3rd ed.): Karp, G.John Wiley & Sons, Inc., New York, 2002.
4. Molecular Biology of the Gene, 5th Edition, James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick, Pearson publication 2002.
5. Molecular Cell Biology 5th Edition by Harvey Lodish, Arnold Berk, Freeman publications, 2003.
6. Lehinger's principle of Biochemistry, Nelson and Cox2000.

7. Harper's Biochemistry - Rober K. Murray, Daryl K.Grammer, McGrawHill, Lange Medical Books

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BI4002	IMMUNOLOGY AND IMMUNOTECHNOLOGY	5	PAPER XIV	5

OBJECTIVES:
✓ To Learn on how much immune system is important to the humans.
✓ To Learn the basic terminology and techniques in immunology.

UNIT-I-INTRODUCTION & ORGANIZATION OF IMMUNE SYSTEM   20 Hrs

Introduction to immunology: Symbols,organs of immune system-Lymphoid organs. Immunity types – Innate and acquired immunity, Cells of immunity – NK cells, LAK, Macrophages, Neutrophils and Eosinophils.Determinants of innate immunity. Acquired immunity – humoral and cell mediated immunity, development and mechanism.Haematopoiesis.

UNIT-II- ANTIGEN & ANTIBODIES   15 Hrs

Antigens: Definition, criteria for antigenicity, Epitope, Paratope, Haptens. Classification of antigen based on Chemical nature, mode of action, and antigenic determinant. Antibodies: Basic Structure, Classes, Subclasses of Immunoglobins, biological functions, Monoclonal antibodies - Production and applications. Tumour antigens, immune prophylaxis and immune therapy- Vaccines and their types.

UNIT-III- COMPLEMENT SYSTEM   15 Hrs

Complement: Definition, components, activation, pathways of activation – classical complement pathway and Alternative complement pathway. Biological activities of complement components.Disease due to complement abnormalities.HLA/MHC complex.

UNIT-IV- HYPERSENSITIVITY   20 Hrs

Hypersensitivity – definition, Classification based on coombs and gel, based on onset of action, and based on mechanism of action. Types of hypersensitivity – type I, II, II, IV, V and their mechanisms. Anaphylaxis - Clinical aspects of Anaphylaxis and serum sickness. Transplantation immunity and mechanism of graft rejection.

UNIT-V- IMMUNO TECHNOLOGY   20 Hrs

Techniques based on antigen- antibody reactions and their applications - Agglutination test and its type, Precipitation, Complement fixation test, immuno assays using labelled reagents- immunofluorescence, ELISA, RIA, RAST and RIST, western blotting.Commonly used immunological tests – ASO, WIDAL, VDRL, RPR, TPH, Viral diseases, hepatitis B & C, HIV.

Text books

1. Immunology - A Short Textbook. MdAkramHussain. Second Edition, Jaypee publications 2003.
2. Immunobiology- Janeway'sMurphy, K.,Travers, P. and Walport, M. Garland Science, Taylor and Francis Group, LLC. 2008.
3. Immunology - KubyKindt, T.J.,Goldsby, R.A. and Osborne, B.A. W.H.Freeman and Co, New York, 2007.
4. Fundamental of Immunology - Lippincotpraven publications, 4th edition.
5. Immunology - Geoffrey zubay, W.M.C, Brown publishers, 4th edition 1992.

References

5. Essential Immunology –Peter J Delves , Seamus J. martin, Dennis R Burton, Ivan

   M. Roitt, Blackwell Publishing, Massachustts, USA 1998.
6. Basic and Clinical Immunology. Stites D.P. Stobo, J.D. Fundanberg. H.A and Wells. J.V. 6th edition Los Atlas Lange 1990.
7. Immunology-Charles. A.Janeway. J.R. Paul Travels4th edition: Black well Scientific Publishers, 1994.
8. Immunology, KubyRichard. A. Goldsby, Thomas. J.Kint, Barbara. A. Osborne, 4th Edition, W.H. Freeman and Company, New York 2000

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIPR41	PRACTICAL – VII MOLECULAR BIOLOGY	4	XV	6

Objectives: **90 Hrs**

Learning the methods of molecular biology techniques

1. Fractionation of subcellular organelles by differential centrifugation
2. Sodium Dodecyl sulphate poly acrylamide gel electrophoresis (SDS – PAGE) CBB & Silver staining method
3. Native -PAGE electrophoresis – Activity Staining of Superoxide Dismutase & Catalase
4. Extraction of genomic DNA.
5. Agarose gel electrophoresis of DNA
6. DNA Ligation
7. Restriction enzyme digestion of DNA

8. Separation of Isoenzymes – LDH, ALP by electrophoresis
9. Plasmid DNA isolation
10. Semidry Blotting (Demonstration)
11. ELISA (Demonstration)
12. Polymerase chain reaction (Demonstration)

Text Books

1. Experimental procedures in Life Sciences by Dr.S.Rajan&Mrs.R.Selvi Christy. Anjaana Book House 2005.
2. Medical Laboratory Science: Theory and Practice ArundhatiKolhatkar, J. OcheiPublished by Tata McGraw-Hill Education Pvt. Ltd., 2000.
3. Practical Clinical Biochemistry, by Harold VarleyPublished by CBS Publishers & Distributors Pvt. Ltd., New Delhi 2005.

References

1. Molecular Cloning: A Laboratory Manual (Fourth Edition) Green and SambrookCold Spring Harbor Laboratory Press, 2001
2. Medical Laboratory Technology, Vol. I,II,III: Procedure Manual for Routine Diagnostic Tests, Kanai L. Mukherjee &SwarajitGhosh (Eds)Published by Tata McGraw-Hill Education Pvt. Ltd., 2010.
3. Textbook of Medical Biochemistry. 4th Editionby ShindeRana, Chatterjea MN, Jaypee Brothers Medical Publishers (P) Ltd, 2000.
4. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 5th Edition By Carl A. Burtis, PhD, Edward R. Ashwood, MD and David E. Bruns, MD 2012.
5. Practical Methods in Molecular Biology Robert F. Schleif, Pieter C. Wensink, 2011.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIPJ41	PROJECT WITH VIVA	4	XV	6

COURSE WORK

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.
3. The project will comprise of the following:
    a. Study of background material
    b. Collection of data, procurement and fabrication of experimental set up and
    c. Writing of computer programs if needed.

d. 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.

<u>Viva</u>

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 - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIE401	BIOTECHNOLOGY	4	ELECTIVE PAPER IV	5

Objectives
- ✓ To apply the genetic concepts into manipulating living things.
- ✓ To exploit living things for human benefit.
- ✓ To develop understanding of industrial processes for production of antibiotics, enzymes etc

UNIT – ITOOLS OFGENETIC ENGINEERING -   **20 hrs**
Recombinant DNA technology - Isolation of DNA from Genomic DNA and cDNA.Genomic DNA library, cDNA library. Restriction digestion - Exonucleases, Endonucleases. SI nuclease, DNA ligase, Alkaline phosphatase, Reverse transcriptase, DNA polymerase, T4 polynucleotide kinase, terminal transferase, use of Linkers and adaptors.

UNIT – II TOOLS OFGENETIC ENGINEERING - II   **20 hrs**
Cloning vectors - Plasmid PBR^{322}, PUC^{19}, Phage - Phage λ, M13, Cosmid, Yeast artificial chromosome vector.
Gene transfer methods – transformation, transfection, transduction, electroporation, microinjection, Biolistics, Episome fusion.
Screening methods – Direct selection, insertional selection, Blue white selection, colony hybridization method.

UNIT – III TECHNIQUES OF GENETIC ENGINEERING   **20 hrs**
DNA sequencing – Maxam-Gilbert's and Sanger dideoxy method. SDS PAGE, Agarose electrophoresis, Southern, Northern and Western blotting techniques, Autoradiography, RNA sequencing –site directed mutagenesis. Polymerase chain reaction.DNA chips and micro arrays.

UNIT – IV PLANT AND ANIMAL BIOTECHNOLOGY   **15 hrs**
Agrobacterium mediated gene transfer, Ti-DNA plasmid vector, Production of transgenic plants and its applications - virus resistance, pest resistance, stress resistance, disease resistant plant, delayed fruit ripening. Gene

transfer or transfection, Production of transgenic animals and its applications - transgenic sheep, fish, cattle, Goat.

UNIT – V GENETIC ENGINEERING FOR HUMAN WELFARE
15 hrs

Genetic engineering for human welfare – production of insulin, somatotropin, somatostatin, β-endorphin, human interferon, DNA vaccine, Hepatitis-B Vaccine, Tissue plasminogen activator (TPA).Gene therapy- types and its applications. Reproductive cloning – Dolly.

Text Books
1. Biotechnology – U. Satyanarayanan, 2013.
2. A text book of Biotechnology – R.C. Dubey – S. Chand publications
3. Concept in Biotechnology - D. Balasubraniam, Universal press India 1996.
4. Molecular biotechnology – principle and application of recombinant DNA 3rd edition by Bernard J. Glick, Jack J. Pasternak, Cheryl L. Patten, 2003.
5. Molecular Biotechnology: Principles and Practices. Channarayappa, Universities Press, 2006.
6. Concept in biotechnology - D. Balasubraniam et al., Universal press India 1996.

References
1. Molecular Biotechnology Primrose, S.B (2nd Edi). Blackwell Scientific Publishers, 1994.
2. Molecular Biology and Biotechnology - H.D. Kumar Vivas publishing house Pvt .Ltd 1997.
3. Animal Biotechnology A.K. Srivastava, R.K. Singh and M.P. Yadav Oxford and IBH 2005.
4. Introduction To Plant Tissue Culture 2nd edition By Razdan M K-English-Oxford &Ibh Publishing Co. Pvt Ltd-Paperback, 2006.
5. Animal cell culture - a practical approach. edited by R. I. Freshney, IRL Press at Oxford University Press, 1992.
6. Textbook Of Biotechnology DrPrakash S Lohar MJP Publishers, Chennai
7. Plant Tissue Culture: Theory and Practice, Volume 5 1st EditionS.S. Bhojwani M.K. Razdan, Elsevier Science, 1996.
8. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, 6th Edition Wiley Blackwell publications.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BIE402	BIOSTATISTICS AND BIOINFORMATICS	4	ELECTIVE PAPER IV	5

Objectives
- To understanding of theoretical and conceptual framework for quantitative reasoning, such as aspects of mathematics, statistics and logicSolve problems quantitatively using appropriate arithmetical, algebraic, or statistical methods.
- To create and interpret visual representations of quantitative information, such as graphs or charts
- To understand and critically assess data collection and its representation
- Understand statistics - basic theory, and application of Bioinformatics

UNIT – I INTRODUCTION TO BIOSTATISTICS   20 hrs
Biostatistics –definition, scope, applications and limitations. Data-Collection, classification, tabulation of statistical data. Organization of data - Individual series, discrete series, continuous series / class interval.Diagrammatic and graphical representation of statistical data (bar diagram, line diagram, pictogram, histogram & horizontal and vertical bar diagram).

UNIT - II MEASURE OF CENTRAL TENDENCY   15 hrs
Introduction, Characteristics of a good average, Mean, Median, Mode (Raw, Discrete & Continuous data), calculations, merits and demerits.

UNIT - III MEASURE OF DISPERSION   20 hrs
Introduction, definition, classification & properties.Variability, Range - Introduction, definition, location of range in individual, discrete, continuous series, merits and demerits of Range.Standard deviation, standard error, Variance, Coefficient of variation, merits and demerits.

UNIT - IV PROBABILITY & CORRELATION ANALYSIS   20 hrs
Probability - Introduction, Definition, Kinds of Probabilities.
Correlation Analysis - Introduction, Definition, uses, correlation and causation, kinds of correlation. Types of correlation - Positive and negative, linear and nonlinear, simple and multiple, partial and total correlation.

UNIT – V BIOINFORMATICS   15 Hrs

Introduction to Bioinformatics – database concepts, data base management system, database security, biological databases – types.Protein and Nucleic acid sequence alignments, Sequence databases, the use of algorithm BLAST, Multiple sequence alignments. Genome and organism specific database.

Text Books:
1. Biostatistical analysis - Jerrold H. Zar5[th] edition Prentice Hall of India 2010.
2. Statistical Methods,S.P.Gupta28[TH] edition Sultan Chand & Sons 2009.
3. Introduction to Bioinformatics by T.K Atwood and D.J Parry- Smith Publisher: Pearson Education Pvt Ltd 2002.
4. An Introduction to Biostatistics, 3nd Edition by Thomas Glover, Kevin Mitchell.
5. An Introduction for Biostatistics [2nd edition] Prestographit, vellore, IndiaSundarRao P.S.S, Jesudian.G&Richard.J 1987.
6. Biostatistics - P. Rama Krishna, Saras Publication 1995.

References
1. Introduction To Biostatistics And Research Methods By P. S. S. SundarRao, J. Richard 5th edition PHI learning Pvt Ltd 2012.
2. Bioinformatics A Practical Guide to the analysis of Genes and Proteins, Andreas D Baxevanis and BF Francis Oueliene A John wiley& sons, INC, Pub 2001.
3. Bioinformatics – Sequence and Genome Analysis David W Mount, CBS Publishers, Ian Korf, Mark Yandell& Joseph Bedell, 2003.
4. Biostatistics: A Foundation for Analysis in the Health Sciences, 10th EditionWayne W. Daniel, Chad L. CrossWiley Global Education, 2012.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BINM41	NONMAJOR- HUMAN PHYSIOLOGY	2	NON MAJOR PAPER	4

Objectives:
- ✓ To understand the anatomical structures and the physiological functions of body systems.
- ✓ To understanding of neurophysiology, respiratory, cardiovascular and digestive and excretory physiology of human system.

UNIT – I BLOOD, AND CIRCULATION & MUSCLE PHYSIOLOGY
12 Hrs

Blood corpuscles, haemopoiesis and formed elements, plasma function, blood volume, blood volume regulation, blood groups and Rh typing, haemoglobin, immunity, haemostasis.Mechanism of Blood clotting.Muscle – types and their mechanism of action.

UNIT – IICARDIOVASCULAR SYSTEM &SENSE ORGANS
12 Hrs

Comparative anatomy of heart structure, myogenic heart, specialized tissue, ECG – its principle and significance, cardiac cycle, heart as a pump, blood pressure, neural and chemical regulation of all above, Pace maker.

Physiology of vision: Structure of eye, image formation and defects of the eye, Receptor mechanism of the eye, photopigments, Visual cycle and colour adaptation.

Sense organs –structure of hearing, defect of hearing and tactile response.

UNIT – IIIRESPIRATORY SYSTEM&THERMOREGULATION
12 Hrs

Comparison of respiration in different species, anatomical considerations, transport of gases, exchange of gases, waste elimination, neural and chemical regulation of respiration.

Thermoregulation - Comfort zone, body temperature – physical, chemical, neural regulation, acclimatization

UNIT – IVNERVOUS SYSTEM&REPRODUCTIVE SYSTEM
12 Hrs

Neurons, action potential, gross neuroanatomy of the brain and spinal cord, central and peripheral nervous system, neural control of muscle tone and posture. Nerve impulse, conduction of nerve impulse –myelinated, nonmyelinatedfibres, synapse, synaptic transmission, neuro macular junction, reflex action.

Reproductive organ - Hormonal regulation of testicular and ovarian function.Spermatogenesis and Oogenesis.Puberty, pregnancy and lactation.Contraceptive methods.

UNIT – VDIGESTIVE & EXCRETORY SYSTEM

12 Hrs

Digestion, absorption, energy balance, BMR.Comparative physiology of excretion, kidney, urine formation, urine concentration, waste elimination, micturition, regulation of water balance, blood volume, blood pressure, electrolyte balance, acid-base balance.

Text Books
1. Human Physiology 11th Edition (Volume 1) by C.C.Chatterjee2016.
2. Human Physiology: An Integrated Approach 5th Edition by Dee UnglaubSilverthorn 2010.
3. Text Book of Medical physiology – Guyton& Hall, 2015.
4. Human Physiology – Dr. N. Arumugam, Saras publications.
5. Human Physiology and Mechanisms of Disease by Guyton, 6th edition, Saunders Publications 1996.
6. Review of medical physiology, William. F. Ganong, 14th edition, A Lange Medical book.
7. Human physiology, 2nd edition- BJ Mejer, HS Meij, AC Meyer, AITBs publishers abd distributers.

References
1. Human Body in health and Diseases, Barbara Janson Cohen, Jasan J Taylor, Memmler's 10th edition, Lippincott Willaims&Wilkuns publications.
2. Review of Medical Physiology by William. F. Ganong. McGraw-Hill Medical; 22 edition 2005.
3. Human Physiology & Mechanism of Disease by Guyton MD, Arthur C, 6th edition.
4. Vander's Human Physiology 11th edition, Widmaler, E.P, Raff.H, Strang,K.T McGraw Hill International Publications 2008.
5. Human Physiology 7th edition Fox, S.I. McGraw Hill Publications2002.

A Hand Book of Basic Human physiology- K. Saradhasubramanyam, S. Chand & Co., Ltd.
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DEPARTMENT OF BIOTECHNOLOGY

SYLLABUS
For
B.Sc Biotechnology

SEMESTERS – V & VI

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT5001	INDUSTRIAL BIOTECHNOLOGY	5	CC13	5

Objectives: To understand the process and application of biotechnology for the production of bio products of commercial importance at industrial scale

UNIT 1: Introduction to Fermentation Biotechnology: Introduction: objective and scope of industrial biotechnology. A historical overview of industrial fermentation in fermentation technique – types of Bioreactor, fed-batch & batch fermentation. Microbial culture: microbial growth in batch and continuous culture.
UNIT 2: Strain Development: Isolation, preservation and improvement of industrial important microbes. Media requirement for fermentation: carbon & nitrogen sources, minerals, vitamins & antibiotics. Basic Nutrient Requirements of Industrial Media.
UNIT 3 : Microbial production of primary and secondary metabolites: role of microbes in production of primary and secondary metabolites, production of commercially important organic solvents- ethanol, acetone, vitamins A, B, & B12, carotene. Organic acids, acetic acid, citric acid & lactic acid. Antibiotics: penicillin, bacitracin, erythromycin, streptomycin. Downstream process.
UNIT 4: Fermented foods and Agricultural products: production of milk products, natural preservatives, Bio-pesticides, SCP, mushroom cultivation, golden rice & microorganism as bio-fertilizers (cyanobacteria, azotobacter, rhizobium, azospirillum).
UNIT 5: Bio remediation: various aerobic and anaerobic process for waste water treatment and solid waste management. Microbes in mining, oil recovery & production of Bio fuels & Biofertilizers.
Reference books:

1. Microbiology Prescott Harley fifth edition McGraw Hill Higher Education- (2002).
2. Biotechnology – A hand book of industrial; Microbiology W Cruger and A Cruger (20040.
3. Industrial microbiology by L.E.Casida Willey Eastern Limited (1989).
4. Environmental biotechnology and cleaner bioprocess edited by Eugenia olguyine (2001).
5. Principles of Fermentation technology stanbury Whitaker second edition aditya books private lilited (1995).
6. Food microbiology A.R.Adams, M.O.Moss, University of Surrey UK (2004)

Text Books:
1. Biotechnology by satyanarayana I Edition (2005).
2. Industrial microbiology A.H Patel II Edition (2007).
3. Modern industrial microbiology and biotechnology by Nduka Okafor.
4. Microbiology by Saras publication (2013).

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT5002	ANIMAL BIOTECHNOLOGY	5	CC14	5

Objective: To familiarize the cell culture techniques, Gene transfer method, Genetic modification and application.

UNIT – I Introduction – Structure and organization of animal cell. Culture media, Balance salt solutions and simple growth medium. Physical, chemical and metabolic function of different constituents of culture medium. Role of carbon di-oxide, serum, growth factor, glutamine in cell culture. Serum free defined media and their application.

UNIT – II Cell culture technique – Animal Cell culture, materials and methods. Animal cell lines, biology of cultured cells, types of culture – organ culture. Stem cells – basics of stem cell. ASC, ESC – applications. Bone Marrow Transplantation. Animal cell bioreactors.

UNIT – III Gene transfer methods in animals – microinjection, embryonic stem cell, retro virus. Conservation biology – embryo transfer technique, animal propagation – artificial insemination, animal clones. Hybridoma technology – monoclonal antibodies.

UNIT – IV Genetic modification in medicine – Gene therapy, types, vectors. Molecular engineering, human genetic engineering, problems and ethics.

UNIT – V Applications – development of recombinant vaccines, production of secondary metaboloites/products – insulin, growth harmones, interferons. Transgenic animals – production and application, transgenic animals in livestock improvement, transgenic animals as model for human disease.

SUGGESTED BOOKS
1. Ian freshney, Culture of animal cells. A manual of basic techniques, Wiley-Liss 3rd Edition, 2005.
2. Masters, JRW (ed), Animal cell culture. Practical approach, Oxford University press.
3. Gupta PK, Biotechnology and genomics, Rastogi publications, meerut, 2004.

4. M. Butler, Mammalian cell biotechnology. A practical approach, Oxford University press.
5. Satyanarayana U, A text book of biotechnology.
6. Animal Biotechnology - Ranga

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT5003	r- DNA TECHNOLOGY	5	CC15	5

Objective: To understand the concept of genetic engineering and impart knowledge about its applications.

Unit I: Introduction to rDNA technology - Components of r-DNA: DNA polymerase, polynucleotide kinase, alkaline phosphatases, DNA ligase, nick translation systems, deoxynecletidyltranserase, reverse transcriptase, restriction endonucleases

Unit II: Cloning vectors: Plasmid vectors – pBR322, PUC, Ti plasmid – Phage vectors: lambda, M13 – Cosmid, phagemid: Yeast vector: expression vector, shuttle vector. Plant and animal vector – CaMV, SV40. Artificial chromosomes – BAC and YAC

Unit III: Gene probes: Types and methods of gene probe generation. Methods of labelling gene probes. Strategies for identifying desirable recombinant clones. Gene mapping techniques.

Unit IV: cDNA arrays and micro array technology. Molecular markers – RFLP, RAPD, VNTR, SSRs, AFLP, Cox gene. DNA finger printing – production of recombinant proteins – insulin and HGH.

Unit V: Genes for vaccines – Vaccine for hepatitis – B virus, vaccine for rabies virus; vaccine for polio virus; malaria vaccine& vaccine for Ebola virus. Genes associated with single gene disorders – phenylketonuria; urokinase, thalassaemia&hemophilia.

Reference Books:
1. Genes to clones – Ernst L Winnacker, Panima Publishing House, New Delhi. (2003)
2. Gene cloning – T A brown, Blackwell Science (2001).
3. Molecular Biotechnology – Bernard R Glick and Jack J Pasternak, Panima Publishing House, New Delhi (2002).
4. Principles of Gene Manipulation - Primrose

Text Books:
1. A text book of Biotechnology, RC Dubey, S. Chand and Company Ltd (2006).
2. Biotechnology by satyanarayana (2010)

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT5004	ENDOCRINE TECHNOLOGY	5	CC16	5

Objective: To understand about the role of hormones in functioning of human body and biochemical impact.

UNIT – I
Endocrine glands and their significance - concepts of secretion - Hormones – classification - Definition and importance – peptide and steroid hormones – Mechanisms of hormone action, positive and negative feedback. Hormones as messenger – characteristics of hormones.

UNIT - II
Hypophysis or Pituitary gland – Adenohypophysis or Anterior Pituitary gland hormones – Growth hormone, Thyroid Stimulatory hormone, Adrenocortico Trophic hormone, prolactin, Follicle stimulating hormone and Lutinizing hormone. Hypopituitarism - gigantism, acromegaly Dwarfism. Neurohypophysis or posterior pituitary gland – Antidiuretic hormone and oxytocin. Hypothalamic regulation of pituitary hormones

UNIT – III
Thyroid, parathyroid and adrenal glands – Thyroid hormones – secretion, synthesis and functions. Hypothyroidism and Hyper thyroidism. Thyroid nodules and cancer. Parathyroid hormone and calcitonin and their role in bone metabolism. Adrenal cortex – Gluco corticoids and biological effects. Adrenal medullary hormones – Adrenaline and nor adrenaline – Emergency hormones – Disorders of adrenal gland. Addison's disease, Cushing syndrome of Hirsuitism.

UNIT – IV
Pancreases and Reproductive glands – Regulation and secretion of insulin – Glucose tolerance test – Diabetes mellitus – Type I & II. Biological actions and glucagon and Hypoglycemia. Testis, Hormonal control of spermatogenesis, male infertility, gynecomastia. Ovary – ovarian cycle and ovarian dysfunction. Hormonal control of oogenesis. Infertility and IVF. Endocrinology of Pregnancy.

UNIT – V

Hormones as pharmaceuticals – Hormones in contraception – Estrogen and Cancer – Sex hormones and immune system – Endocrine therapy for cancer – Endocrine auto immune disease – Genetic engineering for the commercial production of Insulin.

Reference Books:
1. Basic & Clinical endocrinology – F.S. Greenspan & D. G. Gardner- (2007)
2. Text Book of Endocrinology – R. H. Williams – (2009)
3. Endocrinology: Hormones and Human Health – Prakash Loher - (2014)
4. Harper's Biochemistry – Murray , Granner, Mayes, Rodwell - (2001)
5. Text Book of Biotechnology – R. C. Dubey – (2012)
6. Biotechnology – U. Satyanarayana – (2013)

Textbooks:
1. Principles of gene manipulation – Old R. W. and Primrose S. B – (1985)
2. From gene to clones – Winnackeo E. L – (2003)
3. Molecular Biotechnology Principles and Applications of r-DNA – Glick B. R and Pasterwak J.J – (2002)
4. Immunology – Roitt – (2006)
5. Medical Physiology – Guyton and Hall – (2008)
6. Molecular Biology of Genes – Watson J. D. et al – (1988).

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BTPR51	INDUSTRIAL AND ANIMAL BIOTECHNOLOGY- PRACTICAL V	2	CC17	4

INDUSTRIAL BIOTECHNOLOGY
1. Isolation of any one industrially important enzyme and antibiotics.
2. Production and estimation of biomass (SCP)- dry weight and wet weight method.
3. Production of acetic acid or amylase or any solvent.
4. Immobilization of yeast cells.
5. Immobilized yeast for alcohol production and estimation.
6. Mushroom cultivation.
7. Production of yeast/Production of milk products.

ANIMAL BIOTECHNOLOGY

1. Preparation of animal cell culture media and sterilization

2. Cell counting and viability
3. *In vitro* fertilization (IVF)
4. Procedure for the Maintenance of cell lines.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BTPR52	r-DNA & ENDOCRINE TECHNOLOGY- PRACTICAL VI	2	CC18	4

r- DNA Technology

1. Isolation of Plasmid Vector
2. Restriction Digestion
3. SDS PAGE
4. Agarose Gel Electrophoresis
5. Southern Blotting
6. Bacterial Transformation
7. Genetic Recombination in Bacteria
8. Isolation of Genomic DNA
9. PCR

Endocrine Technology

10. Radio Immune assay for Hormones – Demonstration
11. Estimation of Thyroid Hormones by ELISA
12. T.S. of Pituitary, Thyroid, Pancreas, Adrenal, Testis and Ovary
13. Recombinant production of Insulin – Demonstration.
14. Squash Preparation of Frog testis and ovary.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BTSB51	BIOINFORMATICS	1	AEC5	2

Objectives: To make the learner to understand the basics of Bioinformatics and to give an insight into the applications of Biological and Biotechnological fields.

UNIT-I Introduction to Computers: – History of Computer (First, Second, Third, Fourth and Fifth Generation) – Programming Languages, Machine Language, Assembly Language.

UNIT-II Input Devices- Keyboard, Mouse, Trackball; Output Devices – Monitor, Dot Matrix , Inkjet, Laser Printer; Memory Devices -Hard Disk, CD, DVD.

UNIT-III Basics of hardware and software, operating systems. Fundamentals of networking- LAN and WAN. Network topology, Modem, telnet, ftp.

UNIT-IV Introduction to Internet, World Wide Web, Browsers, Search Engines – Google, Yahoo. Biological Research on the web:- Using search engines, finding scientific articles, databases searching biological databases.

UNIT-V Bioinformatics-Definition, History, Scope and Applications. Opportunities in Bioinformatics. Use of nucleic acid and protein data banks - NCBI, EMBL, DDBJ, SWISSPORT, Multiple sequence alignment.

Reference Book:
1. Fundamentals of computers science and Communication Engineering. Alexis Leon & Mathews Leon, Vikas Publishing House Pvt. Ltd., New Delhi
2. Basic Bioinformatics – S.Ignacimuthu (2005). Narosa Publishing House
3. Bioinformatics for Beginners – K.Mani and Vijayaraj (2002). Kalaikathir Achagam
4. Fundamentals of Bioinformatics – Irfan Ali Khan, Atiya Khanum (2003). Ukaaz publications.
5. Bioinformatics Basics. Applications in Biological Science and Medicine by Hooman H. Rashidi and Lukas K.Buehler CAC Press 2000.
6. Attwood T.K. and Parry Smith D.J. 2002. Introduction to Bioinformatics, Pearson Education Asia.

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT6001	ENVIRONMENTAL BIOTECHNOLOGY	5	CC19	5

Objectives: To impact the knowledge of environment by use of biotechnological techniques.

UNIT 1 :Introduction to Environmental issues and Management : Scope and awareness of global environmental problems – Global warming : causes of global warming , green house effect – accumulation of toxic gases in environment. Effects of global warming – ozone depletion. Environmental policy and Environmental impact assessment, natural disaster management
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UNIT 2 : An overview of atmosphere – Hydrosphere ,Lithosphere and Anthrosphere. Environmental problem. Environmental pollution – Air , Water ,Noise, soil pollution – causes , effects and preventive measures . Environmental impact assessment.

UNIT 3 : Waste Water Treatments: Aerobic process: Activated sludge oxidation ponds, trickling filters rotating discs, oxidation ditch. Anaerobic process: Anaerobic digestion , Anaerobic filters, sludge blanket reactors , Treatment of industrial waste of dairy, distillery ,tannery and sugar

UNIT 4 : Xenobiotic compounds –Organic (chlorinated hydrocarbons substituted simple aromatic compounds , poly aromatic hydrocarbons , pesticides surfactants , and Inorganic (Metals , radio nuclides , phosphates , nitrates) Bioremediation of Xenobiotic in Environment – Ecological consideration , Decay behavior and degradative plasmids , molecular techniques in Bioremediation.

UNIT 5 : *Renewable and Nonrenewable resources. Role of immobilized cells / enzymes in treatment of toxic* compounds . Bioleaching, Bio techniques for air pollution abatement and odour control waste water & soil biotrearment.

Reference books:
1.chemistry and the Environment, Johnson D.O.Netterville J.T.Wood J.C. and James M.W.B Sundars company Philadelphia, (1973).
2.waste water Engineering- treatment, disposal and reuse Metcalf and Eddy Inc Tata McGraw Hill New Delhi (1979).
3.environmental chemistry, AK De, Wiley Ltd New Delhi. (2010).
4.introduction to bideterioration, D.Allospp and K.J. Seal, ELBS,/Edward Arnold.(2004).
5.bioremediation, Baakedr, K H and D S, McGraw Hill Inc New York.(19940.
6.environmental molecular biology paul A. Rochelle, Horizon press, (2001)
7. environmental bio technology by maria gavrilescu.
Text Books:
1. Biotechnology by satyanarayana(2010).
2. Industrial and environmental bio technology – Nuzhat Ahmed, Fouad M Qureshi and Obaid Y. Khan, Horizon press (2006).

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT6002	NANO IOTECHNOLOGY	5	CC20	5

Objective: To bring out the knowledge of nanomaterial and its tremendous application in various fields of biology.

UNIT – I Introduction – Nanoscale, Types of nanomaterial, Physical and chemical properties. Biosynthesis of nanomaterials - Bacteria, Fungi, Algae, Plants, Gold, Silver, Cadmium, Copper.

UNIT – II DNA based artificial nanostructure, fabrication, properties and application. Nucleic acid engineered nanomaterial and their application. Protein patterning for application in biomaterials. DNA lipoplexes – Lipofection efficiency in In-vitro and In-vivo, Polymer controlled deliver of therapeutic nucleic acid.

UNIT – III X-ray diffraction (XRD), UV-Visible Spectroscopy, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Scanning Tunneling Microscope (STM), Atomic Force Microscope (AFM).

UNIT – IV Chemical fixation technique - Cryofixation technique, Dehydration, Embedding biological samples section, Sectioning, Staining, Mechanical milling, Chemical etching, Ion etching, Conductive coating.

UNIT – V Medicine – Diagnosis, Therapeutic agents - Gene therapy, Antimicrobial activity and wound healing, Tissue engineering, Cosmetics. Communication in Bacteria - Satellite Communication. Environment – Nano material for Pollution abatement, Environmental sensors.

SUGGESTED BOOKS
1. Challa S.S.R. Kumar (Ed). 2006. Biological and pharmaceutical nanomaterial's. Wiley – VCH Verlag Gmbh & Co., KgaA.
2. KK. Jain 2006 Nanobiotechnology in Molecular Diagnostics: Current Techniques and Application Horizon Biosciences.
3. Niemeyer, C.M. Mirking C.A., (Eds) 2004. Nano biotechnology concepts.
4. Application and Perspectives, Wiley – VCH, Weinheim – 2004.

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT6003	MEDICAL BIOTECHNOLOGY	5	CC21	5

Objective: To impart the knowledge of biotechnological advancement in treating infectious and genetic diseases and to impart the principals involved in preparation of antibodies and vaccines.

UNIT- I: Introduction to Human physiology, Organ structure and function as involved in Respiratory, Circulatory- Digestive –Excretory-Nervous and Reproductive Systems. Blood and Composition, Anaemia, leukaemia Necrosis and Apoptosis, stem cell and Bone marrow transplant.

UNIT – II: Disease and Diagnostics - Infectious diseases caused by bacteria, fungi and virus. Genetic diseases – Cystic fibrosis, Alzheimer's diseases &Dunchenne muscular dystrophy (DMD). Use of nucleic acid probe and antibodies in clinical diagnostics.

UNIT – III: Gene therapy – background, types of gene therapy (*ex vivo &in vivo*). Vectors in gene therapy - retroviruses, adenoviruses & adeno-associated viruses. Types of gene delivery - Weismann barrier (soma-to-germ line barrier), epigenetic inheritance and its limitations.

UNIT – IV: Hybridoma technology–Producing monoclonal antibodies. Advantage and limitations of monoclonal antibody production. Animal cell culture – primary, secondary and continuous cell lines. Genetic engineering of animal cells and their applications. Embryonic stem cell culture and bone marrow transplantation – its Application.

UNIT – V: Medical Engineering – Antibody engineering, cell adhesion based therapy (integrins, inflammation, cancer & metastasis), tissues engineering, artificial blood, blood component based therapy. Application of PCR in medical diagnosis and finger printing.

Reference Books:
1. Medical microbiology Mims Play fair Roitt, wekelin Williams.- (2009)
2. Immunology by Roitt- (2006)
3. Immunology by Kuby-(2003)
4. Human Genetics- Gangane –(2000)
5. Medical Physiology Guyton and Hall-(1996)
6. Genetics in Medicine - Thomson and Thomson

Text Books:
   1. Biotechnology by Satyanarayana-(2010)
   2. Text book of Biotechnology by R. C. Dubey-(2008)

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BT6004	HERBAL BIOTECHNOLOGY	5	CC22	5

Objectives: This course includes an elementary treatment of various morphological, Biochemical parameters used in the identification and utilization of medicinal plants in general. The course provides an opportunity to explore and exploit the medicinal values of Indian plants.

Unit-I: Definition and scope of Pharmacognosy –
Ancient and modern medicines -   Islamic   Medicine,   Siddha, Ayurveda, Unani.

Unit-II: Crude Drugs (Root, Leaves, stems, flowers, seeds) – Scope and Importance, Cultivation, Collection & processing of Crude Drugs.

Unit-III: Basic techniques of Plant Tissue Culture, Plant Tissue Culture for enhancing   secondary   metabolite   production   (Withania   somnifera, Catheranthus roseus, Andrographis paniculata, Aloe vera).

Unit-IV: Analysis of Phytochemicals - Methods of Drug evaluation (Morphological,   Microscopic,   Physical   &   Chemical).   Preliminary screening, Assay of Drugs – Biological evaluation / assays, Microbiological methods.

Unit-V: Types of Phytochemicals - Carbohydrates & derived products; Glycosides - extraction methods (Digitalis, Dioscorea,); Tannins (Hydrolysable & Condensed types); Volatile Oils - extraction methods (Clove, Menthol).

Text book:
 Natural Products in medicine: A Biosynthetic approach (1997), Wiley.
Hornok,L. (ed.) (1992). Cultivation & Processing of Medicinal Plants,
Chichister, U. K: J. Wiley & Sons.
Pharmacognosy and Phytochemistry - Edwin Gerald.

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BTPR61	ENVIRONMENTAL AND NANO BIOTECHNOLOGY – PRACTICAL VII	2	CC23	4

I. Environmental Biotechnology

(i)   Estimation of dissolved oxygen
(ii)   Estimation of salinity
(iii)   Estimation of pH
(iv)   Estimation of carbon dioxide
(v)   Estimation of chloride
(vi)   Estimation of alkalinity
(vii)   Estimation of COD & BOD
(viii) Estimation of carbonate and bicarbonate
(ix)   Microbial assessment of Air, Water, and Soil

II. Nano Biotechnology

(i)   Preparation of plant materials for Nanoparticle synthesis.
(ii)   Preparation of Nanoparticles for Electron microscopic observation.
(iii)   Preparation of Nanomaterial for characterization in TEM and SEM.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BTPR62	MEDICAL AND HERBAL BIOTECHNOLOGY – PRACTICAL VIII	2	CC13	4

I. Medical Biotechnology

1. Estimation of blood glucose level
2. Estimation of hemoglobin
3. Estimation of cholesterol in human blood
4. SDS-PAGE
5. Western Blotting technique
6. ELISA   test
7. RIA (Demonstration)
8. WIDAL Test
9. Hospital and Industrial visit
10. Polymerase Chain Reaction (PCR)

II.   Herbal Biotechnology

1. Collection and study of economically important plants and morphology of the useful parts.
2. Solid and Liquid Media Preparation (M S and White's)
3. Familiarize with at least 5 folk medicines and study the cultivation, extraction and its   medicinal application.
4. Experimental conditions for various methods of extraction for plants material
5. Secondary metabolites phytochemical screening test
- Braemer's test   Tannin
- Liebermann-Burchardt test   Steroid
- Fehling test   Reducing sugar
- Shinoda test   Flavonoid
- TLC method, Wagner test   Alkaloid
6. Quantitative estimation of chemical constituency
- *Determination of alkaloids*
- Ascorbic acid (vitamin C)

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BTSB61	MARINE BIOTECHNOLOGY	1	AEC6	2

Objectives: To understand the importance of Diverse life forms in Seas & Oceans and use of biotechnological techniques to explore its beneficial and medicinal impacts.

Unit I: Introduction: Biotechnology in marine science- history of marine biotechnology application in aquaculture, pharmaceutical, environment remediation, biofouling and biocorroison.

Unit II: Marine biodiversity: Global, National and Local scenario. Distribution of life on marine habitats (Inter tidal zone, rocky shore, muddy shore, sandy shore, mangrove ecosystem, reefs, shallow water, deep sea).Molecular approach to conservation of marine biodiversity.

Unit III: Marine bioprospecting: Marine Natural Products – antimicrobial, antiviral, anticancer drugs and marine toxins - bioadhesives– Marine microbes of Biotechnological importance. Commercial development of marine natural products- chitosan, chitin.

Unit IV: Algal biotechnology: single cell protein, hydrocolloids, agarose, carrageen alginates and other byproducts. Marine Enzymes sources and their applications Marine Lipids sources and their applications.

Unit V: Fouling and corrosion: Biofouling - Biofilm formation - Marine fouling and boring organisms - Antifouling and Anti boring treatments -

Application of biotechnology in controlling the bio deterioration of wood. – Bio invasion and ballast water.

Reference Books:

1. An Introduction to Marine Environment, Weyl, R R, Oceanography, John Wiley,(1974).
2. Introduction to physical Oceanography, Thurman, HV, Merril Publ. Co. (1988)
3. Biological Oceanography, Angel, MV, Methuen, (1975).
4. Introduction to Marine Plankton, Mitra , A. Ed Daya Publication, New Delhi (2001)
    5. Marine Biotechnology, Volume 1, Pharmaceutical and Bioactive Natural Products. David H. Attaway, 2001.
    6. Biotechnology in the Marine Sciences (Advances inMarine Science & Biotechnology) Rita R. Colwell 1984. Wiley Interscience.
    7. Chemistry of Marine Natural Products, ,Chemical and Biological Perspectives. Scheupr, P.J. (Ed.), 1984. Vol. I III, Academic Press, New York.

Text Books:

1. A Text Book of Marine Biology, Nair, MB, &Thamphy, DM, Mac Millan, (1980)
2. Environmental Biotechnology, Principles and applications by Bruce E.Rittmann and Perry L. McCarthy., McGraw Hill.

DEPARTMENT OF BIOTECHNOLOGY

SYLLABUS
For
M.Sc Biotechnology

SEMESTERS – III & IV

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BT3001	IMMUNOTECHNOLOGY	5	PAPER IX	6

Objective: The course helps the students understand about the immune system and the immune response of cells and their roles in effective resistance mechanism.

UNIT – I Outline of immunology – History, Innate and acquired immunity. Organs and cells of immune response, organs of stem cell origin. Primary and secondary lymphoid organs – Hemopoetic stem cells, T-cells, B-cells, macrophages, monocytes, polymorphs and platelets. Immunological memory – differentiation of lymphocytes.

UNIT – II Antigens, antibodies and comfort immunogenicity. Antigens and antigenicity – types, structure, and requirements. Immunoglobulin – structure, function and biological properties of Ig classes. Generation of antibody – effector, functions of antibody. Complement – activation, classical, alternate and lectin pathways, biological role of complement activation. Immnonoglobulins for bio thrurapeutics.

UNIT – III Immuno Pathology – Hypersensitivity – immediate and delayed hypersensitivity reactions. Autoimmunity - transplantation immunity, tumor immunology. Immunological tolerance and immune suppression, immune deficiency diseases. Immune therapy of infectious diseases – types and principle of immunization, natural and artificial immunotherapy.

UNIT – IV ELISA, RIA, Immuno blot, immunofluorescence, agglutination, precipitation, immunodiffusion, immunoelectro microscopy, immunoelectrophoresis. Immune response to infectious diseases – viral, bacterial and protozoan disease. Basic concepts of vaccine design and development – vaccines, polyclonal and monoclonal antibodies, hybridoma technology to produce antibodies.

UNIT – V Preparation of specimen for serology – serum, plasma, blood antigen. Preparation of antigens from pathogenic bacteria, purification of antigen and antibodies. Identification of blood cells, isolation of blood cells, flow cytometry, nephlometry. Isolation of macrophages, culture of macrophages. Immune screening of recombinants, immune diagnostics.

SUGGESTED BOOKS

1. Benjamini E, Coico R and Sunshine G (2000), Immunology 4th Edn. A John-Wiley & sons inc. publication.
2. Kuby J, Cameron J, Tood C, Mitchell J. Immunology, W.H. Freeman and Co, 2000.
3. Richard A Goldsby, Thomas J Kindt, Barbara A oshome, J Kuby, Immunology 5th Edition, W.H. Freeman and company, 2003.
4. Kannan I. 2010. Immunology, MJP publishers, Chennai.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BT3002	RECOMBINANT DNA TECHNOLOGY	5	PAPER X	6

UNIT-I Basic concept in genetic Engineering: DNA structure and properties – Restriction enzymes – modifying enzymes, linker, Adaptor, Homopolymor tailing, DNA ligase, polymerase enzyme, types – Functions and its applications.

UNIT-II Plasmids, Gene transfer methods & vectors, PBR.322, lambda phage, phagemids, cosmids, Artificial Chromosomes- BAC & YAC, shuttle vectors Expression Vectors -Viral vectors and their design in animal & plant cell.

Transformation, Transduction, particle bombardment, Electroporation, liposome mediated gene transfer, microinjection. Agrobacterium mediated gene transfer.

UNIT-III Molecular probes: DNA probes, Radioactive labeling, Non-radioactive labeling, use of moleculer probes and DNA finger printing and its applications in forensic medicine.

Gene libraries: Construction of cDNA and genomic library – Amplification of gene libraries. Identifying the product of cDNA clones.

UNIT-IV Analysis of cloned genes: Restriction enzyme analyses, southern blotting, Northern blotting, Western blotting, colony & plague hybridization, Factors affecting expression of cloned genes, Reporter genes, Fusion proteins. Cloning and expression of commercially useful proteins.

UNIT-V

Sequencing and synthesis of gene, Polymerase chain reaction (PCR) – Basic principle, & applications, Techniques of DNA sequencing, microarray sequencing, RAPD,RFLP, Artificial DNA synthesis – Molecular mechanism of Antisense technology and its applications.

Reference:

1.Principles of gene manipulation, R.N. Old and S.B> Primrose, 1994. Blackwell Scientific Publications.

2.DNA Cloning I & II , D.M. Glover & B.D. Hames, 1995. IRL Press.

3. PCR Strategies, M.A. Innis, D.H. Gelfant& J.J. Sninskey, 1995. IRL Press.

4. Recombinant DNA [2nd Ed], J.D. Watson, M.Gillman, J.Witknow Ski and M.Zoller, 1992. Scientific Americans books, N.Y.

5.Genetic Engineering of Animals, A.Publer, 1993. VCH Publishers, Weininheim FRG.

6.Gene Transfer and expression protocols – methods is molecular biology volume 7, E.T. Murray, 1991. Humana press.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTPR31	PRACTICAL – V IMMUNOTECHNOLOGY	4	PAPER XI	6

1. Isolation of coliphage from sewage.
2. Antigen preparation – heat treatment.
3. Antigen preparation – chemical.
4. Radial immune diffusion test.
5. Double immune diffusion test.
6. ELISA test.
7. Separation of protein by SDS-PAGE.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTPR32	Practical –VI RECOMBINANT DNA TECHNOLOGY	XII	PAPER IX	6

1. Restriction digestion
2. Western Blotting techniques
3. PCR amplification
4. Bacterial Transformation
5. Genetic Recombination in Bacteria
6. Dot ELISA

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTE301	BIOPHYSICS, BIOSTATISTICS AND BIOINFORMATICS	4	ELECTIVE PAPER III	6

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 primary, Secondary & Tertiary molecular structure: X-ray crystallography and NMR. General

Spectroscopy, Lambert-Beer Law, Spectrophotometry & Colorimetery, UV-VIS, Fluorescence, AAS, IR, Mass Spectroscopy .

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: Netsc ape (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.

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SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTE302	ENZYMES AND FERMENTATION TECHNOLOGY	4	PAPER IX	6

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. 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.

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: Analysis of batch fed batch and continuous fermentation, stability of microbial reactors, analysis of mixed microbial populations, specialized Bioreactors (pulsed, fluidized, Photobioreactors etc).

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. Trevor Palmer Understanding Enzymes, Second Edition, J. Wiley & Sons, New York.
3. Prescott LM, Harley JP, Klein DA. (1996) Microbiology, Wm.C. Brown Publishers.
4. Alba. S, Humphrey, A.E and Millis N.F. (1973) Biochemical engineering, Academic press, NY.
5. Atkinson B, (1974) Biochemical Reactors, Pion Ltd, London.
6. Stanbury P. F Whittaker A, and Hall S. J. (1995) Principles of Fermentation Technology, 2nd Edition, pergamon press, Oxford.
7. Jackson A.T, Prentice Hall and Engelwood Cliffs (1991) Process engineering in Biotechnology.
8. Nielson J, Villadsen J (1994) Bioreactor Engineering Principles, Plenium Press.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BT4001	ENVIRONMENTAL BIOTECHNOLOGY	5	PAPER XIII	5

Unit – 1 Scope of Biotechnology in Environmental protection. Non-conventional energy resources. Environment protection and conservation, Environment impact assessment, Eco-planning and sustainable development.

Unit – 2 Environmental Pollution - Types– water, air, land, Thermal, Radioactive – causes, effects and control measures. Environmental Problems – Ozone depletion, global warming, greenhouse effect.Response of microbes, plants and animals to environmental stress.

Unit – 3 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 – 4Solid 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 – 5Pesticides 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.

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. Milton Wain Wright (1999) An Introduction to Environmental Biotechnology, Kluwar Acad. Publ. Group, Springer.
5. Nicholas Cheremisinoff P., (2001) Biotechnology for Wastewater Treatment, Prentice Hall of India.
6. Gray N. F., (2004) Biology for Wastewater Treatment, McGraw Hill.
7. Abbasi S. A and Ramaswami E., (1999) Biotechnological Methods for Pollution Control, University Press.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BT4002	RESEARCH METHODOLOGY	5	PAPER XIV	6

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. Design of Experiments (DoE Concepts).

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 : Research report writing: Title – Keywords – Abstract – Introduction – Materials and Methods – Results – Discussion – Conclusion – Summary – Acknowledgement – References. Preparation of manuscript.

UNIT IV: Biotechnological Tools: AGE, SDS-PAGE, Gel documentation – Immunotechniques – Blotting techniques – DNA finger printing – RFLP, RAPD, AFLP, PCR.

UNIT V: Good laboratory practices for animal facility: CPCSEA guidelines for laboratory animals – Animal procurement, veterinary care – quarantine, stabilization, separation, diagnosis, treatment and control of diseases. Animal care and technical personnel. Animal husbandry. Anaesthesia and euthanasia. Laboratory animal ethics.

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

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTPR41	PRACTICAL –VII ENVIRONMENTAL BIOTECHNOLOGY	4	PAPER IX	6

1. Rate of O2 Consumption under temp stress by fish.
2. Estimation of Dissolved Oxygen.
3. Estimation of Total Dissolved Solids.
4. Estimation of Total Suspended Solids.
5. Estimation of Alkalinity.
6. Estimation ofSalinity.
7. Determination of BOD from sewage sample.
8. Determination ofCOD from sewage sample.
9. Isolation of Xenobiotic degrading bacteria – by selective enrichment technique.
10. Microbial degradation of cellulose.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTE401	MEDICAL BIOTECHNOLOGY	4	ELECTIVE PAPER IV	5

Objective: To impart the knowledge of biotechnological advancement in treating infectious and genetic diseases and to impart the principals involved in preparation of antibodies and vaccines.

UNIT-I: Historical aspects of biotechnology in human welfare. Infectious diseases caused by microbes- bacterial, viral, fungal and protozoan disease, diagnosis, control and treatment. Genetic diseases – Cystic fibrosis, Alzheimer's diseases & Dunchenne muscular dystrophy (DMD). Use of nucleic acid probe and antibodies in clinical diagnostics. Application of PCR in medical diagnosis and finger printing.

UNIT – II: Gene therapy – background, types of gene therapy (ex vivo &in vivo). Vectors in gene therapy - retroviruses, adenoviruses & adeno-associated viruses. Types of gene delivery - Weismann barrier (soma-to-germ line barrier), epigenetic inheritance and its limitations. Antigen and antisense therapy – here knock out and its applications.

UNIT-III: Methods involved in the production of Recombinant vaccines – vaccines for hepatitis B, Rabies, polio virus, foot and mouth disease, small pox virus, malaria vaccines, Tuberculosis and AIDS. Methods involved in the production of DNA and RNA vaccines.

UNIT – IV: Hybridoma technology– production of human mouse monoclonal antibodies. Advantage and limitations of monoclonal antibody production. Human gene therapy and its ethics. Animal cell culture – primary, secondary and continuous cell lines. Genetic engineering of animal cells and their applications. Embryonic stem cell culture and bone marrow transplantation – its Application.

UNIT-V: Methods involved in the production of recombinant hormones and its applications in human health - GH, Insulin, B-endorphin, Ig, human interferon genes. Transgenic animals and their applications in treating of human diseases. Artificial blood and blood component based therapy.

Reference Books:
1. Biotechnology by Satyanarayana-(2010)
2. Medical microbiology Mims Play fair Roitt, wekelin Williams.-(2009)
3. Text book of Biotechnology by R. C. Dubey-(2008)
4. Immunology by Roitt- (2006)
5. Immunology by Kuby-(2003)
6. Human Genetics- Gangane –(2000)
7. Medical Physiology Guyton and Hall-(1996)

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTE402	AQUACULTURE BIOTECHNOLOGY	4	ELECTIVE PAPER IV	5

Objective: To provide an adequate knowledge of the wealth of marine and aquaculture resources. In addition to know the economically important marine animals and their potency as toxins and drugs.

Unit I: Introduction to aquaculture – history and scope, aquaculture in local, national and global level. Design and construction of fish farm – site selection, soil types, porosity, water column (depth, turbidity, height and light), aeration and its types, automatic feeders and Heaters. Cultivable fresh water, marine and ornamental fish species. Criteria for selection of species.

Unit II: Types of culture system – extensive, semi-intensive, intensive methods, merits and demerits of different systems. Introduction, monosex & poly culture, sewage fed fish culture, integrated fish farming, brackish water aquaculture, culture technique of carps. Marine aquaculture – sea ranching, cage culture, raft culture, rope culture, pen culture and culture technique of shrimp and prawns.

Unit III: Ornamental fish culture -Guppy, Molly, Sword tail, Gold fish, Angel fish, Blue morph and Butterfly fish. 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 IV: 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 live food organisms.

Unit V: Principles of disease diagnosis in fish .Clinical diagnosis, histopathological and haematological methods. Diseases caused by bacteria, fungi and viruses, their prophylactic and therapeutic measures. Economic importance of freshwater and marine organisms - fishes, crabs, oyster, shrimp, lobster, mussels.

Reference Books:
1. Arumugam. N. 2015. Aquaculture. Saras publications.
2. Santhanam,James Lee Burke,ChatterjeeDipankar. 2012. A Manual of Fresh Water Aquaculture. Publisher: Oxford University Press.
3. Arumugam. N. 2012. Aquaculture. Saras publications.
4. Herbert Axel rod. 1992. Encyclopedia of Ornamental fishes. – T.F.H. pub. NewJercy.
5. Shanmugam, K. 1990. Fishery biology and Aquaculture. Leo Pathipagam, Chennai.
6. Jhingran V.G. 1985, Fish & Fisheries of India, Hindustan publishing co. New Delhi
7. Dr. Schultz and H. Axel rod. 1980. Hand Book of aquarium fishes.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTPJ41	PROJECT WITH VIVA	4	XVI	6

COURSE WORK

The project will comprise of the following:

a. Study of background material
b. Collection of data, procurement and fabrication of experimental set up and
c. Writing of computer programs if needed.
d. 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.

Viva

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

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6BTNM41	INDUSTRIAL BIOTECHNOLOGY	2	NON MAJOR PAPER	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. Isolation of induced mutants synthesizing improved levels of primary and secondary metabolites. microbes exploited commercially – saccharomyces, lactobacillus, penicillium, acetobacter, bifidobacterium, lactoccus, streptococcus.

Unit-3 medium requirement for fermentation process. Addition of precursors and metabolic regulators to media and medium optimization. Fermentor – design, functions and types. Quorum sensing in bioprocess.

Unit-4 microbial enzymes in food processing – industrial production of enzymes – proteases, amylase, invertase, pectinase and cellulases. High fructose corn syrup (HFCS) . food products – cheese, yoghurt, jelly. Health care products – neutraceuticals, vitamins, antibiotics.

Unit-5 mass cultivation of spirulina, single cell protein (SCP), petrocrops. Improvements of nutritional value of seed storage proteins. Mass production of phosphate solubilizing bacteria. Natural bio preservatives. Biopolymers. 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, washinton.
5. Waites M. J., el. Al., (2007) Industrial Biotechnology – An Introduction, Black well publishers, UK.
6. Casida L.E., (2007) Industrial Microbiology, Wiley publishers.
7. Cruegar F and Anne Liese Cruegar (2001) Industrial Biotechnology.

DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS
For
B.Sc Computer Science

SEMESTERS – V & VI

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS5001	DESIGN AND ANALYSIS OF ALGORITHMS	5	CC13	5

Objectives: To build a solid foundation of the most important fundamental subject in computer science. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

UNIT -I: INTRODUCTION

What is an Algorithm? - Algorithm Specification- Performance Analysis- Randomized Algorithms. *(Chapter 1 Sections: 1.1 to 1.4)*

UNIT - II: DIVIDE AND CONQUER

General Method - Binary Search - Finding the Maximum and Minimum- Merge Sort - Quick Sort - Selection Sort- Stassen's Matrix Multiplications. *(Chapter 3: Sections 3.1,3.3,3.4,3.5,3.6,3.7,3.8)*

UNIT - III: THE GREEDY METHOD

The General Method - Knapsack Problem – Tree Vertex Splitting - Job Sequencing with Deadlines- Minimum Cost Spanning Trees - Optimal Storage on Tapes - Optimal Merge Pattern - Single Source Shortest Paths.*(Chapter 4: Sections: 4.1,4.3 to 4.9)*

UNIT - IV: DYNAMIC POGRAMMING

The General Method – Multistage Graphs - All pair shortest path - String Editing - 0/1 Knapsack – Reliability Design - The Traveling Salesperson Problem - *(Chapter 5: Sections 5.1 to 5.3,5.6 to 5.9)*

UNIT - V: TRAVERSAL, SEARCHING & BACKTRACKING

Techniques for Binary Trees- Techniques for Graphs - The General Method - The 8-Queens Problem – Sum of Subsets- Graph Coloring- Hamiltonian Cycles.*(Chapter 6, Section 6.1,6.2 Chapter 7:Sections 7.1 to 7.5)*

Text Book:

Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, 2nd Edition, 2015, Universities Press.

Reference Books:

1. Introduction to Algorithms , Coremen T.H, Leiserson C.E. and Rivest R.L., PHI, 3rd Edition 2009.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson Education, 3rd Edition 2012.

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS5002	MICROPROCESSORS AND ITS APPLICATIONS	5	CC14	5

Objectives: To learn the architecture, programming, interfacing and rudiments of system design of microprocessors.

Unit-I : 8085 MICROPROCESSOR AND ARCHITECTURE

Microprocessors - Memory - I/O Devices - Memory Mapped I/O - Pin diagram and internal architecture of 8085 - Registers, ALU, Control & Status Registers - Instruction and Machine Cycles. Interrupts (Chapter 1 to 4 and 12)

Unit II : PROGRAMMING THE 8085

Introduction to 8085 Assembly language programming - 8085 instructions - Programming techniques with Additional instructions - Counters and Time Delays - Stack and Subroutines - Code Conversions (Chapter 7 to 10)

Unit-III : 8086 MICROPROCESSOR AND ARCHITECTURE

Pin Details and Internal Architecture of 8086 - Register organization, Bus interface unit, Execution unit, Memory addressing, Memory segmentation. Operating modes - Hardware and Software interrupts - Addressing Modes.(Chapter 2)

Unit-IV : PROGRAMMING THE 8086

8086 Assembly Language Programming - Implementing Standard Program Structures - String - Procedure and Macros. Instruction Description and Assembler Directives (Chapter 3, 4, 5 and 6)

Unit-V : INTERFACING PERIPHERALS

8255 PPI, 8253/8254 PIT, 8237 DMAC,8259 PIC, 8251 USART. (Chapter 14,15,16)

Text Books:

1. Microprocessor Architecture, Programming and Applications with 8085,Ramesh S.Gaonkar, Penram International Publishing (India) Pvt. Ltd. 6th Ed. 2013 (for Units I,II and V)
2. Microprocessors and Interfacing, Douglas V. Hall, Tata McGraw Hill, 2nd Ed. 2006(for Units III and IV)

Reference Books:

1. Assembly Language Programming the IBM PC ,Alan R. Miller, Subex Inc,
2. Advanced Microprocessors and Peripherals, Ray A K , Bhurchandi K M , TMH. 3rd Edition, 2012
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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS5003	COMPUTER NETWORKS	5	CC15	5

Objectives: This course introduces the concepts and theories of networking and applies them to various situations, classifying networks, analyzing performance and implementing new technologies.

UNIT-1 BASIC CONCEPTS OF OSI LAYERS

Data Communication – Networks – Protocol and Standards – Line Configuration – Topology – Transmission Modes – Categories of Networks – Internetworks- OSI Models – Functions of OSI Layers.
(Chapter 1: Sections: 1.2 to 1.5, Chapter 2: Sections: 2.1 to 2.5, Chapter 3: Sections: 3.1 and 3.2)

UNIT-II SIGNALS & ENCODING

Analog and digital – Periodic and Non Periodic signals – Analog Signals – Composite Signals- Digital signals – Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum – Error Correction- Analog to Digital Conversion- Digital to Digital Conversion – Digital to Analog Conversion – Analog to Analog Conversion.
(Chapter 4: Sections: 4.1 to 4.6, Chapter 5: Sections: 5.1 to 5.4)

UNIT-III TRANSMISSION MEDIA, ERROR DETECTION AND CORRECTION

Type of errors –Detection-Vertical Redundancy Check (VRC) - Longitudinal Redundancy Check (VRC) Cyclic Redundancy Check (CRC) –check sum=Error Corrections.(Chapter 7: Sections: 7.1 to 7.4, Chapter 9: Sections: 9.1 to 9.7)

UNIT-IV SWITCHING & NETWORK DEVICES

Circuit Switching-Packet Switching-Message Switching Repeaters-Bridges-Routers-Gateways-other Devices - Routing Algorithms-Distance Vectors Routing- Link State Routing.(Chapter 14: Sections: 14.1 to 14.3, Chapter 21: Sections: 21.1 to 21.8)

UNIT-V PROTOCALS & NETWORK SECURITY

TCP/IP-Network layer-Other protocols-ARP, RARP, ICMP, UDP, TCP Client/Server Model-Domain Name System (DNS) – Tel Net –File Transmission Protocol (FTP) –Simple Mail Transfer Protocol (SMTP) – Hyper Text Transmission Protocol (HTTP) World Wide Web (WWW) – Four Aspects of Security – Privacy – Digital Signature –Access Authorization. (Chapter 25: Sections: 25.1 to 25.10, Chapter 27: Sections: 27.1 to 27.5)

Text Book:

Data Communication and Networking 2nd Edition Behrouz A. Forouzan, McGraw Hill Education 2014.

Reference Books:
1. Data And Communication, Network William Stalling PHI 2014.
2. Computer Networks, Andrew S. Tanenbaum , David J. Wetherall, 5th Edition,Prentice Hall. 2010

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS5004	SOFTWARE ENGINEERING	5	CC16	5

Objectives: This course introduces the concepts and methods required for the construction of large software intensive systems.

Unit I: INTRODUCTION AND SOFTWARE PROCESSES

The Problem Domain- The Software Engineering Challenges -The Software Engineering Approach.
Software Process-Desired Characteristics of Software Process-Software Development Process Models-Other Software Processes (Chapter 1 Sections: 1.1 to 1.3) (Chapter 2: Sections: 2.1 to 2.4)

Unit II: SOFTWARE REQUIREMENT ANALYSIS AND SPECIFICATION AND SOFTWARE ARCHITECTURE

Software Requirements-Problem Analysis-Requirement Specification-Functional Specification with Use Cases –Validation-Metrics - Role of Software Architecture-Architecture Views-Component and Connector View (Chapter 3 Sections : 3.1 to 3.6 Chapter 4: Sections:4.1 to 4.3)

Unit III: PLANNING A SOFTWARE PROJECT AND DETAILED DESIGN

Process Planning-Effort Estimation-Project Scheduling and Staffing-Software Consideration Management Plan-Quality Plan-Risk Management-Project Monitoring Plan - Detailed Design and PDL-Verification-Metrics.(Chapter 5 Sections: 5.1 to 5.7, Chapter 8 Sections: 8.1 to 8.3)

Unit IV: FUNCTION-ORIENTED DESIGN AND OBJECT ORIENTED DESIGN

Design Principles-Module Level Concepts-Design Notation and Specification-Structured Design Methodology-Verification-Metrics.-OO Analysis and OO Design-OO Concepts-Design Concepts-Unified Modeling Language- A Design Methodology-Metrics. (Chapter 6: Sections: 6.1 to 6.6, Chapter 7 Sections:7.1 to 7.6)

Unit V: CODING AND TESTING

Programming Principles and Guidelines-Coding Process-Refactoring-Verification-Metrics Testing Fundamentals-Black Box Testing-White Box Testing-Testing Process-Defect Analysis and Prevention-Metrics-

(Reliability Estimation) (Chapter 9 Sections: 9.1 to 9.5, Chapter 10 Sections: 10.1 to 10.6)

Text Book:

An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Publishing - 3rd Edition Reprint 2014

Reference Books:

1. Software Engineering, Richard Fairley, TMH Publication, 2012
2. Software Engineering, Ian Sommerville, Person Education Ltd, 9th Edition, 2011.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CSPR51	MICROPROCESSORS LAB	2	CC17	4

8085:

1. 8-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
2. 16-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
3. Block Operations (Sum, Copy, Reverse, Search, Largest/Smallest, Sort ,Fibonacci Series)
4. Code Conversion (BCD/Hex to Binary/ASCII and vice versa).
5. Bit Manipulation (Count Even/odd/Positives/Negatives) and Delay Routines.

8086:

1. 8/16-bit arithmetic addition, subtraction, Multiplication, Division.
2. Block operations (Sum, Average, Search, Largest/Smallest, Sort)
3. String Manipulation (Display, Case Conversion, Search, Copy, Reverse,Read)
4. BIOS routines (Rename a File, Keyboard input)
5. Lookup Table, Bit Manipulation.

Reference :

Lab Manual

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CSPR52	COMPUTER NETWORKS LAB	2	CC18	4

Exercises Using Java
1. Implementation of Subnetting
2. Implementation of UDP
3. Implementation of TCP
4. Implementation of Stop and Wait Protocols.
5. Implementation of Sliding Window Protocol.
6. Implementation of Shortest Path Algorithm.
7. Implementation of Distance Vector Algorithm.
8. Implementation of Link State Routing Algorithm.
9. Program using RPC & RMI
10. Implementation of ARP
11. Implementation of RARP
12. Implementation of FTP

Reference :

Lab Manual

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CSSBP5	MOBILE APPLICATION DEVELOPMENT LAB	1	AEC5	2

1. Intent and Activity
2. Using Controls
3. Alert Dialogs
4. List View
5. Options Menu
6. Seek Bars
7. Shared Preferences
8. Status Bar Notifications
9. Tab Widgets Talking Clock.
10. Tween Animation
11. Grid View
12. Internal Storage - Files
13. SQlite - Database
14. Google Map
15. Permissions

Reference :

1. Lab Manual

1. Professional Android 4 Application Development, Reto Meier, Wiley-India 2012

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS6001	COMPUTER GRAPHICS AND MULTIMEDIA	5	CC19	5

Objectives: To equip students to basics of computer drawing and prepare them for computer modeling of objects.

UNIT-I : GRAPHIC SYSTEMS AND OUTPUT PRIMITIVES
Video Display Devices : Refresh CRT -Raster scan display-Random scan display- Raster Scan Systems – Random Scan Systems – Output Primitives :DDA line algorithm– Bresenham Line Drawing Algorithms –Bresenham Circle Generating Algorithm – GUI: Logical Classification of Input Devices – Interactive Picture Construction Methods. (Chapter 3: Sections: 3.1,3.2,3.5, Chapter 8: Sections: 8.2,8.5)

UNIT-II : 2D TRANSFORMATION AND VIEWING
2D Geometric transformations: Translation-Rotation-Scaling -Homogenous Coordinates- Composite Transformation-other Transformation - 2D Viewing : Viewing pipeline- Window to Viewport Co-ordinate Transformation – point clipping-Cohen Sutherland Line Clipping Algorithms – Liang Barsky Line Clipping Algorithm-Sutherland Hodgeman polygon Clipping Algorithm.(Chapter 5: Sections: 5.1 to 5.4, Chapter 6: Sections: 6.1, 6.3, 6.5 to 6.8)

Unit- III : 3D TRANSFORMATION AND VIEWING
3D Geometric Transformation :Translation, Rotation, Scaling-General 3D rotation - 3D viewing: viewing pipeline-viewing coordinates-Projections: parallel projection-perspective projection.(Chapter 11: Sections: 11.1 to 11.3, Chapter 12: Sections: 12.1 to 12.3)

Unit-IV : VISIBLE SURFACE DETECTION
Classification- Back Face detection- Depth buffer method- A buffer method- Scan line method-BSP tree method-Area subdivision method-Octree methods – Ray Casting method(Chapter 13: Sections:13.1 to 13.10)

Unit-V : MULTIMEDIA
Classification- MM building blocks: Audio-audio editing-MIDI-Text-display design and content design- Images-development- Computer animation classifications-2D animation-3D Animation—3D Animation

environment-digital video fundamentals-video broadcasting standards-MM file format.(Chapter 1, Chapter 5 to 10, Chapter 12 to 16, Appendix A)

Text Books:
1. D. Hearn and M.P. Baker – Computer Graphics (C version) with OpenGL – Pearson Education-4th edition-2011
2. S. Gokul - Multimedia Magic –BPB Publications- 2nd Edition 2008

Reference Books:
1. W.M. Newman and R.F. Sproull – Principles of Interactive Computer Graphics – McGraw Hill International Edition – 2nd Edition, 2001
2. Tay Vaughan-Multimedia making it work -TMH publication-9th Edition, 2014

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS6002	DATABASE MANAGEMENT SYSTEM	5	CC20	5

Objectives: To understand the concepts of Database Management System and mastering Structured Query Language

UNIT – I : INTRODUCTION ,DATABASE DESIGN & E-R MODEL

Purpose of Database Systems – View of Data – Database Languages - Relational Databases – Database Design – Database Architecture (*Chapter 1 : Sections 1.2 to 1.6 & 1.11)* Entity Relationship model – Constraints - Entity Relationship Diagrams (*Chapter 6: Sections 6.2 to 6.4)*

Unit –II : RELATIONAL MODEL AND OTHER RELATIONAL LANGUAGES

Structure of Relational Databases – Fundamental Relational Algebra Operations –Additional Relational Algebra Opearations - Extended Relational Algebra Operations - Null Values - Modification of the Database (*Chapter 2 : Sections 2.1 to 2.6)* The Tuple Relational Calculus – The Domain Relational Calculus (*Chapter 5 : Sections 5.1 to 5.2)*

Unit – III : SQL, INTERMEDIATE and ADVANCED SQL

Data Definition – Basic Structure of SQL Queries –Set Operations – Aggregate Functions – Null Values - Nested Sub queries – Views - Modification of the Database - Joined Relations (*Chapter 3 : Sections 3.2 to3.11)* SQL Data Types and Schemas – Integrity Constraints - Authorization - Embedded SQL (*Chapter 4 : Sections 4.1 to 4.4)*

Unit – IV: RELATIONAL DATABASE DESIGN

Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory - Decomposition using Multivalued Dependencies.(*Chapter7:Sections 7.1to 7.4&7.6)*

Unit – V: SYSTEM ARCHITECTURE

Centralized and Client - Server Architecture - Server System Architecture - Parallel Systems - Distributed System. *(Chapter 20: Sections 20.1 to 20.4)* Distributed Database Storage - Distributed Transactions - Concurrency Control in Distributed Databases - Distributed Query Processing. *(Chapter22:Sections 22.2,22.3,22.5,22.7)*

Text Book:

Database System Concepts , Abraham Silberchatz, Henry F Korth , S.Sudarshan, McGraw-Hill - 6th Edition - 2013.

Reference Books:
1. Fundamentals of Database Systems, Elmasri and Navathe:, Pearson Education, 7th Edition 2015.
2. Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke: McGraw-Hill, 3rd Edition. 2002.

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS6003	OPERATING SYSTEMS	5	CC21	5

Objectives: To learn the various aspects of the internal operation of modern operating systems such as process management, threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

UNIT – I :INTRODUCTION & OPERATING SYSTEM STRUCTURES

What is an Operating System? - Mainframe Systems-Desktop Systems-Multiprocessor Systems-Distributed Systems-Clustered Systems-Real-Time Systems-Handheld Systems (*Chapter 1 : Sections 1.1 to1.8)* System Components-Operating System Services-System Calls-System Programs *(Chapter 3: Sections 3.1 to 3.4)*

UNIT – II :PROCESSES,CPU SCHEDULING & DEADLOCKS

Process Concept-Process Scheduling-Operations on Processes-Cooperating Processes-Interprocess Communication (*Chapter 4: Sections 4.1 to 4.5)* Basic Concepts-Scheduling Criteria-Scheduling Algorithms (*Chapter 6: Sections 6.1, 6.2, 6.3)* Deadlock Characterization-Methods for Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery from Deadlock (*Chapter 8: Sections 8.2 to 8.7)*

UNIT – III: STORAGE MANAGEMENT AND VITUAL MEMORY

Swapping-Contiguous Memory Allocation-Paging-Segmentation (*Chapter 9: Sections 9.2 to 9.5)* Demand Paging-Page Replacement (*Chapter 10: Sections 10.2, 10.4)*

Unit – IV: FILE SYSTEM INTERFACE, FILE SYSTEM MPLEMENTATION, MASS- STORAGE STRUCTURE

File Concept-Access Methods-Directory Structure (*Chapter 11 : Sections 11.1,11.2,11.3)*Allocation Methods-Free Space Management (*Chapter 11 : Sections 12.4,12.5)* Disk Structure-Disk Scheduling-Disk Management-Disk Attachment (*Chapter 12 : Sections 14.1,14.2,14.3,14.6)*

Unit – V: PROTECTION AND SECURITY

Goals of Protection-Domain of Protection-Access Matrix-Implementation of Access Matrix (*Chapter 18 : Sections 18.1 to18.4)* The Security Problem

-User Authentication-Program Threats-Cryptography-Computer Security Classifications *(Chapter 19: Sections 19.1,19.2,19.3,19.7,19.8)*

Text Book:
Operating System Concepts, Silbershatz, Galvin, Gange, John Wiley &Sons Inc, 9th Edition, 2015.   .

Reference Books:
1. Operating Systems – Internals and Design Principles, William Stallings - Pearson, 8th Edition, 2014
2. Operating Systems – A Concept Based Approach- Dhananjay M. Dhamdhere, Tata McGraw – Hill, 3rd Edition, 2012
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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CS6004	OPEN SOURCE PROGRAMMING	5	CC22	5

Objectives: To discuss techniques that can be effectively applied in practice about HTML5, JavaScript, PHP , CSS and Python.

UNIT I : INTRODUCTION TO HTML5,JAVA SCRIPT, PHP AND CSS

Introduction to Dynamic Web content- HTTP and HTML- Request and Response Procedure- The Benefits of PHP, JAVA Script, CSS, and HTML5- Introduction to HTML5- The Canvas -The HTML5 Canvas-HTML5 Audio and Video- Introduction to CSS- CSS Rules-Style Types-CSS Selectors- CSS Colors. (Chapter 1: Page no 1to 6, 7 to 9 , Chapter 19: Page no. 423, 424, 426 to 435 and 447, 448 , Chapter 22: Page no. 509,510,513)

UNIT II : PHP INCORPORATING PHP WITHIN HTML

The Structure of PHP- Expressions- Operators – Conditionals – Looping – PHP Functions- PHP Objects – PHP Arrays (Chapter: 3 page no: 48 to 66, Chapter 4: Page No: 73 to 98 , Chapter 5: Page No: 104 to 111, 113 to 118 , Chapter 6: Page No: 131 TO 134)

UNIT III : EXPLORING JAVA SCRIPT

Java Script and HTML Text- Using Comments- Semicolons – Variables-Operators- Functions- Global Variables, Local Variables - Expressions and Control Flow in Java Script : Expressions – Literal and Variables-Operators - Java Script Functions - Java Script Objects - Java Script

Arrays: Numeric Arrays – Associative Arrays – Multidimensional Arrays – Using Array Methods (Chapter 14: Page No:323 to 336) (Chapter 15: Page No: 343 to 347,)

UNIT IV : LEARNING PERL

Introduction -   Scalar Data : Numbers,Strings,Chomp Operator – Control Structures. List and Arrays : Special Array Indices ,List Literals & assignments – Subroutines – Input and Output – PERL Modules – Directory Operations (Chapter 1 to 5) (Chapter 11 and Chapter 13)

UNIT V : PYTHON- BEGINNING TO USE PYTHON

Strings- Quotes – Numbers and Operators – Variables – Making Decisions – Functions (Chapter 1: Page No: 7 to 12) Chapter 2: Page No15 to 25) Chapter 3: Page no 31to 42) Chapter 4: Page No: 51 to 57) (Chapter 5: Page No: 71 to 87)

Text Books:
1. "Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. (Unit I,II and III)
2. "Learning PERL", Randall L.Schwartz, Tom Pheonix and Brain d foy. 7th Edition,2016 (Unit IV)
3. Beginning Python, James Payne, Wiley Publication, 1st Edition , 2011. (Unit V)

Reference Books
1. Learning JavaScript, Tim Wright, Pearson Education Inc,1st Edition, 2013.
2. Learning JavaScript, Ethan Brown, O'Really Media Inc, 3rd Edition, 2016.
3. Programming PHP , Rasmus Lerdorf and Levin Tatroe, O'Reilly Publications, 3rd Edition,2013.

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CSPR61	DATA BASE MANAGEMENT SYSTEM LAB (DBMS)	2	CC23	4

1. DML Commands
2. DDL Commands
3. Built in String/Date/Aggregate Functions
4. Single Table Queries
5. Joins
6. Sub Queries
7. Set Operators
8. Multiple Table Queries
9. Programmable Objects (Functions, Procedures, Triggers)
10. Advance Queries using AdventureWorks, Pubs, and NorthWind Databases and SqlReports.

Ex No.	Ex Name	No of Queries
1	World Database	70
2	HR Database	40
3	Publisher Database	25
4	Northwind Database	21
5	Sailor Database	20
6	Sakila Database	35
7	Adventure Works DB	30
8	Functions	6
9	Procedures	5
10	Triggers	3

Reference :Lab Manual

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CSPR62	UNIX AND OPERATING SYSTEM LAB	2	CC24	4

1. Create process (Child, Zombie,Orphan).

2. Inter Process Communication (Pipes, Message Queues and Semaphores)

2. Shell Programming (loops, patterns, expansions, substitutions, matching, searching)

3. Implement the various process scheduling (First Come First Serve, Shortest Job First, Priority, Round Robin).

4. Implement Memory allocation strategies (FirstFit, BestFit and WorstFit)

5. Implement Page Replacement Algorithms (First In First Out, Least Recently Used, Optimal)

6. Implement Disk Scheduling Algorithms (First In First Out, Shortest Seek Time First and SCAN)

Reference : Lab Manual

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5CSSBP6	OPEN SOURCE PROGRAMMING - LAB	1	AEC6	2

1. HTML (Frames, Links, Tables, ImageMap, Audio/Video and other tags)
2. CSS(inline, external, embedded)
3. JavaScript (Form validation)
4. Random number generation using PHP.
5. Any online application with database access.
6. PHP Program - Arrays Manipulation
7. Text Processing with PERL.
8. Sample web application development in the Open Source Environment.
9. Python Programs- Making Decisions
10. Python Programs- Functions

REFERENCE: Lab Manual

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DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS
For
B.Sc Software Computer Science

SEMESTERS – V & VI

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW5001	DESIGN AND ANALYSIS OF ALGORITHMS	5	CC13	5

Objectives: To build a solid foundation of the most important fundamental subject in computer science. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

UNIT -I: INTRODUCTION

What is an Algorithm? - Algorithm Specification- Performance Analysis- Randomized Algorithms. *(Chapter 1 Sections: 1.1 to 1.4)*

UNIT - II: DIVIDE AND CONQUER

General Method - Binary Search - Finding the Maximum and Minimum- Merge Sort - Quick Sort - Selection Sort- Stassen's Matrix Multiplications. *(Chapter 3: Sections 3.1,3.3,3.4,3.5,3.6,3.7,3.8)*

UNIT - III: THE GREEDY METHOD

The General Method - Knapsack Problem – Tree Vertex Splitting - Job Sequencing with Deadlines- Minimum Cost Spanning Trees - Optimal Storage on Tapes - Optimal Merge Pattern - Single Source Shortest Paths.*(Chapter 4: Sections: 4.1,4.3 to 4.9)*

UNIT - IV: DYNAMIC POGRAMMING

The General Method – Multistage Graphs - All pair shortest path - String Editing - 0/1 Knapsack – Reliability Design - The Traveling Salesperson Problem - *(Chapter 5: Sections 5.1 to 5.3,5.6 to 5.9)*

UNIT - V: TRAVERSAL, SEARCHING & BACKTRACKING

Techniques for Binary Trees- Techniques for Graphs - The General Method - The 8-Queens Problem – Sum of Subsets- Graph Coloring- Hamiltonian Cycles.*(Chapter 6, Section 6.1,6.2 Chapter 7:Sections 7.1 to 7.5)*

Text Book:

Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, 2nd Edition, 2015, Universities Press.

Reference Books:

1. Introduction to Algorithms , Coremen T.H, Leiserson C.E. and Rivest R.L., PHI, 3rd Edition 2009.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson Education, 3rd Edition 2012.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW5002	MICROPROCESSORS AND ITS APPLICATIONS	5	CC14	5

Objectives: To learn the architecture, programming, interfacing and rudiments of system design of microprocessors.

Unit-I : 8085 MICROPROCESSOR AND ARCHITECTURE

Microprocessors - Memory - I/O Devices - Memory Mapped I/O - Pin diagram and internal architecture of 8085 - Registers, ALU, Control & Status Registers - Instruction and Machine Cycles. Interrupts (Chapter 1 to 4 and 12)

Unit II : PROGRAMMING THE 8085

Introduction to 8085 Assembly language programming - 8085 instructions - Programming techniques with Additional instructions - Counters and Time Delays - Stack and Subroutines - Code Conversions (Chapter 7 to 10)

Unit-III : 8086 MICROPROCESSOR AND ARCHITECTURE

Pin Details and Internal Architecture of 8086 - Register organization, Bus interface unit, Execution unit, Memory addressing, Memory segmentation. Operating modes - Hardware and Software interrupts - Addressing Modes.(Chapter 2)

Unit-IV : PROGRAMMING THE 8086

8086 Assembly Language Programming - Implementing Standard Program Structures - String - Procedure and Macros. Instruction Description and Assembler Directives (Chapter 3, 4, 5 and 6)

Unit-V : INTERFACING PERIPHERALS

8255 PPI, 8253/8254 PIT, 8237 DMAC,8259 PIC, 8251 USART. (Chapter 14,15,16)

Text Books:

1. Microprocessor Architecture, Programming and Applications with 8085,Ramesh S.Gaonkar, Penram International Publishing (India) Pvt. Ltd. 6th Ed. 2013 (for Units I,II and V)
2. Microprocessors and Interfacing, Douglas V. Hall, Tata McGraw Hill, 2nd Ed. 2006(for Units III and IV)

Reference Books:

1. Assembly Language Programming the IBM PC ,Alan R. Miller, Subex Inc,
2. Advanced Microprocessors and Peripherals, Ray A K , Bhurchandi K M , TMH. 3rd Edition, 2012

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW5003	COMPUTER NETWORKS	5	CC15	5

Objectives: This course introduces the concepts and theories of networking and applies them to various situations, classifying networks, analyzing performance and implementing new technologies.

UNIT-1 BASIC CONCEPTS OF OSI LAYERS

Data Communication – Networks – Protocol and Standards – Line Configuration – Topology – Transmission Modes – Categories of Networks – Internetworks- OSI Models – Functions of OSI Layers.
(Chapter 1: Sections: 1.2 to 1.5, Chapter 2: Sections: 2.1 to 2.5, Chapter 3: Sections: 3.1 and 3.2)

UNIT-II SIGNALS & ENCODING

Analog and digital – Periodic and Non Periodic signals – Analog Signals – Composite Signals- Digital signals – Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum – Error Correction- Analog to Digital Conversion- Digital to Digital Conversion – Digital to Analog Conversion – Analog to Analog Conversion.
(Chapter 4: Sections: 4.1 to 4.6, Chapter 5: Sections: 5.1 to 5.4)

UNIT-III TRANSMISSION MEDIA, ERROR DETECTION AND CORRECTION

Type of errors –Detection-Vertical Redundancy Check (VRC) - Longitudinal Redundancy Check (VRC) Cyclic Redundancy Check (CRC) –check sum=Error Corrections.(Chapter 7: Sections: 7.1 to 7.4, Chapter 9: Sections: 9.1 to 9.7)

UNIT-IV SWITCHING & NETWORK DEVICES

Circuit Switching-Packet Switching-Message Switching Repeaters-Bridges-Routers-Gateways-other Devices - Routing Algorithms-Distance Vectors Routing- Link State Routing.(Chapter 14: Sections: 14.1 to 14.3, Chapter 21: Sections: 21.1 to 21.8)

UNIT-V PROTOCALS & NETWORK SECURITY

TCP/IP-Network layer-Other protocols-ARP, RARP, ICMP, UDP, TCP Client/Server Model-Domain Name System (DNS) – Tel Net –File Transmission Protocol (FTP) –Simple Mail Transfer Protocol (SMTP) – Hyper Text Transmission Protocol (HTTP) World Wide Web (WWW) – Four Aspects of Security – Privacy – Digital Signature –Access Authorization. (Chapter 25: Sections: 25.1 to 25.10, Chapter 27: Sections: 27.1 to 27.5)

Text Book:

Data Communication and Networking 2nd Edition Behrouz A. Forouzan, McGraw Hill Education 2014.

Reference Books:
1. Data And Communication, Network William Stalling PHI 2014.
2. Computer Networks, Andrew S. Tanenbaum , David J. Wetherall, 5th Edition,Prentice Hall. 2010

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW5004	SOFTWARE ENGINEERING	5	CC16	5

Objectives: This course introduces the concepts and methods required for the construction of large software intensive systems.

Unit I: INTRODUCTION AND SOFTWARE PROCESSES

The Problem Domain- The Software Engineering Challenges -The Software Engineering Approach.
Software Process-Desired Characteristics of Software Process-Software Development Process Models-Other Software Processes (Chapter 1 Sections: 1.1 to 1.3) (Chapter 2: Sections: 2.1 to 2.4)

Unit II: SOFTWARE REQUIREMENT ANALYSIS AND SPECIFICATION AND SOFTWARE ARCHITECTURE

Software Requirements-Problem Analysis-Requirement Specification-Functional Specification with Use Cases –Validation-Metrics - Role of Software Architecture-Architecture Views-Component and Connector View (Chapter 3 Sections : 3.1 to 3.6 Chapter 4: Sections:4.1 to 4.3)

Unit III: PLANNING A SOFTWARE PROJECT AND DETAILED DESIGN

Process Planning-Effort Estimation-Project Scheduling and Staffing-Software Consideration Management Plan-Quality Plan-Risk Management-Project Monitoring Plan - Detailed Design and PDL-Verification-Metrics.(Chapter 5 Sections: 5.1 to 5.7, Chapter 8 Sections: 8.1 to 8.3)

Unit IV: FUNCTION-ORIENTED DESIGN AND OBJECT ORIENTED DESIGN

Design Principles-Module Level Concepts-Design Notation and Specification-Structured Design Methodology-Verification-Metrics.-OO Analysis and OO Design-OO Concepts-Design Concepts-Unified Modeling Language- A Design Methodology-Metrics. (Chapter 6: Sections: 6.1 to 6.6, Chapter 7 Sections:7.1 to 7.6)

Unit V: CODING AND TESTING

Programming Principles and Guidelines-Coding Process-Refactoring-Verification-Metrics Testing Fundamentals-Black Box Testing-White Box Testing-Testing Process-Defect Analysis and Prevention-Metrics-

(Reliability Estimation) (Chapter 9 Sections: 9.1 to 9.5, Chapter 10 Sections: 10.1 to 10.6)

Text Book:
An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Publishing - 3rd Edition Reprint 2014

Reference Books:
1. Software Engineering, Richard Fairley, TMH Publication,2012
2. Software Engineering, Ian Sommerville, Person Education Ltd, 9th Edition, 2011.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SWPR51	MICROPROCESSORS LAB	2	CC17	4

8085:

4. 8-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
5. 16-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
6. Block Operations (Sum, Copy, Reverse, Search, Largest/Smallest, Sort ,Fibonacci Series)
7. Code Conversion (BCD/Hex to Binary/ASCII and vice versa).
8. Bit Manipulation (Count Even/odd/Positives/Negatives) and Delay Routines.

8086:

6. 8/16-bit arithmetic addition, subtraction, Multiplication, Division.
7. Block operations (Sum, Average, Search, Largest/Smallest, Sort)
8. String Manipulation (Display, Case Conversion, Search, Copy, Reverse,Read)
9. BIOS routines (Rename a File, Keyboard input)
10. Lookup Table, Bit Manipulation.

Reference :

Lab Manual

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SWPR52	COMPUTER NETWORKS LAB	2	CC18	4

Exercises Using Java

1. Implementation of Subnetting
2. Implementation of UDP
3. Implementation of TCP
4. Implementation of Stop and Wait Protocols.
5. Implementation of Sliding Window Protocol.
6. Implementation of Shortest Path Algorithm.
7. Implementation of Distance Vector Algorithm.
8. Implementation of Link State Routing Algorithm.
9. Program using RPC & RMI
10. Implementation of ARP
11. Implementation of RARP
12. Implementation of FTP

Reference :

Lab Manual

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SWSBP5	MOBILE APPLICATION DEVELOPMENT LAB	1	AEC5	2

1. Intent and Activity
2. Using Controls
3. Alert Dialogs
4. List View
5. Options Menu
6. Seek Bars
7. Shared Preferences
8. Status Bar Notifications
9. Tab Widgets Talking Clock.
10. Tween Animation
11. Grid View
12. Internal Storage - Files
13. SQlite - Database
14. Google Map
15. Permissions

Reference :

1. Lab Manual

1. Professional Android 4 Application Development, Reto Meier, Wiley-India 2012

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW6001	SOFTWARE TESTING TECHNIQUES	5	CC19	5

Objectives: To discuss techniques that can be effectively for Programmers, Testers, Teachers, Researchers and Developers in practice, present object oriented testing and emphasize testing web applications and automated test data generation techniques.

UNIT-I: INTRODUCTION and TAXONOMY OF BUGS
Purpose of Testing-Some Dichotomies- a Modal for Testing-Playing Pool and Consulting Oracles-Is complete Testing Possible? (Chapter 1) **Taxonomy of Bugs:** The Consequences of Bugs-Taxonomy for Bugs-Some Bug Statistics (Chapter 2).
UNIT-II: FLOW GRAPHS and PATH TESTING
Path Testing Basics-Predicates, Path Predicates, and Achievable Paths-Path Sensitizing-Path Instrumentation-Implement and Application of Path Testing –Testability Tips (Chapter 3).
UNIT-III: TRANSACTION FLOW AND DATA FLOW TESTING
Generalizations-Transaction Flows-Transaction Flow Testing Techniques-Implementation Comments (Chapter 4) **Data-Flow Testing:** Data Flow Testing Basics-Data Flow Testing Strategies-Application, Tools, Effectiveness (Chapter 5).
UNIT-IV: DOMAIN TESTING
Domains and Paths-Nice Domains and Ugly Domains-Domain Testing-Domains and Interface Testing-Domains and Testability (Chapter 6).
UNIT-V: METRICS AND COMPLEXITY
Metrics, What and Why-Linguistic Metrics-Structural Metrics-Hybrid Metrics-Metrics Implementation-Testability Tips (Chapter 7).
Text Book:
Software Testing Techniques, Boris Beizer, Published by DreamTech, 2nd Edition 2014.
Reference Books:
1. Software Testing, Yogesh Singh, Cambridge University Press, 1st Edition, 2013.
2. Software Testing A Craftmans Approach, Paul C Jourgensen, Aueredach Publications, 3rd Edition, 2011.

3. Foundations of Software Testing – Fundamental Algorithms and Techniques, Adithya P.Mathur, Pearson Education India, 2011.

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW6002	DATABASE MANAGEMENT SYSTEM	5	CC20	5

Objectives: To understand the concepts of Database Management System and mastering Structured Query Language

UNIT – I : INTRODUCTION ,DATABASE DESIGN & E-R MODEL

Purpose of Database Systems – View of Data – Database Languages - Relational Databases – Database Design – Database Architecture (*Chapter 1 : Sections 1.2 to 1.6 & 1.11*) Entity Relationship model – Constraints - Entity Relationship Diagrams (*Chapter 6: Sections 6.2 to 6.4*)

Unit –II : RELATIONAL MODEL AND OTHER RELATIONAL LANGUAGES

Structure of Relational Databases – Fundamental Relational Algebra Operations –Additional Relational Algebra Opearations - Extended Relational Algebra Operations - Null Values - Modification of the Database (*Chapter 2 : Sections 2.1 to 2.6*) The Tuple Relational Calculus – The Domain Relational Calculus (*Chapter 5 : Sections 5.1 to 5.2*)

Unit – III : SQL, INTERMEDIATE and ADVANCED SQL

Data Definition – Basic Structure of SQL Queries –Set Operations – Aggregate Functions – Null Values - Nested Sub queries – Views - Modification of the Database - Joined Relations (*Chapter 3 : Sections 3.2 to3.11*) SQL Data Types and Schemas – Integrity Constraints - Authorization - Embedded SQL (*Chapter 4 : Sections 4.1 to 4.4*)

Unit – IV: RELATIONAL DATABASE DESIGN

Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory - Decomposition using Multivalued Dependencies.(*Chapter7:Sections 7.1to 7.4&7.6*)

Unit – V: SYSTEM ARCHITECTURE

Centralized and Client - Server Architecture - Server System Architecture - Parallel Systems - Distributed System. *(Chapter 20: Sections 20.1 to 20.4)* Distributed Database Storage - Distributed Transactions - Concurrency Control in Distributed Databases - Distributed Query Processing. *(Chapter22:Sections 22.2,22.3,22.5,22.7)*

Text Book:

Database System Concepts, Abraham Silberchatz, Henry F Korth , S.Sudarshan, McGraw-Hill - 6th Edition - 2013.

Reference Books:

1. Fundamentals of Database Systems, Elmasri and Navathe:, Pearson Education, 7th Edition 2015.
2. Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke: McGraw-Hill, 3rd Edition. 2002.

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW6003	OPERATING SYSTEMS	5	CC21	5

Objectives: To learn the various aspects of the internal operation of modern operating systems such as process management, threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

UNIT – I: INTRODUCTION & OPERATING SYSTEM STRUCTURES

What is an Operating System? - Mainframe Systems-Desktop Systems-Multiprocessor Systems-Distributed Systems-Clustered Systems-Real-Time Systems-Handheld Systems (*Chapter 1 : Sections 1.1 to1.8)* System Components-Operating System Services-System Calls-System Programs *(Chapter 3: Sections 3.1 to 3.4)*

UNIT – II :PROCESSES,CPU SCHEDULING & DEADLOCKS

Process Concept-Process Scheduling-Operations on Processes-Cooperating Processes-Interprocess Communication (*Chapter 4: Sections 4.1 to 4.5)* Basic Concepts-Scheduling Criteria-Scheduling Algorithms (*Chapter 6: Sections 6.1, 6.2, 6.3)* Deadlock Characterization-Methods for Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery from Deadlock (*Chapter 8: Sections 8.2 to 8.7)*

UNIT – III: STORAGE MANAGEMENT AND VITUAL MEMORY

Swapping-Contiguous Memory Allocation-Paging-Segmentation (*Chapter 9: Sections 9.2 to 9.5)* Demand Paging-Page Replacement (*Chapter 10: Sections 10.2, 10.4)*

Unit – IV: FILE SYSTEM INTERFACE, FILE SYSTEM MPLEMENTATION, MASS- STORAGE STRUCTURE

File Concept-Access Methods-Directory Structure (*Chapter 11 : Sections 11.1,11.2,11.3)*Allocation Methods-Free Space Management (*Chapter 11 : Sections 12.4,12.5)* Disk Structure-Disk Scheduling-Disk Management-Disk Attachment (*Chapter 12 : Sections 14.1,14.2,14.3,14.6)*

Unit – V: PROTECTION AND SECURITY

Goals of Protection-Domain of Protection-Access Matrix-Implementation of Access Matrix (*Chapter 18 : Sections 18.1 to18.4)* The Security Problem -User Authentication-Program Threats-Cryptography-Computer Security Classifications *(Chapter 19: Sections 19.1,19.2,19.3,19.7,19.8)*

Text Book:
Operating System Concepts, Silbershatz, Galvin, Gange, John Wiley &Sons Inc, 9th Edition, 2015.   .

Reference Books:
1. Operating Systems – Internals and Design Principles, William Stallings - Pearson, 8th Edition, 2014
2. Operating Systems – A Concept Based Approach- Dhananjay M. Dhamdhere, Tata McGraw – Hill, 3rd Edition, 2012

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SW6004	OPEN SOURCE PROGRAMMING	5	CC22	5

Objectives: To discuss techniques that can be effectively applied in practice about HTML5, JavaScript, PHP, CSS and Python.

UNIT I: INTRODUCTION TO HTML5, JAVA SCRIPT, PHP AND CSS

Introduction to Dynamic Web content- HTTP and HTML- Request and Response Procedure- The Benefits of PHP, JAVA Script, CSS, and HTML5- Introduction to HTML5- The Canvas -The HTML5 Canvas-

HTML5 Audio and Video- Introduction to CSS- CSS Rules-Style Types- CSS Selectors- CSS Colors. (Chapter 1: Page no 1to 6, 7 to 9 , Chapter 19: Page no. 423, 424, 426 to 435 and 447, 448 , Chapter 22: Page no. 509,510,513)

UNIT II : PHP INCORPORATING PHP WITHIN HTML

The Structure of PHP- Expressions- Operators – Conditionals – Looping – PHP Functions- PHP Objects – PHP Arrays (Chapter: 3 page no: 48 to 66, Chapter 4: Page No: 73 to 98 , Chapter 5: Page No: 104 to 111, 113 to 118 , Chapter 6: Page No: 131 TO 134)

UNIT III : EXPLORING JAVA SCRIPT

Java Script and HTML Text- Using Comments- Semicolons – Variables- Operators- Functions- Global Variables, Local Variables - Expressions and Control Flow in Java Script : Expressions – Literal and Variables- Operators - Java Script Functions - Java Script Objects - Java Script Arrays: Numeric Arrays – Associative Arrays – Multidimensional Arrays – Using Array Methods (Chapter 14: Page No:323 to 336) (Chapter 15: Page No: 343 to 347,)

UNIT IV : LEARNING PERL

Introduction - Scalar Data : Numbers,Strings,Chomp Operator – Control Structures. List and Arrays : Special Array Indices ,List Literals & assignments – Subroutines – Input and Output – PERL Modules – Directory Operations (Chapter 1 to 5) (Chapter 11 and Chapter 13)

UNIT V : PYTHON- BEGINNING TO USE PYTHON

Strings- Quotes – Numbers and Operators – Variables – Making Decisions – Functions (Chapter 1: Page No: 7 to 12) Chapter 2: Page No15 to 25) Chapter 3: Page no 31to 42) Chapter 4: Page No: 51 to 57) (Chapter 5: Page No: 71 to 87)

Text Books:
1. "Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. (Unit I,II and III)
2. "Learning PERL", Randall L.Schwartz, Tom Pheonix and Brain d foy. 7th Edition,2016 (Unit IV)
3. Beginning Python, James Payne, Wiley Publication, 1st Edition , 2011. (Unit V)

Reference Books

1. Learning JavaScript, Tim Wright, Pearson Education Inc,1st Edition, 2013.
2. Learning JavaScript, Ethan Brown, O'Really Media Inc, 3rd Edition, 2016.
3. Programming PHP , Rasmus Lerdorf and Levin Tatroe, O'Reilly Publications, 3rd Edition,2013.

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SWPR61	DATA BASE MANAGEMENT SYSTEM LAB (DBMS)	2	CC23	4

1. DML Commands
2. DDL Commands
3. Built in String/Date/Aggregate Functions
4. Single Table Queries
5. Joins
6. Sub Queries
7. Set Operators
8. Multiple Table Queries
9. Programmable Objects (Functions, Procedures, Triggers)
10. Advance Queries using AdventureWorks, Pubs, and NorthWind Databases and SqlReports.

Ex No.	Ex Name	No of Queries
1	World Database	70
2	HR Database	40
3	Publisher Database	25
4	Northwind Database	21
5	Sailor Database	20
6	Sakila Database	35
7	Adventure Works DB	30

8	Functions	6
9	Procedures	5
10	Triggers	3

Reference: Lab Manual

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SWPR62	UNIX AND OPERATING SYSTEM LAB	2	CC24	4

1. Create process (Child, Zombie,Orphan).

2. Inter Process Communication (Pipes, Message Queues and Semaphores)

3. Shell Programming (loops, patterns, expansions, substitutions, matching, searching)

4. Implement the various process scheduling (First Come First Serve, Shortest Job First, Priority, Round Robin).

5. Implement Memory allocation strategies (FirstFit, BestFit and WorstFit)

6. Implement Page Replacement Algorithms (First In First Out, Least Recently Used, Optimal)

7. Implement Disk Scheduling Algorithms (First In First Out, Shortest Seek Time First and SCAN)

Reference: Lab Manual

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5SWSBP6	OPEN SOURCE PROGRAMMING - LAB	1	AEC6	2

1. HTML (Frames, Links, Tables, ImageMap, Audio/Video and other tags)
2. CSS(inline, external, embedded)
3. JavaScript (Form validation)
4. Random number generation using PHP.
5. Any online application with database access.
6. PHP Program - Arrays Manipulation
7. Text Processing with PERL.
8. Sample web application development in the Open Source Environment.
9. Python Programs- Making Decisions
10. Python Programs- Functions

REFERENCE: Lab Manual

DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS
For
B.C.A
SEMESTERS – V & VI

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC5001	DESIGN AND ANALYSIS OF ALGORITHMS	5	CC13	5

Objectives: To build a solid foundation of the most important fundamental subject in computer science. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

UNIT -I: INTRODUCTION

What is an Algorithm? - Algorithm Specification- Performance Analysis- Randomized Algorithms. *(Chapter 1 Sections: 1.1 to 1.4)*

UNIT - II: DIVIDE AND CONQUER

General Method - Binary Search - Finding the Maximum and Minimum- Merge Sort - Quick Sort - Selection Sort- Stassen's Matrix Multiplications. *(Chapter 3: Sections 3.1,3.3,3.4,3.5,3.6,3.7,3.8)*

UNIT - III: THE GREEDY METHOD

The General Method - Knapsack Problem – Tree Vertex Splitting - Job Sequencing with Deadlines- Minimum Cost Spanning Trees - Optimal Storage on Tapes - Optimal Merge Pattern - Single Source Shortest Paths.*(Chapter 4: Sections: 4.1,4.3 to 4.9)*

UNIT - IV: DYNAMIC POGRAMMING

The General Method – Multistage Graphs - All pair shortest path - String Editing - 0/1 Knapsack – Reliability Design - The Traveling Salesperson Problem - *(Chapter 5: Sections 5.1 to 5.3,5.6 to 5.9)*

UNIT - V: TRAVERSAL, SEARCHING & BACKTRACKING

Techniques for Binary Trees- Techniques for Graphs - The General Method - The 8-Queens Problem – Sum of Subsets- Graph Coloring- Hamiltonian Cycles.*(Chapter 6, Section 6.1,6.2 Chapter 7:Sections 7.1 to 7.5)*

Text Book:

Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, 2nd Edition, 2015, Universities Press.

Reference Books:

1. Introduction to Algorithms , Coremen T.H, Leiserson C.E. and Rivest R.L., PHI, 3ʳᵈ Edition 2009.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, Pearson Education, 3ʳᵈ Edition 2012.

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC5002	MICROPROCESSORS AND ITS APPLICATIONS	5	CC14	5

Objectives: To learn the architecture, programming, interfacing and rudiments of system design of microprocessors.

Unit-I : 8085 MICROPROCESSOR AND ARCHITECTURE

Microprocessors - Memory - I/O Devices - Memory Mapped I/O - Pin diagram and internal architecture of 8085 - Registers, ALU, Control & Status Registers - Instruction and Machine Cycles. Interrupts (Chapter 1 to 4 and 12)

Unit II : PROGRAMMING THE 8085

Introduction to 8085 Assembly language programming - 8085 instructions - Programming techniques with Additional instructions - Counters and Time Delays - Stack and Subroutines - Code Conversions (Chapter 7 to 10)

Unit-III : 8086 MICROPROCESSOR AND ARCHITECTURE

Pin Details and Internal Architecture of 8086 - Register organization, Bus interface unit, Execution unit, Memory addressing, Memory segmentation. Operating modes - Hardware and Software interrupts - Addressing Modes.(Chapter 2)

Unit-IV : PROGRAMMING THE 8086

8086 Assembly Language Programming - Implementing Standard Program Structures - String - Procedure and Macros. Instruction Description and Assembler Directives (Chapter 3, 4, 5 and 6)

Unit-V : INTERFACING PERIPHERALS

8255 PPI, 8253/8254 PIT, 8237 DMAC,8259 PIC, 8251 USART. (Chapter 14,15,16)

Text Books:

3. Microprocessor Architecture, Programming and Applications with 8085,Ramesh S.Gaonkar, Penram International Publishing (India) Pvt. Ltd. 6th Ed. 2013 (for Units I,II and V)
4. Microprocessors and Interfacing, Douglas V. Hall, Tata McGraw Hill, 2nd Ed. 2006(for Units III and IV)

Reference Books:

1. Assembly Language Programming the IBM PC ,Alan R. Miller, Subex Inc,
2. Advanced Microprocessors and Peripherals, Ray A K , Bhurchandi K M , TMH. 3rd Edition, 2012
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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC5003	COMPUTER NETWORKS	5	CC15	5

Objectives: This course introduces the concepts and theories of networking and applies them to various situations, classifying networks, analyzing performance and implementing new technologies.

UNIT-1 BASIC CONCEPTS OF OSI LAYERS

Data Communication – Networks – Protocol and Standards – Line Configuration – Topology – Transmission Modes – Categories of Networks – Internetworks- OSI Models – Functions of OSI Layers.
(Chapter 1: Sections: 1.2 to 1.5, Chapter 2: Sections: 2.1 to 2.5, Chapter 3: Sections: 3.1 and 3.2)

UNIT-II SIGNALS & ENCODING

Analog and digital – Periodic and Non Periodic signals – Analog Signals – Composite Signals- Digital signals – Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum – Error Correction- Analog to Digital Conversion- Digital to Digital Conversion – Digital to Analog Conversion – Analog to Analog Conversion.
(Chapter 4: Sections: 4.1 to 4.6, Chapter 5: Sections: 5.1 to 5.4)

UNIT-III TRANSMISSION MEDIA, ERROR DETECTION AND CORRECTION

Type of errors –Detection-Vertical Redundancy Check (VRC) - Longitudinal Redundancy Check (VRC) Cyclic Redundancy Check (CRC) –check sum=Error Corrections.(Chapter 7: Sections: 7.1 to 7.4, Chapter 9: Sections: 9.1 to 9.7)

UNIT-IV SWITCHING & NETWORK DEVICES

Circuit Switching-Packet Switching-Message Switching Repeaters-Bridges-Routers-Gateways-other Devices - Routing Algorithms-Distance Vectors Routing- Link State Routing.(Chapter 14: Sections: 14.1 to 14.3, Chapter 21: Sections: 21.1 to 21.8)

UNIT-V PROTOCALS & NETWORK SECURITY

TCP/IP-Network layer-Other protocols-ARP, RARP, ICMP, UDP, TCP Client/Server Model-Domain Name System (DNS) – Tel Net –File Transmission Protocol (FTP) –Simple Mail Transfer Protocol (SMTP) – Hyper Text Transmission Protocol (HTTP) World Wide Web (WWW) – Four Aspects of Security – Privacy – Digital Signature –Access Authorization. (Chapter 25: Sections: 25.1 to 25.10, Chapter 27: Sections: 27.1 to 27.5)

Text Book:

Data Communication and Networking 2nd Edition Behrouz A. Forouzan, McGraw Hill Education 2014.

Reference Books:
1. Data And Communication, Network William Stalling PHI 2014.
2. Computer Networks, Andrew S. Tanenbaum , David J. Wetherall, 5th Edition,Prentice Hall. 2010

SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC5004	SOFTWARE ENGINEERING	5	CC16	5

Objectives: This course introduces the concepts and methods required for the construction of large software intensive systems.

Unit I: INTRODUCTION AND SOFTWARE PROCESSES

The Problem Domain- The Software Engineering Challenges -The Software Engineering Approach.
Software Process-Desired Characteristics of Software Process-Software Development Process Models-Other Software Processes (Chapter 1 Sections: 1.1 to 1.3) (Chapter 2: Sections: 2.1 to 2.4)

Unit II: SOFTWARE REQUIREMENT ANALYSIS AND SPECIFICATION AND SOFTWARE ARCHITECTURE

Software Requirements-Problem Analysis-Requirement Specification-Functional Specification with Use Cases –Validation-Metrics - Role of Software Architecture-Architecture Views-Component and Connector View (Chapter 3 Sections : 3.1 to 3.6 Chapter 4: Sections:4.1 to 4.3)

Unit III: PLANNING A SOFTWARE PROJECT AND DETAILED DESIGN

Process Planning-Effort Estimation-Project Scheduling and Staffing-Software Consideration Management Plan-Quality Plan-Risk Management-Project Monitoring Plan - Detailed Design and PDL-Verification-Metrics.(Chapter 5 Sections: 5.1 to 5.7, Chapter 8 Sections: 8.1 to 8.3)

Unit IV: FUNCTION-ORIENTED DESIGN AND OBJECT ORIENTED DESIGN

Design Principles-Module Level Concepts-Design Notation and Specification-Structured Design Methodology-Verification-Metrics.-OO Analysis and OO Design-OO Concepts-Design Concepts-Unified Modeling Language- A Design Methodology-Metrics. (Chapter 6: Sections: 6.1 to 6.6, Chapter 7 Sections:7.1 to 7.6)

Unit V: CODING AND TESTING

Programming Principles and Guidelines-Coding Process-Refactoring-Verification-Metrics Testing Fundamentals-Black Box Testing-White Box Testing-Testing Process-Defect Analysis and Prevention-Metrics-

(Reliability Estimation) (Chapter 9 Sections: 9.1 to 9.5, Chapter 10 Sections: 10.1 to 10.6)

Text Book:
An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Publishing - 3rd Edition Reprint 2014

Reference Books:
1. Software Engineering, Richard Fairley, TMH Publication,2012
2. Software Engineering, Ian Sommerville, Person Education Ltd, 9th Edition, 2011.

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BCPR51	MICROPROCESSORS LAB	2	CC17	4

8085:

1. 8-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
2. 16-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
3. Block Operations (Sum, Copy, Reverse, Search, Largest/Smallest, Sort ,Fibonacci Series)
4. Code Conversion (BCD/Hex to Binary/ASCII and vice versa).
5. Bit Manipulation (Count Even/odd/Positives/Negatives) and Delay Routines.

8086:

1. 8/16-bit arithmetic addition, subtraction, Multiplication, Division.
2. Block operations (Sum, Average, Search, Largest/Smallest, Sort)
3. String Manipulation (Display, Case Conversion, Search, Copy, Reverse,Read)
4. BIOS routines (Rename a File, Keyboard input)
5. Lookup Table, Bit Manipulation.

Reference: Lab Manual

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BCPR52	COMPUTER NETWORKS LAB	2	CC18	4

Exercises Using Java

1. Implementation of Subnetting
2. Implementation of UDP
3. Implementation of TCP
4. Implementation of Stop and Wait Protocols.
5. Implementation of Sliding Window Protocol.
6. Implementation of Shortest Path Algorithm.
7. Implementation of Distance Vector Algorithm.
8. Implementation of Link State Routing Algorithm.
9. Program using RPC & RMI
10. Implementation of ARP
11. Implementation of RARP
12. Implementation of FTP

Reference: Lab Manual

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SEMESTER - V

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BCSBP5	MOBILE APPLICATION DEVELOPMENT LAB	1	AEC5	2

1. Intent and Activity
2. Using Controls
3. Alert Dialogs
4. List View
5. Options Menu
6. Seek Bars
7. Shared Preferences
8. Status Bar Notifications
9. Tab Widgets Talking Clock.
10. Tween Animation
11. Grid View
12. Internal Storage - Files
13. SQlite - Database
14. Google Map
15. Permissions

Reference :

1. Lab Manual

1. Professional Android 4 Application Development, Reto Meier, Wiley-India 2012

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC6001	COMPUTER GRAPHICS AND MULTIMEDIA	5	CC19	5

Objectives: To equip students to basics of computer drawing and prepare them for computer modeling of objects.

UNIT-I : GRAPHIC SYSTEMS AND OUTPUT PRIMITIVES
Video Display Devices : Refresh CRT -Raster scan display-Random scan display- Raster Scan Systems – Random Scan Systems – Output Primitives :DDA line algorithm– Bresenham Line Drawing Algorithms –Bresenham Circle Generating Algorithm – GUI: Logical Classification of Input Devices – Interactive Picture Construction Methods. (Chapter 3: Sections: 3.1,3.2,3.5, Chapter 8: Sections: 8.2,8.5)
UNIT-II : 2D TRANSFORMATION AND VIEWING
 2D Geometric transformations: Translation-Rotation-Scaling - Homogenous Coordinates- Composite Transformation-other Transformation - 2D Viewing : Viewing pipeline- Window to Viewport Co-ordinate Transformation – point clipping-Cohen Sutherland Line Clipping Algorithms – Liang Barsky Line Clipping Algorithm-Sutherland Hodgeman polygon Clipping Algorithm.(Chapter 5: Sections: 5.1 to 5.4, Chapter 6: Sections: 6.1, 6.3, 6.5 to 6.8)
Unit- III : 3D TRANSFORMATION AND VIEWING
     3D Geometric Transformation :Translation, Rotation, Scaling- General 3D rotation - 3D viewing: viewing pipeline-viewing coordinates-Projections: parallel projection-perspective projection.(Chapter 11: Sections: 11.1 to 11.3, Chapter 12: Sections: 12.1 to 12.3)
Unit-IV : VISIBLE SURFACE DETECTION
     Classification- Back Face detection- Depth buffer method- A buffer method- Scan line method-BSP tree method-Area subdivision method-Octree methods – Ray Casting method(Chapter 13: Sections:13.1 to 13.10)
Unit-V : MULTIMEDIA
     Classification- MM building blocks: Audio-audio editing-MIDI-Text-display design and content design- Images-development- Computer animation classifications-2D animation-3D Animation—3D Animation environment-digital video fundamentals-video broadcasting standards-MM

file format.(Chapter 1, Chapter 5 to 10, Chapter 12 to 16, Appendix A)

Text Books:
1. D. Hearn and M.P. Baker – Computer Graphics (C version) with OpenGL – Pearson Education-4th edition-2011
2. S. Gokul - Multimedia Magic –BPB Publications- 2nd Edition 2008

Reference Books:
3. W.M. Newman and R.F. Sproull – Principles of Interactive Computer Graphics – McGraw Hill International Edition – 2nd Edition, 2001
4. Tay Vaughan-Multimedia making it work -TMH publication-9th Edition, 2014

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC6002	DATABASE MANAGEMENT SYSTEM	5	CC20	5

Objectives: To understand the concepts of Database Management System and mastering Structured Query Language

UNIT – I : INTRODUCTION ,DATABASE DESIGN & E-R MODEL

Purpose of Database Systems – View of Data – Database Languages - Relational Databases – Database Design – Database Architecture (*Chapter 1 : Sections 1.2 to 1.6 & 1.11*) Entity Relationship model – Constraints - Entity Relationship Diagrams (*Chapter 6: Sections 6.2 to 6.4*)

Unit –II : RELATIONAL MODEL AND OTHER RELATIONAL LANGUAGES

Structure of Relational Databases – Fundamental Relational Algebra Operations –Additional Relational Algebra Opearations - Extended Relational Algebra Operations - Null Values - Modification of the Database (*Chapter 2 : Sections 2.1 to 2.6*) The Tuple Relational Calculus – The Domain Relational Calculus (*Chapter 5 : Sections 5.1 to 5.2*)

Unit – III : SQL, INTERMEDIATE and ADVANCED SQL

Data Definition – Basic Structure of SQL Queries –Set Operations – Aggregate Functions – Null Values - Nested Sub queries – Views - Modification of the Database - Joined Relations (*Chapter 3 : Sections 3.2 to3.11*) SQL Data Types and Schemas – Integrity Constraints - Authorization - Embedded SQL (*Chapter 4 : Sections 4.1 to 4.4*)

Unit – IV: RELATIONAL DATABASE DESIGN

Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory - Decomposition using Multivalued Dependencies.(*Chapter7:Sections 7.1to 7.4&7.6)*

Unit – V: SYSTEM ARCHITECTURE

Centralized and Client - Server Architecture - Server System Architecture - Parallel Systems - Distributed System. *(Chapter 20: Sections 20.1 to 20.4)* Distributed Database Storage - Distributed Transactions - Concurrency Control in Distributed Databases - Distributed Query Processing. *(Chapter22:Sections 22.2,22.3,22.5,22.7)*

Text Book:
Database System Concepts , Abraham Silberchatz, Henry F Korth , S.Sudarshan, McGraw-Hill - 6th Edition - 2013.
Reference Books:
1. Fundamentals of Database Systems, Elmasri and Navathe:, Pearson Education, 7th Edition 2015.
2. Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke: McGraw-Hill, 3rd Edition. 2002.

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BC6003	OPERATING SYSTEMS	5	CC21	5

Objectives: To learn the various aspects of the internal operation of modern operating systems such as process management, threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

UNIT – I :INTRODUCTION & OPERATING SYSTEM STRUCTURES

What is an Operating System? - Mainframe Systems-Desktop Systems-Multiprocessor Systems-Distributed Systems-Clustered Systems-Real-Time Systems-Handheld Systems (*Chapter 1 : Sections 1.1 to1.8)* System Components-Operating System Services-System Calls-System Programs *(Chapter 3: Sections 3.1 to 3.4)*

UNIT – II :PROCESSES,CPU SCHEDULING & DEADLOCKS

Process Concept-Process Scheduling-Operations on Processes-Cooperating Processes-Interprocess Communication (*Chapter 4: Sections 4.1 to 4.5*) Basic Concepts-Scheduling Criteria-Scheduling Algorithms (*Chapter 6: Sections 6.1, 6.2, 6.3*) Deadlock Characterization-Methods for Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery from Deadlock (*Chapter 8: Sections 8.2 to 8.7*)

UNIT – III: STORAGE MANAGEMENT AND VITUAL MEMORY

Swapping-Contiguous Memory Allocation-Paging-Segmentation (*Chapter 9: Sections 9.2 to 9.5*) Demand Paging-Page Replacement (*Chapter 10: Sections 10.2, 10.4*)

Unit – IV: FILE SYSTEM INTERFACE, FILE SYSTEM MPLEMENTATION, MASS- STORAGE STRUCTURE

File Concept-Access Methods-Directory Structure (*Chapter 11 : Sections 11.1,11.2,11.3*)Allocation Methods-Free Space Management (*Chapter 11 : Sections 12.4,12.5*) Disk Structure-Disk Scheduling-Disk Management-Disk Attachment (*Chapter 12 : Sections 14.1,14.2,14.3,14.6*)

Unit – V: PROTECTION AND SECURITY

Goals of Protection-Domain of Protection-Access Matrix-Implementation of Access Matrix (*Chapter 18 : Sections 18.1 to18.4*) The Security Problem -User Authentication-Program Threats-Cryptography-Computer Security Classifications *(Chapter 19: Sections 19.1,19.2,19.3,19.7,19.8)*

Text Book:
Operating System Concepts, Silbershatz, Galvin, Gange, John Wiley &Sons Inc, 9th Edition, 2015. .

Reference Books:
1. Operating Systems – Internals and Design Principles, William Stallings - Pearson, 8th Edition, 2014
2. Operating Systems – A Concept Based Approach- Dhananjay M. Dhamdhere, Tata McGraw – Hill, 3rd Edition, 2012

SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/WEEK
U5BC6004	OPEN SOURCE PROGRAMMING	5	CC22	5

Objectives: To discuss techniques that can be effectively applied in practice about HTML5, JavaScript, PHP , CSS and Python.

UNIT I : INTRODUCTION TO HTML5,JAVA SCRIPT, PHP AND CSS

Introduction to Dynamic Web content- HTTP and HTML- Request and Response Procedure- The Benefits of PHP, JAVA Script, CSS, and HTML5- Introduction to HTML5- The Canvas -The HTML5 Canvas- HTML5 Audio and Video- Introduction to CSS- CSS Rules-Style Types- CSS Selectors- CSS Colors. (Chapter 1: Page no 1to 6, 7 to 9 , Chapter 19: Page no. 423, 424, 426 to 435 and 447, 448 , Chapter 22: Page no. 509,510,513)

UNIT II : PHP INCORPORATING PHP WITHIN HTML

The Structure of PHP- Expressions- Operators – Conditionals – Looping – PHP Functions- PHP Objects – PHP Arrays (Chapter: 3 page no: 48 to 66, Chapter 4: Page No: 73 to 98 , Chapter 5: Page No: 104 to 111, 113 to 118 , Chapter 6: Page No: 131 TO 134)

UNIT III : EXPLORING JAVA SCRIPT

Java Script and HTML Text- Using Comments- Semicolons – Variables- Operators- Functions- Global Variables, Local Variables - Expressions and Control Flow in Java Script : Expressions – Literal and Variables- Operators - Java Script Functions - Java Script Objects - Java Script Arrays: Numeric Arrays – Associative Arrays – Multidimensional Arrays – Using Array Methods (Chapter 14: Page No:323 to 336) (Chapter 15: Page No: 343 to 347,)

UNIT IV : LEARNING PERL

Introduction - Scalar Data : Numbers,Strings,Chomp Operator – Control Structures. List and Arrays : Special Array Indices ,List Literals & assignments – Subroutines – Input and Output – PERL Modules – Directory Operations (Chapter 1 to 5) (Chapter 11 and Chapter 13)

UNIT V : PYTHON- BEGINNING TO USE PYTHON

Strings- Quotes – Numbers and Operators – Variables – Making Decisions – Functions (Chapter 1: Page No: 7 to 12) Chapter 2: Page No15 to 25) Chapter 3: Page no 31to 42) Chapter 4: Page No: 51 to 57) (Chapter 5: Page No: 71 to 87)

Text Books:
1. "Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. (Unit I,II and III)
2. "Learning PERL", Randall L.Schwartz, Tom Pheonix and Brain d foy. 7th Edition,2016 (Unit IV)
3. Beginning Python, James Payne, Wiley Publication, 1st Edition , 2011. (Unit V)

Reference Books
4. Learning JavaScript, Tim Wright, Pearson Education Inc,1st Edition, 2013.
5. Learning JavaScript, Ethan Brown, O'Really Media Inc, 3rd Edition, 2016.
6. Programming PHP , Rasmus Lerdorf and Levin Tatroe, O'Reilly Publications, 3rd Edition,2013.

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BCPR61	DATA BASE MANAGEMENT SYSTEM LAB (DBMS)	2	CC23	4

1. DML Commands

2. DDL Commands

3. Built in String/Date/Aggregate Functions

4. Single Table Queries

5. Joins

6. Sub Queries

7. Set Operators

8. Multiple Table Queries

9. Programmable Objects (Functions, Procedures, Triggers)

10. Advance Queries using AdventureWorks, Pubs, and NorthWind Databases and SqlReports.

Ex No.	Ex Name	No of Queries
1	World Database	70
2	HR Database	40
3	Publisher Database	25
4	Northwind Database	21
5	Sailor Database	20
6	Sakila Database	35
7	Adventure Works DB	30
8	Functions	6
9	Procedures	5
10	Triggers	3

Reference: Lab Manual

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BCPR62	UNIX AND OPERATING SYSTEM LAB	2	CC24	4

1. Create process (Child, Zombie,Orphan).

2. Inter Process Communication (Pipes, Message Queues and Semaphores)

3. Shell Programming (loops, patterns, expansions, substitutions, matching, searching)

4. Implement the various process scheduling (First Come First Serve, Shortest Job First, Priority, Round Robin).

5. Implement Memory allocation strategies (FirstFit, BestFit and WorstFit)

6. Implement Page Replacement Algorithms (First In First Out, Least Recently Used, Optimal)

7. Implement Disk Scheduling Algorithms (First In First Out, Shortest Seek Time First and SCAN)

Reference: Lab Manual

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SEMESTER - VI

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
U5BCSBP6	OPEN SOURCE PROGRAMMING - LAB	1	AEC6	2

1. HTML (Frames, Links, Tables, ImageMap, Audio/Video and other tags)
2. CSS(inline, external, embedded)
3. JavaScript (Form validation)
4. Random number generation using PHP.
5. Any online application with database access.
6. PHP Program - Arrays Manipulation
7. Text Processing with PERL.
8. Sample web application development in the Open Source Environment.
9. Python Programs- Making Decisions
10. Python Programs- Functions

REFERENCE: Lab Manual

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DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS
For
M.Sc. Computer Science
SEMESTERS – III & IV

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CS3001	DIGITAL IMAGE PROCESSING	5	PAPER IX	6

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 – Hierarchal 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

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SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CS3002	INFORMATION & NETWORK SECURITY	5	PAPER X	6

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   (Unit-I : Chapter 1 - 1.1,1.2,1.3,1.4,1.6,1.8,1.9) (Unit –II : Chapter 2 -2.1, 2.2,2.3,2.4 , Chapter 3) (Unit – III : Chapter 4 : 4.2, 4.3,4.4)
2. Cryptography and Network security – Principles and Practice , William Stallings, 6th Edition, Pearson Education, 2014.(Unit-IV – Page 11,32,52,57) (Unit-V – Page 244,252,277,293)

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.

SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSPR31	DIGITAL IMAGE PROCESSING LAB	4	PAPER XI	6

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

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SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CS3003	ADVANCED COMPUTER ARCHITECTURE	4	PAPER XII	6

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 – heterogenous 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.

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SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSE301	BUSINESS INTELLIGENCE AND DATA MINING	4	ELECTIVE PAPER III	6

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.*(Chapter 3: Section 3.1,3.2,3.3,3.4,)*

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. *.(Chapter 1: Section 1.1,1.2,1.3, Chapter 2: Section 2.1,2.2,2.3,2.4,2.5,2.6)*

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. *.(Chapter 1: Section 1.4, Chapter 5: Section 5.1,5.2, 5.3, 5.5)*

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.*(Chapter 6: Section 6.1 to 6.15)*

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.*(Chapter 7: Section 7.1to 7.11)* **Total : 75 Hours**

TEXT BOOK:

Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Elsevier, 2nd Edition, Reprinted 2008.

REFERENCES:

1. Data Warehousing, Data Mining, and OLAP , Berson,Alex & Smith, Stephen J, Tata McGraw Hill, 2012

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

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SEMESTER - III

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSE302	WIRELESS NETWORK	4	ELECTIVE PAPER III	6

OBJECTIVES:
To study about Wireless networks, protocol stack, standards, fundamentals of 3G Services, its protocols and applications, evolution of 4G Networks, its architecture and applications.

UNIT I WIRELESS LAN 9

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum - IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security – IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX.

UNIT IIMOBILE NETWORK LAYER 9

Introduction – Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol – mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing.

UNIT III MOBILE TRANSPORT LAYER   9

TCP enhancements for wireless protocols – Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility – Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP – TCP over 3G wireless networks**.**

UNIT   IVWIRELESS WIDE AREA NETWORK   9

Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.

UNIT V4G NETWORKS   9

Introduction – 4G vision – 4G features and challenges – Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , "Wireless Communications and networking", First Edition, Elsevier 2007.(Unit IV,V)

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.
3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications",

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CS4001	CLOUD COMPUTING	4	PAPER XIII	6

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 schedulesm 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.

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

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CS4002	**PRINCIPLES OF COMPILER DESIGN**	5	PAPER XIV	5

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.
(Chapter 1: Section 1.1, 1.2, 1.3,1.4,1.5,1.6,1.7, Chapter 2: Section 2.1,2.3,2.42.5,2.6,2.10)

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.
(Chapter 3: Section 3.1,3.2,3.5,3.3, Chapter 4: Section 4.2,4.5 Chapter 8: Section 8.2,8.3,8.4)

UNIT III : INTERMEDIATE CODE GENERATION   18 Hours
Intermediate languages-Declarations-Assignment statements - Boolean expressions- Case statements- Backpatching-Procedure calls
(Chapter 5: Section 5.2,5.3,5.4,5.5,5.6,5.7,5.8)

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.
(Chapter 6: Section 6.2,6.3,6.4,6.5,6.6,6.7,6.8)

UNIT V : CODE OPTIMIZATION   **18 Hours**

Introduction-The principle sources of optimization-Peephole optimization-Optimization of basic blocks-Loops in flow graphs- Introduction to global data-flow analysis-Code improving transformations.
    (Chapter 7: Section 7.1,7.2,7.3,7.4,)

                                                           Total : 90 Hours

TEXT BOOK:

Compiler Design , Dr. R. Venkatesh, Yes Dee Publishing pvt. Ltd, 2015

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.

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSPR41	**COMPILER DESIGN LAB**	4	**PAPER XV**	5

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

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSE401	HUMAN COMPUTER INTERACTION	4	ELECTIVE PAPER IV	5

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**

The Importance of user Interface-Defining the User Interface, The importance of Good Design , The Benefits of good design, A brief History of Screen design. **Characteristics of Graphical and Web User Interfaces-** The Graphical User Interface, The popularity of graphics, The Concept of Direct Manipulation. Graphical system: Advantages and Disadvantages , Characteristics of the Graphical User Interface, The Web User Interface – The Popularity of the Web- Characteristics of a Web Interface- Principles of User Interface Design**.(Part 1, Chapter 1 & 2)**

UNIT - II   **12 Hours**

The User Interface Design Process – Understanding How People Interact with computers – Important Human Charactersitics in Design- Human Considerations in Design- Human Interaction Speeds- Understanding Business Functions. **(Part 2, Step: 1 & 2)**

UNIT - III   **12 Hours**

Understand the Principles of Good Screen Design: Interface Design Goals – Screen Meaning and Purpose- Organizing Screen Elements Clearity and Meaningfully- Ordering of Screen Data and Content – Screen Navigation and Flow – Visually Pleasing Composition – Amount of Iinformation – Focus and Emphasis – Presenting Information Simply and Meaningfully – Reading, Browsing, and Searching on web- Statistical Graphics – Technological Consideration in Interface Design. **(Part 2:Step : 3)**

UNIT - IV   **12 Hours**

Development System Menus and Navigation Schemes- Select the Proper Kinds of Windows- Select the Proper Device Based Controls- Choose the Proper Screen Based Controls-Write Clear Text and Messages- Create Meaning ful Graphics-Icons and Images- Choose the Proper Colors: Color- Color Uses- Possible Problems with Color-Choosing Colors**.(Part 2: Step: 4,5,6,7,8,11,12)**

UNIT - V   **12 Hours**

Software Tools – Specification Methods, Interface – Building Tools. **(Part II: Chapter: 5)**
Interaction Devices: Introduction- Keyboards and Keypads- Pointing Devices- Speech and Auditory Interfaces- Displays Small and Large**.(Part III: Chapter:9)**

                                                            Total : 60 Hours

TEXT BOOKS :
1. The Essential Guide to User Interface Design, Second Edition, Wilbert O Galitz, Wiley India Edition. **(Unit: I,II,III,IV)**
2. Designing the User Interface, Ben Shneidermann, Pearson Education Asia, 4rd, Edition, 2005.**(Unit: V)**

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.

SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSE402	**WEB PUBLISHING**	**4**	**ELECTIVE PAPER IV**	**5**

Unit I:
Exploring the PHP Environment, Special Topic – Uploading to ShawneeSpace Server - Using Variables and Input– Controlling Your Code with Conditions andFunctions - Create Web home pages and sites- Identify the terms, concepts and components used in the internet and Web environment.

Unit II:
Loops and Arrays, Better Arrays and String HandlingWorking With FilesWriting Programs with ObjectsReview and Slack DayRegular expressions, data validation.Create publications for the Internet incorporating graphics such as GIF and JPEG.Work online with computer software programs such as Dreamweaver.Create hyperlinks between pages, documents and other sites.

Unit III:
Connecting to a database with PDOError controlConnecting to a database with PDO (part 2)Security and SQL Injection - Create images and make them serve as hyperlinks.Create tables.Create framed documents.Create image maps.

Unit IV:
XML using simpleXMLHandling AJAX requests Graphic Manipulation using the GD libraryCreating dynamic PDF documents using FPDF. Learn XHTML & CSS - Slice and export images Photoshop - XHTML/CSS -Slicing in Photoshop then export -Double Identity website project.

Unit V:
Link to external CSS - Learn DIVs -one background image repeated horizontally (repeat-x)Link to ext CSS - Make DIVs - Double Identity website project - Troubleshoot Double Identity website project - Make a website graphic in Photoshop - 5-8 page navigation -Logo, banner, body content, footer

TEXT BOOK:

1. Duckett, John (2011). HTML & CSS: Design and build websites. Indianapolis, Indiana: John Wiley and Sons, Inc.
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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSNM41	EMBEDDED SYSTEMS	2	NON MAJOR PAPER	5

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.

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SEMESTER - IV

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
P6CSPJ41	**PROJECT WITH VIVA**	4	**ELECTIVE PAPER IV**	4

1. Mini projects would be allotted to IV Semester students which have to be carried out by them
2. The studentswillsubmitthe title of the miniproject in their field of interest.

   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 and alogorithms.
   c. Giving a preliminary seminarfor the purpose of internal assessment.
   d. Writing a dissertation or mini project report. This will be submitted by the students at the end of semester.

Viva-Voce

The Final evaluation of the mini project work completed will be done by external and internal examiners appointed by the Board on the basis of an oral presentation andthe submitted Project-Report.

DEPARTMENT OF MATHEMATICS

SYLLABUS
For
M.Phil. Mathematics

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5MS01	ALGEBRA AND ANALYSIS	5	PAPER I	6

UNIT– I : RINGS, IDEAL AND MODULES

Rings and ring homomorphisms – Ideals, Quotient rings – Zero divisors, Nilpotent elements, Units – Prime ideals and maximal ideals – Nilradical and Jacobson radical – Operations on ideals – Extension and contraction – Exercise – Modules and module homomorphisms – Submodules and quotient modules – Operations on submodules – Direct sum and product – Finitely generated modules – Exact sequences – Tensor product of modules – Restriction and extension of scalars – Exactness properties of the tensor product – Algebras – Tensor product of algebras – Exercises.
Chapter 1: (pp. 1 – 10)
Chapter 2: (pp. 17 – 31).

UNIT–II: RINGS, MODULES OF FRACTIONS AND PRIMARY DECOMPOSITION
Local properties – Extended and contracted ideals in rings of fractions – Exercise – Primary Decomposition – Exercise.
Chapter 3: (pp. 36 – 43)
Chapter 4: (pp. 50 – 55).

UNIT–III: CHAIN CONDITIONS, NOETHERIAN RINGS AND ARTIN RINGS
Chain conditions – Exercises – Primary Decomposition in Noetherian rings – Exercises – Artin Rings – Exercises.
Chapter 6: (pp. 74 – 78)
Chapter 7: (pp. 80 – 84)
Chapter 8: (pp. 89 – 91).

UNIT– IV : ABSTRACT INTEGRATION AND L^p SPACE
The concept of measurability – simple functions – Elementary properties of measures integration of positive functions – Integration of complex functions – The role played by sets of measure zero – Convex functions and inequality – L^p spaces.
Chapter 1: (pp. 5 – 31)
Chapter 3: (pp. 61 – 69).

UNIT – V : FOURIER TRANSFORMS AND HOLOMORPHIC FOURIER TRANSFORMS
Formal properties – The Invention Theorem – The Plancheral Theorem – The Banach algebra L^1 – Introduction – Two Theorems of Paley and Wiener Quasi – Analytic classes – The Denjoy – Carleman theorem.
Chapter 9: (pp. 178 – 193)
Chapter 19: (pp. 371 – 383).

Content and Treatment as in:

1. INTRODUCTION TO COMMUTATIVE ALGEBRA, *M.F. Atiyah and I.G. Macdonald*, (1969), Addison – Wesley.
2. REAL AND COMPLEX ANALYSIS, (Third Edition), *Walter Rudin*, (1986), McGraw Hill.

References:

1. ABSTRACT ALGEBRA, *R.S. Pierce*, Springer Verlag.
2. REAL ANAYLSIS, *R.G. Bartle*, (1976), John Wiley and Sons.

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5MS02	TOPOLOGY AND DIFFERENTIAL EQUATIONS	5	PAPER II	6

UNIT – I : FUNDAMENTAL GROUP AND COVERING SPACES

Homotopy – Fundamental group – Covering spaces.

Chapter 3: (pp. 49 – 77)

UNIT – II : SIMPLICIAL COMPLEXES

Geometry of simplicial Complexes – Bary centric subdivisions – simplicial approximation Theorem – Fundamental Group of a simplicial complex.

Chapter 4 : (pp. 78 – 108)

UNIT – III : LINEAR SYSTEMS

Uncoupled Linear system – Diagonalization – Exponential operators – The Fundamental Theorem for linear system – Linear system in R^2 – Complex Eigen Values – Multiple Eigen Values – Non Homogeneous Linear System.

Chapter 1 : Sections 1.1 to 1.7 and 1.10 (pp. 1 – 39, 60 – 63)

UNIT – IV : NONLINEAR SYSTEMS : LOCAL THEORY

Some preliminary concepts & definitions – The Fundamental Existence – Uniqueness Theorem – Dependence on initial conditions and parameters – The Maximum interval of Existence – The Flow defined by a Differential Equation.

Chapter 2 : Sections 2.1 and 2.5 (pp. 65 – 101)

UNIT – V : NONLINEAR SYSTEMS

Linearization – The Stable Manifold Theorem – Dynamical Systems and Global Existence Theorems – Limits Sets and Attractors.

Chapter 2 : Sections 2.6 and 2.7 (pp. 101 – 118)

Chapter 3 : Sections 3.1 and 3.2 (pp. 181 – 199)

Content and Treatment as in :

1. LECTURE NOTES ON ELEMENTARY TOPOLOGY AND GEOMETRY, *I.M. Singer and J.A. Thorpe*, (1967), Springer Verlag, New York.

2. DIFFERENTIAL EQUATION AND DYNAMICAL SYSTEM, *L. Perko*, (2006), Third Edition, Springer Verlag, New York.

References:

1. INTRODUCTION TO TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), Mcgraw Hill.

2. COUNTER EXAMPLES IN TOPOLOGY, *L. Sten and J. Subash*, Holt, RineHart and Winston.

3. ADVANCED DIFFERENTIAL EQUATIONS, *M.D. Raisinghania*, (2001), S. Chand & Co., New Delhi.

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DEPARTMENT OF PHYSICS

SYLLABUS
For
M.Phil. Physics

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5PY01	RESEARCH METHODOLOGY	5	PAPER I	6

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 Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and feature of good design – Different research design – Basic principles of experimental design.

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 squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve fitting – Measurement of errors – Types and souces of errors – Determination and control 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 – Wishwa Prakasam Publications, II Edition.
2. Research: An introduction – Robert Ross – Harper and Row Publications.

3. Research Methodology – P.Saravanavel – Kitlab Mahal, Sixth Edition.
4. A Hand book of Methodology of Research – Rajammal P.A.Devadass - Vidyalaya Press.
5. Introduction to Computers- N.Subramanian
6. Statistical methods – G.W. Snedecor and W.Cocharan – Oxford and IBH, New Delhi.
7. Statistical Methods – S.P.Gupta
8. How to write and publish a scientific paper – R.A.Day- Cambridge University Press.
9. Thesis and Assignment writing – Anderson – Wiley Eastern Ltd.

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SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5PY02	ADVANCED PHYSICS	5	PAPER II	6

UNIT I: QUANTUM MECHANICS

Second quantization of Schrödinger and Klein-Gordon fields – Creation and annihilation operators – Commutation relations – Second quantization of Dirac field – Covariant and anti-commutation relations for Dirac field.

UNIT II: NUCLEAR AND PARTICLE PHYSICS

Compound nucleus and statistical theory – Experimental evidence – Statistical assumption – Average cross section – Angular distribution – Transmission coefficients – Level density – Decay of the statistical compound nucleus – Emission of charged particles.
Symmetries and conservation laws – Gell Mann Nishijima formula – CPT invariance – Quark model.

UNIT III: NON-LINEAR AND MOLECULAR MECHANICS

Basics of nonlinearity – Linear and nonlinear oscillators – Autonomous and non-autonomous system – Dynamical systems.
The energy calculations – Energy minimization – Force field paramertization – Conformation analysis – Solvation-Montecarlo methods – Molecular dynamics – Free energy calculation.

UNIT IV: SOLID STATE PHYSICS-I

Band structure theory – Band structure for some semiconductors – Semiconductor transport theory – Basics of continuity equation – Theory of generation and recombination – Theory of PN junction – PN junction solar cells – Ionic conductivity – Normal and super ionic conductors – Application of super ionic solids: Battery, Fuel cells, Electrochromic display.

UNIT V: **SOLID STATE PHYSICS-II**

Basic concepts of dielectrics: Static fields – Time dependent fields – Static dielectric constant: Dipolar interaction – dipolar molecules in gases and dilute solutions – Onsager equation – Debye equations – Dielectric relaxation and loss – Distribution of relaxation time – Complex plane diagrams – Cole-Cole, Cole-Davidson plots.

Books for study and reference:

1. Advanced Quantum Mechanics – B.S. Rajput – Pragathi Praksan
2. Physics of the Nucleus – M.A. Preston – Addison-Wesley
3. Elementary Particles – D. Griffiths.
4. Nonlinear dynamics – M. Lakshmanan and S. Rajasekar – Springer International
5. Computational Chemistry – Guy H. Grant and W. Graham Richards – Oxford University Press
6. Semiconductor Devices – S.M. Sze
7. Electronic Properties of materials – Rolf E. Hummel – Springer
8. Super ionic Solids – S. Chandra – North Holland Publishing Company Ltd.
9. Theory of Dielectrics – H. Frohlich – Oxford University Press.
10. Theory of electric polarization Vol. I and II – C.J.F Botcher – Elsevier scientific Publication.

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DEPARTMENT OF CHEMISTRY

SYLLABUS
For
M.Phil. Chemistry

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5CH01	RESEARCH METHODOLOGY	5	PAPER I	6

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 Problem: 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 set of data – Chi squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve Fitting – Measurement of errors – Types and sources 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 – Wishwa Prakasam Publications, II Edition.
2. Research: An introduction – Robert Ross – Harper and Row Publications.
3. Research methodology – P. Saravanavel – Kitlab Mahal, Sixth Edition.

4. A Hand book of Methodology of Research – Rajammal P.A. Devadass Vidyalaya Press.
5. Introduction to Computers – N. Subramanian
6. Statistical methods – G.W Snedecor and W. Cocharan – Oxford and IBH, New Delhi.
7. Research Methodology Methods and Statistical Techniques – Santosh Gupta.
8. Statistical Methods – S.P Gupta
9. Scientific social surveys and research – P.Young – Asia Publishers, Bombay.
10. How to write and publish a scientific paper – R.A Day – Cambridge College Press.
11. Thesis and Assignment writing – Anderson – Wiley Eastern Ltd.

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5CH02	ADVANCED CHEMICAL ANALYSIS	5	PAPER I	6

UNIT-I

Instrumental methods of analysis: Atomic absorption and emission spectroscopy chromatography including GC and HPLC and electro-analytical methods (Colorimetry, cyclic voltammetry, polarography, amperometry, and ion selective electrodes).

UNIT-II

Spectroscopy:

Principle and applications in structure elucidation:

(i)   Rotational Diatomic molecules; isotopic substitution and rotational constants.
(ii) Vibrational: Diatomic molecules, linear tritomic molecules, specific frequencies of functional groups in polyatomic molecules.
(iii) Electronic: Singlet and triplet states; n p* and P P* transitions; application to conjugated double bonds and conjugated carbonyls – Woodward-Fieser rules; Change transfer spectra.
(iv) Nuclear Magnetic Resonance (IH NMR): Basic principle; chemical shift andspin-spin interation and coupling constant.
(v)   Mass Spectrometry: Parent peak, base peak, metastable peak, Mclafferty rearrangement.

UNIT-III

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of organic molecules.

UNIT-IV

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of inorganic molecules.

UNIT-V

Symmetry elements: point groups; (ii) optical activity its origin, atomic and conformation asymmetry; (iii) Variation of optical activity with wave length. Optical rotatory dispersion and circular dichroism curves and their application, In determining the configuration and conformation of different compounds. (iv) conformational analysis.

REFERENCE BOOKS:

1. H.H. Willand, L.L Merrit and j.A.Dean, Instrumental Methods of Analysis –D. Ven. Nostround Co.
2. H.A. Stobel, Chemical Instrumentalism – Addition – Wesley Publishing Co.

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DEPARTMENT OF BIOCHEMISTRY

SYLLABUS
For
M.Phil. Biochemistry

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5BI01	RESEARCH METHODOLOGY	5	PAPER I	6

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 problem: 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- Principle 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-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 – Rajammal P.A.Devadas-Vidhalaya press.
5. Introduction to computers – N.Subramanian
6. Statistical methods – G.W.Snedecor and W.Cocharan- 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.

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5BI02	ANALYTICAL METHODS	5	PAPER II	6

UNIT I SEPARATION & CHROMATOGRAPHIC TECHNIQUES
Centrifuge techniques, Prepartive centrifugation,Density gradient, Analysis of subcellular fractions. Determination of molecular weight macromolecules ,Analytical ultra centrifugation.
Absorption chromatography , Partition chromatography , Ion exchange chromatography Exclusion chromatography, Affinity chromatography, HPLC, Application of these techniques.

UNIT II ELECTROPHORETIC & RADIO ISOTOPE TEHCNIQUES
General techniques, High voltage electrophoresis, Disc electrophoresis, Iso electric, focusing, Application of these techniques.
Nature of radio activity Detection and measurements of radioactivity ,Application in biological science, Safety Aspects.

UNIT III SPECTROSCOPIC TECHNIQUES
Basic principle, Spectrophotometry, Fluorometry, Flame photometry, ESR, NMR Mass Spec & Application of these techniques.

UNIT IV MANOMETRIC & IMMUNOLOGICAL TECHNIQUES
Types of manometry, Warburgs constant volume, Oxygen electrode, Applications. Introduction, Production of antisera and precipitation reaction, Precipitation in free solution, Precipitation in gel immuno diffusion, RIA, ELISA, Immuno fluorescence

UNIT V STATISTICAL METHODS
Basic concepts, Law of chance, probability, mean, SD, binomial expression, hardy Weinberg laws, Test analysis of variance, co-efficient of correlation.

Reference
1. Practical Biochemistry by K.Wilson and J.Walker. 5th edition Cambridge University Press (2000)
2. Practical Biochemistry by Shawney
3. Physical Biochemistry by David Friefielder, W.H.Freeman 2nd edition (1982)
4. Introduction to Medical Laboratory Techniques by Mukherjee, Volume I,II &III
5. Introduction to instrumental analysis by Robert D.Brown, Pharma BookSyndicate (2006)

DEPARTMENT OF BIOTECHNOLOGY

SYLLABUS
For
M.Phil. Biotechnology

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5BT01	RESEARCH METHODOLOGY	5	PAPER I	6

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.

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5BT02	ADVANCED BIOTECHNOLOGY	5	PAPER II	6

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 metaboloic 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- cord 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 Nano biotechnology.

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.

DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS
For
M.Phil. Computer Science

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5CS01	RESEARCH METHODOLOGY	5	PAPER I	6

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 drafing 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. Cocharan – 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

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5CS02	COMPUTER GRAPHICS AND IMAGE PROCESSING	5	PAPER II	6

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 attenutation, 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, SpatialFiltering , 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.
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DEPARTMENT OF HISTORY

SYLLABUS
For
M.Phil History

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5HI01	RESEARCH METHODOLOGY	5	PAPER I	6

Unit I: Trends in Methodology: Scientific method as applied in History-Heuristics and Hermeneutics-Quantitative and Qualitative methods-Textual Analysis-Oral Traditions-Semiotics and Study of symbols - Inter-disciplinary approaches.

Unit II: Research Process: Problems in existing Research-Selection of Topic-feasibility-Methods of authentication-Research Plan and Working Hypothesis.

Unit III: Data Collection: Sources: Repositories - Libraries and Archives-Digital Information- Possibilities of field Research –Data Arrangement-Manual Card System-Word Processor – Files and Folders

Unit IV: Data Analysis: Source Analysis-Content Analysis-Objectivity and Bias reasoning-Fallacies-generalizations and explanations-Ordering of the data-Conceptual Linkages – Method of explanation-Verification of Hypothesis-Formulation of the final argument.

Unit V: Documentation: Chapterisation- Logical arrangement of chapters-Citations-Acknowledgement of sources-References and functions of Bibliography-use of Tables, Charts and Maps-Analytical writing-Language-Need for consistency and Terminological clarity – Glossary and Index.

Reference Books:

Kate Turabian: A Manual for the writers of Term papers, Theses and Dissertations
William Goode and Paul Hatt: The methods of Social Research
Marc Bloch: The Historians Craft

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5HI02	HISTORIOGRAPHY	5	PAPER II	6

Unit I:
Introduction: Definition, Nature, Scope and Functions
Unit II:
History and Allied Disciplines: Economics, Sociology, Geography, Literature, Auxiliary sciences
Unit III:
Value and Subject matter of History: Uses and abuses of History, History-Art or Science
Unit IV:
 Early Trends: Greco-Roman-Ancient Indian Historiography-Medieval Historiography, Church Historiography and Arab Historiography-Enlightenment

Unit V:
Modern Trends: Romanticism-Scientific Theory-Materialistic Theory-
Structuralism-Post structuralism – Post-Modernism

References:
E.H.Carr: What is History?
R.G.Collingwood: The idea of History
B.Sheik Ali: History its Theory and Method

DEPARTMENT OF COMMERCE

SYLLABUS
For
M.Phil in Commerce

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5CO01	RESEARCH METHODOLOGY	5	PAPER I	6

UNIT – I

Meaning of Research and Scope of Research Methodology – Stakeholders of Social Research – Significance of Research in Social Science – Identification of Research Problem – Formulation of Research Questions – Pilot Study – Meaning and Components of Research Design – Review of Literature (Theory only)

UNIT – II

Hypothesis – Meaning and role – Structure – Relationship between variables – Types – Strong and Weak – Sampling Theory – Sampling Methods and Techniques – Sampling size – Sampling error(Theory only)

UNIT – III

Data Collection – Sources – Primary and Secondary – Data matrix – Unit of data collection – Methods and tools of data collection – Interview and questionnaires and their types – Scaling and Testing Techniques – Reliability and validity of instruments – Uses of Information Technology in data collection (Theory only)

UNIT – IV

Data Analysis – Analysis of quantitative data – Descriptive statistics – Test of significance – Parametric tests and non-parametric test – Chi-square Test – ANOVA test – Interpretation – Application of SPSS for Data Analysis (Both Theory & Problems)

UNIT – V

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 (Theory only)

Weightage of marks: Theory 50 marks & Problem 25 marks
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) R.L. Anderson.,H.D. Berry.,M.Poole, Thesis and Assignment Writing, Wiley Eastern Ltd.,New Delhi.
4) H. Bernard Russel, Social Research Methods (London: Sage)
5) S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi

SEMESTER - I

COURSE CODE	COURSE TITLE	CREDIT	COURSE NO	HRS/ WEEK
MPH5CO02	ADVANCED FINANCIAL MANAGEMENT	5	PAPER II	6

UNIT – I

Financial Management – Meaning, scope, objectives and functions – Relationship between financial management and other areas of management. (Theory only)

UNIT – II

Accounting Ratios – Classification of Ratios – Profitability – Turnover – Financial – Advantages and limitations – Interpretation of results – Intra Firm Comparisons. (Both Theory and Problem)

UNIT – III

Capital Structure – Meaning – Theories of Capital Structure – Net Income Approach - Net Operating Income Approach – MM Approach and Traditional Approach (Both Theory and Problem)

UNIT – IV

Capital Budgeting – Meaning, Importance, Kinds of capital investment proposals – Factors affecting capital investment decisions – Capital budget appraisal methods (Both Theory and Problem)

UNIT – V

Working Capital Management – Meaning, need and types of working capital – Sources of working capital – Determinants of working capital needs. (Both Theory and Problem)

Weightage of marks: Theory 50 marks & Problem 25 marks

Reference Books:

1) I.M. Pandey, Financial Management, Vikas Publishing House, New Delhi.
2) S.N. Maheswari, Fundamentals of Financial Management, Sultan Chand & Sons, New Delhi.
3) Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw Hill Publishing Company, New Delhi.
4) M.Y. Khan and P.K. Jain, Financial Management, Tata McGraw Hill Publishing Company Limited. New Delhi.
5) P.V.Ratnam, Financial Management Theory, Problems and Solutions, Kitab Mahal, New Delhi.

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SYLLABUS FOR CERTIFICATE/ DIPLOMA COURSES

DEPARTMENT: ENGLISH

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
ENCT01	CERTIFICATE COURSE IN SPOKEN ENGLISH	3 MONTHS	3	100

I. **PHONOLOGY OF ENGLISH**
OBJECTIVES:
1) To identify the sound patterns of the English language.
2) To understand the sound that is not in their regional language.
3) To recognize the word stress and speech rhythm in Spoken English.

Topics:
Phonemes: 12 Pure Vowels, 8 Diphthongs and 24 Consonants
Syllables: Kinds of syllables
Word Stress: Primary Stress, Secondary Stress, Penultimate stress and Anti-
                penultimate stress.
Tones: Rising Tone and Falling Tone

Practical Test: 1   A passage from the text will be given to read aloud, to
                            check the Pronunciations of the words
                        2. Work Sheets will be given to mark the word Stress and
                            the Tones

Reference Books: 1) Elements of Linguistics and Phonetics-Dr. Amresh
Sharma

                        2) English Phonology-An Introduction-Heinz J. Giegerich-
                            Cambridge University Press
                        (BOOKS AVAILABLE AT COLLEGE LIBRARY)

II.   **CONVERSATION IN ENGLISH**

OBJECTIVES:
1) To train the student to speak slowly and clearly the routine and familiar topics.
2) To improve students with day-to-day English conversation.
     Describing family, other people and living conditions
3) To discard inhibitions and develop competence level in them.

Topics:
       Greeting and introducing
       Buying and asking prices
       Invitations
       Describing People
       Frequency and Time Duration
       Requesting/Offering
       Asking permission-Giving permission

Practical Test: 1. Students will be a situation and were asked to do a role-play.

2. Students to listen to the conversation and have mark their responses in the worksheet.

Reference Books: 1) Speaking English Effectively   -Krishna Mohan & N.P. Singh – Macmillan
2) English Conversation Practice- Grant Taylor- Tata McGraw-Hill Publishing Company Ltd.
3) Innovative Technique of Communication –Vipul V.Mahodia-Paradise Publisher-Jaipur

(BOOKS AVAILABLE AT COLLEGE LIBRARY)

III.   BASIC ENGLISH GRAMMAR

OBJECTIVES:
1. To introduce temporal linguistics quality.
2. To use appropriate tense for appropriate occasion.
3. To express thoughts and feelings meticulously.

Topics:
1. Parts of Speech and their usage
2. Articles, prepositions, conjunctions/ linkers, adverbs of frequency, can/could for request, used to +verb, Modals verbs, question tags, active and passive, direct and indirect speech
3.Tenses and their uses.

Practical Test: Audio will be played, students have to mark their responses in the worksheet-Cloze Test.

Reference Books: 1) Tenses- Keshab Pradhan-Pacific Books International
2) English Grammar and Comprehension- J.K. Chopra-Unique Publisher
(BOOKS AVAILABLE AT COLLEGE LIBRARY)

DEPARTMENT: TAMIL

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
TACT01	CERTIFICATE COURSE IN "INTRODUCTION TO GENERAL TAMIL" தமிழக அரசுப் பணியாளர் தேர்வு பொதுத்தமிழ் - ஓர் அறிமுகம	3 MONTHS	3	100

சான்றிதழ் படிப்பு (2017 முதல்)

Certificate Course in "Introduction to General Tamil"

Title of the paper: தமிழக அரசுப் பணியாளர் தேர்வு பொதுத்தமிழ் - ஓர் அறிமுகம்

(For all UG and PG Students)

Objectives :

தமிழ்நாடு அரசு பல்வேறு துறைகளுக்குப் பணியாளர்களைத் தேர்வு செய்ய தமிழக அரசுப் பணியாளர் தேர்வு வாரியம் மூலம் நடத்தப்படும் தேர்வுகளில் மாணவர்களைப் பங்கேற்கச் செய்து வேலைவாய்ப்பு பெற செய்வதே இப்பாடத்திட்டத்தின் முதன்மையான நோக்கமாகும்.

அலகு 1
1. (அ) பொருத்தல் - பொருத்தமான பொருளைத் தேர்வு செய்தல்.
   (ஆ) புகழ் பெற்ற நூல் நூலாசிரியர்.
2. தொடரும் தொடர்பும் அறிதல்
   (அ) இத்தொடரால் குறிக்கப் பெறும் சான்றோர்
   (ஆ) அடைமொழியால் குறிக்கப் பெறும் நூல்.
3. பிரித்தெழுதுக.
4. எதிர்ச்சொல்லை எடுத்தெழுதுதல்.

அலகு 2
1. பொருந்தாச் சொல்லைக் கண்டறிதல்.
2. பிழைத்திருத்தம்.
   (அ) சந்திப்பிழையை நீக்குதல்
   (ஆ) ஒருமை பன்மை பிழைகளை நீக்குதல்,மரபுப் பிழைகள்,வழுவுச்சொற்களை நீக்குதல், பிறமொழிச் சொற்களை நீக்குதல்.
3. ஆங்கிலச் சொல்லுக்கு நேரான தமிழ்ச் சொல்லை அறிதல்.
4. ஒலிவேறு பாடறிந்து சரியான பொருளையறிதல்.

அலகு 3
1. ஒரெழுத்து ஒருமொழி உரிய பொருளைக் கண்டறிதல்.
2. வேர்ச்சொல்லைத் தேர்வு செய்தல்.
3. வேர்சொல்லைக்கொடுத்து.∴ வினைமுற்று வினையாலணையும் பெயர்தொழிற் பெயரை.∴ உருவாக்கல்.
4. அகரவரிசைப்படி சொற்களைச் சீர் செய்தல்.

அலகு 4
1. சொற்களை ஒழுங்குபடுத்தி சொற்றொடராக்குதல்.
2. பெயர்ச்சொல்லின் வகையறிதல்.
3. இலக்கணக் குறிப்பறிதல்.
4. விடைக்கேற்ற வினாவைத் தேர்ந்தெடுத்தல்.

அலகு 5
1. எவ்வகை வாக்கியம் எனக் கண்டெழுதுதல்.

2.தன்வினை பிறவினை செய்வினை செயப்பாட்டு வினை வாக்கியங்களைக் கண்டெழுதுதல்

3.உவமையால் விளக்கப் பெறும் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல்.

4.எதுகை மோனை இயைபு இவற்றுள் ஏதேனும் ஒன்றைத் தேர்ந்தெழுதுதல்.

பார்வை நூல்கள்

1.பொதுத்தமிழ் -முனைவர் மு.முகமதுஅலி ஜின்னா,அன்னம் வெளியீடு தருமபுரி-2.

2.இலக்கிய வரலாறு– மு.அருணாச்சலம் திருச்சி-17

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
TADM01	DIPLOMA COURSE IN "INTRODUCTION TO JOURNALISM" பட்டயச் சான்றிதழ் படிப்பு "இதழியல்- ஓர் அறிமுகம"	6 MONTHS	6	100

பட்டயச் சான்றிதழ் படிப்பு (2017 முதல்)
(II Year ,III year and P.G. Students)
(6 months- 30 racticals)

Title of the paper: இதழியல்- ஓர் அறிமுகம்

Objectives:

அறிவியல் தொழில் நுட்ப வளர்ச்சியை முழுமையாகப் பயன்படுத்தி வளர்ந்துள்ள துறைகளுள் மக்கள் தொடர்புச் சாதனத் துறையும் ஒன்றாகும். இத்துறையின் ஓர் அங்கமாகத் திகழ்வன பத்திரிகைகளாகும். இன்று இது இதழியல் துறையாக பெருவளர்ச்சியடைந்திருக்கிறது. இந்த இதழியல் துறைப் பற்றிய பல்வேறு செய்திகளை மாணவர்களுக்கு வழங்குவதே இப்பாடத்தின் முதன்மையான நோக்கமாகும்.

அலகு 1
    இதழியல் அறிமுகம்
    இதழ்களின் பணிகள்
    இதழ்களின் விதிகள்
    இதழ்களின் பொறுப்புகளும் கடமைகளும்

அலகு 2
    செய்தி-செய்தியின் இயல்புகள்
    செய்தியின் உள்ளடக்கம்
    செய்தியின் வகைகள்

அலகு 3
    செய்தியாளர்கள்
    செய்தி சேகரிப்பு
    செய்திகளை எழுதும் முறை

அலகு 4
    இதழியல் நிர்வாகம்
    ஆசிரியப் பிரிவு
    வணிகப் பிரிவு
    இயந்திரப் பிரிவு

அலகு 5
    பத்திரிகை களப்பயிற்சி
    நேர்காணல்
    தலையங்கம் & கட்டுரை
    வாசகர் கடிதம்
பார்வை நூல்கள்
1.இதழியல்- முனைவர் ச.ஈஸ்வரன், முனைவர் இரா.சபாபதி, பாவை பப்ளிகேஷன்ஸ் சென்னை-14
2. .இதழியல்- கி.இராசா, தாமரை பப்ளிகேஸன்ஸ் சென்னை-98
3.விளம்பரக்கலை- ச.ஈஸ்வரன், முனைவர் இரா.சபாபதி, பாவை பப்ளிகேஷன்ஸ் சென்னை-14

DEPARTMENT: MATHEMATICS

I. CERTIFICATE COURSE IN BIO-STATISTICS

PAPER CODE	PAPER TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
MSCT01	BIO-STATISTICS-I	3 Months	3	100

OBJECTIVE OF THE COURSE: The objectives of certificate Programme are to promote the knowledge in statistical theory, methodology. The Programme provides training in statistical theory, methodology, computer systems, data management This programme includes a practicum, involving collaboration between health science professionals and students. A small group of students work under faculty supervision with one or more investigators. Each student in the programme has an academic advisor. The graduates from this course would be able to work in Pharma industries for drug and vaccine development and also to work in national and international institutions as faculty or scientist

Probability and Distribution Theory Probability Theory : Sets and classes of events, Random variables, Definition of probability, Simple properties, Sample space and events, Discrete probability space, General probability space, Distribution function of a random variable, Definition of Expectation.

Properties of Expectation. Inequalities: (Chebychev's, Morkov's, Holder's, Jenison's and Minkowski inequalities). Convergence in probability, Almost sure Convergence, Convergence in distribution. Moment generating function, Characteristic function, Definition and properties. Inversion formula, Convergence of distribution function and characteristic function. Independence, Multiplication properties, Central limit theorem for independently and identically distributed random variables (statement only).

Distribution Theory: Univariate distributions: Review of univariate distributions with special reference to biostatistics; Binomial, Poisson, Geometric, negative-

binomial, Hypergeometric, Normal, Logistic, Lognormal, Exponential, χ^2, t, f, gamma and beta distributions. Their properties and applications, transformation and change of variables techniques.

Multivariate distributions: Bivariate and Multivariate Normal Distribution, Additive properties, Characteristic functions, Conditional distributions, Marginal distributions, Estimation of mean vector and covariance matrix, Partial, Multiple correlation coefficients and their sampling distributions*, Generalised T^2 statistic, Mahalanobis D^2 statistic, Wishart distribution*, Cochran's theorem, Distributions of quadratic forms.

Design of Experiments: Design, Replication, Randamization, Assignable cause, Chance causes, Analysis of CRD, RBD and LSD. Missing values in RBD, CRD and LSD. Design of clinical trials, Single and double blind trials. Type of control, Design of studies with matched controls.

PAPER CODE	PAPER TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
MSCT02	BIO-STATISTICS-II	3 MONTHS	3	100

Estimation Theory: Properties of point estimators, Minimum variance unbiased estimator, Best linear unbiased estimator, Interval estimation. Confidence interval for mean, variance of normal distribution, Proportions, Correlation and Regression coefficients.

Confidence Interval: Confidence interval of mean and variance for small samples. Illustration of Cramer-Rao inequality, Bhatacharya inequality, Rao-Blackwell inequality, Maximum likelihood estimators, Method of moments, Method of minimum Variance, Method of chi-square, Method of modified minimum chisquare, Method of least squares.

Testing of Statistical Hypothesis: Critical region and level of significance, Test of a simple hypothesis against simple alternative, composite hypothesis, Neymen Pearson test of hypothesis, UMP test, UMP unbiased test, Likelihood ratio test, Test on the mean of normal population, Difference between the mean of two normal populations, Test on the variance of normal populations, χ^2 test, χ^2 goodness of fit test and test of independence of contingency tables. Test of proportion, Test of correlation and regression coefficient, Trends of proportion, Test based on t and f, Multiple comparisons.

Non parametric test: Sequential Analysis and Sequential probability ratio test Non-parametric tests Wilcoxon Mann Whitney, Kolmogorov Smirnov tests (two sample tests). Quantile tests, multiple range test, Definitions, Sample, Sampling – advantages of sample studies.

Types of samples: – The convenience sample – Judgment sample and the probability sample –Simple random sampling with and without replacement – Systematic sampling –Stratified sampling- Estimation of mean, Proportion and standard error using the above probability sampling– Sources of error in surveys.
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II. CERTIFICATE COURSE IN DEVELOPMENT OF APTITUDE SKILLS

PAPER CODE	PAPER TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
MSCT03	DEVELOPMENT OF APTITUDE SKILLS	3 Months	3	100

This is as per TNPSC – Group Services Examinations

Conversion of information to data-Collection, compilation and presentation of data - Tables, graphs, diagrams -Analytical interpretation of data - Simplification-Percentage-Highest Common Factor (HCF)-Lowest Common Multiple (LCM).

Ratio and Proportion-Simple interest-Compound interest Area-Volume-Time and Work-Logical Reasoning-Puzzles-Dice-Visual Reasoning-Alpha numeric Reasoning.

Number Series Logical Number/Alphabetical/Diagrammatic Sequences

III. CERTIFICATE COURSE IN ACTUARIAL MATHEMATICS

PAPER CODE	PAPER TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
MSCT04	ACTUARIAL MATHEMATICS	3 Months	3	100

1) Mathematics
    a) Notation and standard functions
    b) Numerical Methods
    c) Algebra
    d) Differentiation
    e) Integration
    f) Vectors
    g) Matrices

2) Statistics
    a) Permutations and combinations
    b) Types of data
      Statistical diagrams, bar chart, histogram, dot plot, stem-and-leaf, boxplot

c) Measures of location

   mean, median, mode

d) Measures of spread

   range, interquartile range, standard deviation, variance, Skewness

e) Probabilities

   basic rules of probabilities

f) Advanced probabilities

   tree diagrams, conditional probabilities

g) Discrete random variables

   definitions, probabilities, mean, mode, median, standard deviation, variance, coefficient
   of skewness

h) Continuous random variables

   definitions, probabilities, mean, mode, median, standard deviation, variance, coefficient
   of skewness

i) Discrete distributions

   discrete uniform, Bernoulli, binomial, Poisson

j) Continuous distributions

   continuous uniform, exponential, the normal distribution

k) Correlation

   scatter plots, covariance, correlation coefficient

l) Regression

3) English

   a) Vocabulary Based (Synonyms Antonyms)

   b) English Usage or Grammar

   c) Sentence Correction

   d) Fill in the blanks

   e) Cloze Passage

   f) Analogies or Reverse Analogies

   g) Jumbled Paragraph

   h) Meaning-Usage Match

   i) Summary Questions

   j) Verbal Reasoning

   k) Facts / Inferences / Judgements

   l) Reading Comprehension

Vocabulary: Vocabulary questions test the candidate's knowledge of the primary meanings of words, secondary shades of meaning, usage, idioms and phrases, antonyms, related words, etc.

Grammar: Grammar-based questions test the candidate's ability to spot and correct grammatical errors. It should generally tests knowledge of high school level grammar and includes areas like subject-verb agreement, use of modifiers, parellel construction, redundancy, phrasal verbs, use of articles, prepositions, etc.

Verbal Reasoning: Verbal reasoning questions are designed to test the candidate's ability to identify relationships or patterns within groups of words or sentences.

4) Data Interpretation

Data is given in form of tables, charts and graphs. In this section it is tested that how can you interpret the given data and answers the questions based on it.

    a) Tables

    b) Column Graphs

    c) Bar Graphs

    d) Line Charts

    e) Pie Chart

    f) Venn Diagrams

    g) Caselets

Combination of two or more types linked to each other.

5) Logical Reasoning

    a) Number and Letter Series

    b) Calendars

    c) Clocks

    d) Cubes

    e) Venn Diagrams

    f) Binary Logic

    g) Seating Arrangement

    h) Logical Sequence

    i) Logical Matching

    j) Logical Connectives

    k) Syllogism

    l) Blood Relations

IV. DIPLOMA IN OPERATIONS RESEARCH

PAPER CODE	PAPER TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
MSDM01	OPERATIONS RESEARCH - I	6 Months	6	100

Optimization Models

Introduction to Optimization Models, Definition, Features and Approaches to Optimisation Models, Models and Modeling in Operations Research, Advantages and Applications of Optimization Models

Sequencing Models

Introduction to Sequencing, Sequencing Problem, Solution to Sequencing Problem – Processing n-jobs through one machine, processing n-jobs through two machines, processing n-jobs through three machines, processing two through m-machines, processing n-jobs through m-machines

Replacement Models

Introduction to Replacement Models, Replacement of items that deteriorate, Replacement of items that fail suddenly, Mortality and Staffing Problem

Inventory Models

Introduction to Inventory Models, Inventory Costs, Inventory Control Problem, Classification of Fixed Order Quantity Inventory Models, Inventory Models with Deterministic Demand, Inventory Models with Probabilistic Demands, Selective Inventory Control techniques – ABC Analysis, VED Analysis, FSN Analysis etc.

Simulation Techniques

Introduction to Simulation, Process of Simulation, Monte Carlo Simulation, Simulation of an Inventory System, Simulation of a Queuing System, Application of Simulation

Reference Books:

1.Quantitative Techniques in Management, N.D.Vohra, McGraw Hill Publication

2.Operations Research, P.K.Gupta and D.S.Hira, S.Chand publication

3.Operations Research, J.K.Sharma,Macmillan Publication

PAPER CODE	PAPER TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
MSDM01	OPERATIONS RESEARCH-II	6 Months	6	100

Queuing Theory

Introduction to Queuing Models, Application of Queuing Models, Elements of a Queuing System, Operating Characteristic of a Queuing System, Classification of Queuing Models, Single Channel Queuing Theory, Multiple Channel Queuing Theory

Assignment Techniques

Definition of Assignment Model, Mathematical Representation of Assignment Model, Hungarian Method of Solution of Assignment Model, Variation of the Assignment Model

Transportation Techniques

Introduction to Transportation Model, Definition of Transportation Model, Matrix Terminology, Formulation and Solution of Transportation Model, Variants in Transportation Model

Network Analysis

Concept of Project Planning, Scheduling and Controlling, Work Break Down Structure, Basic Tools and Techniques of Project Management, Role of Network Technique in Project Management, Concept of Network or Arrow Diagram, Activity on Node Diagram, Critical Path Method, Concept of PERT, Concept of CPM, Cost Analysis and Crashing the Network

Game Theory

Introduction to Theory of Games, Characteristics of Games, Game Models, Rules for Game Theory, Concept of Pure Game, Mixed Strategies – 2x2 Games, Mixed Strategies – 2xN or Mx2, Mixed Strategies – MxN Games

Reference Books:

1.Quantitative Techniques in Management, N.D.Vohra, McGraw Hill Publication

2.Operations Research, P.K.Gupta and D.S.Hira, S.Chand publication

3.Operations Research, J.K.Sharma,Macmillan Publication

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DEPARTMENT: PHYSICS

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
PYCT01	CERTIFICATE COURSE IN BASIC ELECTRONICS AND SERVICING OF HOME APPLIANCES	3 Months	3	100

Objective of the Course

This course has been designed to provide the knowledge of Repairing and Maintenance of home appliances. Students will be familiar with maintenance of everyday household necessities. At the end of the course the students will be having knowledge of: -

- ✓ *Observing the safety precautions while working,*
- ✓ *Single Phase and Three Phase House wiring, Main board, Switch board connections, and testing.*
- ✓ *Electrical and Electronic components Identifications*
- ✓ *Knowledge of constructing power supply*
- ✓ *Dismantle and reassemble of an electric iron,*
- ✓ *Testing of Water Heater, hair dryer, mixer grinder etc.,*
- ✓ *Test line cord for continuity with test lamp/ multimeter*
- ✓ *Install a ceiling fan, Table fan and the regulator,*
- ✓ *Check a fluorescent lamp, LED lamp, Electronic choke, starter and install it,*

UNIT-I

Electrical safety – Ohm's law - Kirchhoff's laws – DC current – AC current - Neutral and earth conductor – Single Phase - Three phase AC fundamentals - Continuity testing - Switch – Types of Switches - Fuses - Transformer and Classification of Transformers

UNIT-II

Resistors – Classification of resistors – Colour code resistance designation – Inductors – Types of Inductors - Capacitors – Classification of Capacitors – Transistor – Junction diode – Zener diode –Testing of electronic components

UNIT III

Half wave rectifier - Full wave rectifier - Bridge rectifier – Power supply construction using Zener diode & IC –Trouble shooting - Analog multimeter – Digital multimeter – Series testing circuit

UNIT-IV

House wiring – Single phase energy meter- Three Phase energy meter- Main Switch – Three Phase and Single phase trip switch – Switch board construction – Load distribution – Power calculation

UNIT V

Inverter circuit- Battery for inverter and maintenance - inverter installation - Automatic Iron & Trouble shooting – Water heater & Trouble shooting - Mixer grinder & Trouble shooting - Ceiling & Table Fan –Trouble shooting - Fluorescent Lamp & Trouble shooting – LED Lamp

Books for study:

1. A Text book in applied electronics- R.S. Sedha, S.Chand company LTD. New Delhi
2. A Text book of Electrical Technology- AK Theraja, S Chand &Co, New Delhi
3. Electrician Trade Theory I Year -National Instructional Media Institute, Chennai.
4. Electrician Trade Theory 2nd Year -National Instructional Media Institute, Chennai.
5. Information Technology & Electronic system maintenance, Trade theory I year--National Instructional Media Institute, Chennai.
6. Basic electronic-Repair & Maintenance of Power supply, Inverter & UPS, National Instructional Media Institute, Chennai.

Books for References:

1. Instrumentation and Measurement in Electrical Engineering – Roman Malaric, Brown   Walker press, New York.
2. Fundamentals of Electrical Engineering and Electronics – BL Theraja, S Chand &Co**,** New Delhi

3. Maintenance & Repair of Test Equipment-National Instructional Media Institute, Chennai.

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COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
PYCT02	Certificate Course in Television &Troubleshooting	3 Months	3	100

Objective of the Course

This course has been designed to provide the basic knowledge of Television and Its Troubleshooting. Students will be familiar with basic troubleshooting of Television receiver. At the end of the course the students will be having knowledge of: -

✓ *Observing the safety precautions while servicing Television,*

✓ *Testing knowledge of Electrical and Electronic components un Television,*

✓ *Knowledge of Servicing any power supply,*

✓ *Testing knowledge for various section in Television,*

✓ *Testing method of CRT*

✓ *Knowledge of testing for high voltage section in Television,*

✓ *Knowledge of alignment of image quality in Television screen.*

UNIT I: Receiver Circuit Components Identification and Testing:

Resistors: Colour coding of Resistors – Potentiometers and Non linear resistors – Capacitors: fixed and variable – Inductors and transformers – Printed circuit board – Testing of PCB – Pin identification and testing methods of Transistors, diode and IC

UNIT II: Power Supply and EHT Transformer

Full wave and Bridge Rectifier – Filter circuit – Transistor regulator - Basic power supply circuit – Power Supply for Small Screen receiver – SMPS power supply for large Screen and LCD and LED screen receiver – Troubleshooting techniques – EHT transformer testing and high voltage measurement

UNIT III: Picture Tube and Receiver Circuit

Monochrome picture tube – Degaussing coil for testing of Picture tube – Yoke assembly and testing – RF tuner – VIF section – Sound section – Horizontal oscillator section – Vertical oscillator circuit – EHT section – Trouble shooting in each section – Picture alignment in Screen.

UNIT IV: Colour Picture Tube and Remote Control

Colour Picture tube construction and working principle –Precaution in handling picture tube – Remote control transmitter – remote control receiver troubleshooting

UNIT V: Television antenna

Television Antenna – construction of antenna for different channels – Booster amplifier for antenna – balun transformer – dish antenna – Satellite communication system – Cable TV system

Books for Study:

1. Modern Television Practice - R.R. Gulati, New Age International (P) Limited, Publishers, New Delhi.
2. Television Engineering and Video Systems Second Edition - RG Gupta, Tata McGraw Hill Education Private Limited New Delhi.
3. Television and Video Engineering – J Rangarajan, Charulatha Publications, Chennai.

Books for Reference:

1. Basic television theory & Servicing – Paul B Zbar, petter W One, Tata McGraw Hill Education Private Limited New Delhi.
2. Modern television circuit – S.K Gupta, BPB Publication, New Delhi

DEPARTMENT: CHEMISTRY

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
CHCT01	CERTIFICATE COURSE IN PREPARATION OF DOMESTIC PRODUCTS	3 Months	3	100

Objectives:-

➢ To develop self employment skills.
➢ To become entrepreneur.

1. Preparation of Detergent washing powder.

2. Preparation of Utensils cleaning powder.

3. Preparation of Normal shampoo.

4. Preparation of Polyvinyl alcohol adhesive.

5. Preparation of Room freshener.

6. Preparation of Liquid blue.

7. Preparation of Pain relieving balm.

8. Preparation of Jasmine perfume liquid.

9. Preparation of Tooth powder.

10. Preparation of Face powder.

11. Preparation of White phenol.

12. Preparation of automobile decarboniser.

13. Preparation of Tooth paste.

14. Preparation of Talcum powder.

TEXT BOOKS AND REFERENCES:

1. Venkateswaran V., Veeraswamy R., Kulandivelu A.R. Basic principles of practical chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons (1997).

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
CHCT02	CERTIFICATE COURSE IN TESTING OF INDUSTRIAL PRODUCTS	3 Months	3	100

Objectives:-

To compare the experimental and standard values of certain commercial substances.

To check the purity of same samples.

1. Estimation of total hardness of water using EDTA.

2. Determination of Iodine value of an oil by Hanus method.

3. Estimation of Ascorbic acid (Vitamin C).

4. Determination of saponification value of oil.

5. Determination of percentage purity of washing soda.

6. Estimation of available chlorine in bleaching powder.

7. Determination of percentage of calcium in lime stone.

8. Determination of acid value of an edible oil.

TEXT BOOKS AND REFERENCES:

1. Venkateswaran V., Veeraswamy R., Kulandivelu A.R. Basic principles of practical chemistry, 2nd Edition, New Delhi, Sultan Chand & Sons (1997).

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DEPARTMENT: BIOCHEMISTRY

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
BICT01	**CERTIFICATE COURSE IN MUSHROOM CULTIVATION TECHNIQUES**	3 Months	3	100

Objectives

- The main objective of the exercise is to present a small scale viable bankable model production unit through adoption of appropriate technology, utilization of resources and suitable market strategy for Mushroom.
- To provide technical skill for the cultivation of Mushroom
- Be able to produce of spawn.
- Be able to cultivate of oyster mushroom.

Unit: I Mushroom morphology & Classification

Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate Edible from Poisonous mushrooms.Based on occurrence- Epigenous & Hypogenous, Natural Habitats-Humicolous, Lignicolous& Coprophilous, Color of spores- white,yellow,pink, purple brown & black, Morphology- fruiting layers exposed to air, fruiting layers not exposed to air, plants with predominantly pitted cap, cap saddled shape & saucer shape, Structure and texture of fruit bodies-gilled fungal& pore fungal, Fruit bodies and spores-classification.

Unit: II Biology of Mushrooms and Nutrient Profile of Mushroom

Button, Straw& Oyster- General morphology, distinguishing characteristics, spore germination and life cycle.
Protein, aminoacids, calorific values, carbohydrates , fats, vitamins & minerals.
Unit: III Health benefits of Mushroom:
Antiviral value, antibacterial effect, antifungal effect, anti-tumour effect, haematological value cardiovascular & renal effect, in therapeutic diets, adolescence, for aged persons & diabetes mellitus.

Unit: IV Cultivation System,Farm design and Compostingmethods
Fundamentals of cultivation system- small village unit & larger commercial unit.
Principles of mushroom farm layout- location of building plot, design of farm,

bulk chamber, composting platform, equipments& facilities , pasteurization room & growing rooms. Methods of Composting- Long method of composting (LMC) & Short method of composting (SMC).

Unit: V Cultivation of Button, Oyster and Straw Mushrooms:

Collection of raw materials, compost & composting, spawn & spawning, casing & case run, croping& crop management, picking & packing. Visit to relevant Labs/Field Visits

Text Books
1. Mushroom Cultivation, Tripathi, D.P.(2005) Oxford & IBH Publishing Co. PVT.LTD, New Delhi.
2. Handbook of Agricultural Sciences. S.S. Singh, P. Gupta, A.K. Gupta, Kalyani Publications.
3. Elements of Farm Machinery. A.C. Srivastava. Oxford & IBH Pub. Co. Pvt. Ltd.
4. Principle of Agricultural Engineering – Vol. I. Michael &Ohja.
5. Mushroom Cultivation, Published by PAU, Ludhiana.
6. Technology of Food Preservation. Derosier AVI Publication.

References

1. Mushroom Production and Processing Technology, PathakYadavGour (2010) Published by Agrobios (India).

2. A hand book of edible mushroom, S.Kannaiyan&K.Ramasamy (1980). Today & Tomorrows printers & publishers, New Delhi

3. Handbook on Mushrooms, Nita Bahl, oxford & IBH Publishing Co.

Practical - Mushroom Cultivation

Objectives

- To provide technical skill for the cultivation of Mushroom

1. Identification of different varieties and species of Mushroom
2. Management of Laboratory for production of Mushroom spawn and mushroom
3. Production process of Mushroom spawn under controlled condition
4. Cultivation of different types of Mushroom
5. Mushroom collection, drying and preservation
6. Preparation of food, taking mushroom as an important ingredient
7. Industrial cum study tour to Mushroom cultivation farms
8. Preparation of on project for commercial Mushroom cultivation

Text Books
1. Mushroom Cultivation, Tripathi, D.P.(2005) Oxford & IBH Publishing Co. PVT.LTD, New Delhi.
2. Handbook of Agricultural Sciences. S.S. Singh, P. Gupta, A.K. Gupta, Kalyani Publications.

3. Elements of Farm Machinery. A.C. Srivastava. Oxford & IBH Pub. Co. Pvt. Ltd.
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3. Handbook on Mushrooms, Nita Bahl, oxford & IBH Publishing Co.

DEPARTMENT: BIOTECHNOLOGY

COURSE CODE	COURSE TITLE	DURATION OF THE COURSE	CREDIT	TOTAL MARKS
BTCT01	CERTIFICATE COURSE IN HERBAL MEDICINE	ONE MONTH	1	100

Objectives: To focus the students about the importance and applications of herbal products for various disease prevention and treatments.

Unit 1 : Introduction Herbal Medicine – History of Traditional Medicine – History of Islamic Medicine, Siddha, Ayurveda, Homeopathy, Allopathic and Unani medicine.

Unit 2: Common Herbal Knowledge – Fruit (Lemon, Gooseberry), Root (Ginger, Garlic), Stem (*Pirandai*), Leaf (Balloon vine / Cardiospermum, Mint), Seed (Pepper, Kadukkai).

Unit 3: Common Diseases- Prevention – symptoms – Treatment for Cold cough, Head ache, Hair, Skin, Eye, Fever, Ulcer, Sperm count, Woman problem.

Unit 4: Epidemic Diseases - Heart disease, Cancer, Diabetics, Jaundice, Bone, Brain.

Unit 5: Without medicine- Prevention our body – Water therapy, Obesity, Food taken method, Waste management system.

Text Book:

Mooligai Maruthuvam, 2010, Trichy Pathipagam, Trichy