

MBA101: MANAGEMENT – MICRO AND MACRO

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12 Marks Teachers Assessment – 6 Marks Attendance – 12 Marks End Semester Exam – 70 Marks

Course Objectives:

- *Personal, managerial and organizational preferences and styles achieved through the use of self-assessment instruments, exercises and role plays.*
- *Key managerial skills gained from class preparation, presentations, case studies, and exercises*
- *Personal ability and skills to work collaboratively*

Hours: 40

UNIT I (10 Hrs): Management Skill Pre-Assessment through personal awareness of one's personal values, orientation toward change and interpersonal skill; Management Skills for Everyday Life, Skills required for managerial success – Technical, Human Relation and Conceptual, Understanding Role and responsibilities of Managers at different levels, Challenges of Globalization

UNIT II (10 Hrs): Personal Management Skill-Learning and Analysis through; Individual Aspects: Perceptual Process, Personality Assessment, Attitude and Values, Learning and trust, Emotional Intelligence, Spiritual Quotient and Stress Management, Time Management, Building Social Capital, Emotional Baggage

UNIT III(10 Hrs): Group and Organizational Management Skill-Learning and Analysis through; Group Aspects: Motivation, Leadership, Group Dynamics and Conflict, Organizational Aspects: Power and Politics, Trends in Organizational Change, Model for Managing Change, Managing Cultural Diversity

UNIT IV (10 Hrs): Management Skill Application through; Organizational Management: Planning and Prioritizing, Decision Making, Organisational Structure, Departmentation, Controlling Concept, How Industries Evolve: Principles for Achieving and Sustaining Superior Performance, Societal Management, Managing Cross Border.

Suggested Readings:

1. Management-Stoner, Freeman & Gilbert Jr, PHI
2. Fundamentals of Management: Concepts and Applications-Robbins S.P. and Decenzo David A, PHI
3. Management: A Global and Entrepreneurial Perspective-Wehrich Heinz and Koontz Harold, McGraw Hill
4. Organizational Behaviour -Robbins Stephen P., Pearson Education
5. Organizational Behaviour: Human Behaviour at Work-Newstrom John W., TMH
6. Organizational Behaviour-McShaneL. Steven, Glinow Mary Ann Von, Sharma R.,TMH

7. Organizational Behaviour -Luthans Fred, TMH

8. Organisational Behaviour-Aswathappa K., Himalaya Publishing House

	COURSE OUTCOMES of MBA101
C01	Understanding the behaviour of individuals and groups in organisations.
C02	Analyse the behaviour of individuals and groups in organisations.
C03	Assess the potential effects of organisational-level factors (such as structure, culture and change) on organisational behaviour.
C04	Critically evaluate the potential effects of important developments in the external environment (such as globalisation and advances in technology) on organisational behaviour.
C05	Analyse behavioural issues in the context of organisational behaviour theories
C06	Ability to identify and apply the knowledge of subject practically in real life

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA102: MARKET SCIENCE

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *Assess market opportunities by analyzing customers, competitors, collaborators, context, and strengths and weaknesses of a company.*
- *Develop effective marketing strategies and skills to achieve organizational objectives.*
- *To apply key marketing terms and concepts to complex business situations.*
- *To utilize a framework for understanding the marketing challenges faced by organizations doing business around the world.*

Hours: 40

UNIT I (8 Hrs): Marketing for 21st Century; Genesis of marketing; Core Marketing Concepts; Marketing Mix elements; Marketing & Customer Value; New Marketing Realities; Breakthrough Marketing; Scanning the marketing environment; Dealing with competition.

UNIT II (10 Hrs): Developing Marketing Strategies and Plans; Conducting Marketing Research and Forecasting Demand; Identifying Market Segments and Targets; Crafting the product positioning; Analysing Consumer markets and Business markets; Setting Product Strategies; Creating Brand Equity.

UNIT III (12 Hrs): Price Vs Value; Developing Pricing Strategies and Programmes; Distribution Vs Convenience; Designing and managing Integrated Marketing Channels- Marketing Channels and Value Network; Managing Retailing, Wholesaling and Logistics.

UNIT IV (10 Hrs): Communicating Value- Designing and Managing Integrated marketing communication; Managing Mass Communications: Advertising, Sales Promotion, PR, Events & Experience; Managing Personal Communications- Direct and Interactive marketing, Personal selling emerging issues in marketing; Tapping in to Global Markets; Social Media Marketing.

SUGGESTED READINGS:

Text Books:

1. Marketing Management: A South Asian Perspective - Kotler, Keller, Kevin 15/e, Pearson Education, 2016.
2. Marketing Management - Ramaswamy V. S. & Namakumar S, 5/e, McGrawHill Education Publishers, 2015.
3. Marketing Management - Tapan Panda, 5/e, Excel Publication, 2007.
4. Fundamentals of Marketing Management - Etzel M. J, B J Walker & William J. Stanton, 14/e, McGrawHill Education Publishers, 2015.

5. Marketing: Asian Edition Paul Bainies, Chris Fill Kelly Page third edition, Oxford.

Reference Books:

1. Marketing: An Introduction - Rosalind Masterson & David Pickton, 2/e, Sage Publications, 2010.
2. Marketing Management- Russ Winer, Ravi Bhar 4/e Pearson Education 2015.
3. Managing Marketing, Noel Capon, Sidharth Shekar Singh, 4/e Wiley
4. Marketing: Lamb, Hair, Mc Danniel, Cengage Learning 2012.

	COURSE OUTCOMES DESCRIPTION
C01	Understanding <i>general concepts about marketing management and the marketing process.</i>
C02	Analyse <i>consumer and buyer behaviour models as they influence customer purchase decision-making</i>
C03	Assessing the <i>concepts of segmentation, targeting and positioning as part of a comprehensive Marketing plan.</i>
C04	Develop a set of skills important to successful performance in marketing management positions, including critical thinking, working in a group environment, oral and written presentation skills.
C05	Explain the prospect of the global market and application of digitalization to reach there.
C06	Apply the knowledge of subject practically in real life situations

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA103: COMPUTING TECHNIQUES

Teaching Scheme	Examination Scheme
Lecture: 2 Hrs/Week Credits: 2	End Semester Exam – 35 Marks

Course Objectives:

- to identify computer hardware and peripheral devices
- to learn about various internet based applications
- to accomplish creating basic documents, spreadsheets, presentations and HTML

Hours: 15

Unit I (04 hours): Conceptual Framework: Hardware: (a) Input devices - keyboard, Mouse, voice speech devices, scanner, MICR, OMR, Bar code reader, digital camera etc. (b) Output devices-Visual Display Unit, printers, plotter (c) Storage Devices – Magnetic storage devices, Optical storage devices, Flash Memory.

UNIT II (06 Hrs): E-commerce, Smart Card, Debit Card, Credit Card, EDI and its Components, Digital Signature, e-Cash, e-Cheque. Cyber Crime, Social network, E-Mail.

Unit III (05 hours): Communication Technology: Network and Internet: Types of computer networks (LAN, WAN and MAN), Network topologies.

Internet: Netiquettes, Architecture & Functioning of Internet, Basic services over Internet like WWW, FTP, Telnet, Gopher, IP addresses, ISPs, URL, Domain names, Web Browsers, Internet Protocols, Search engines.

Suggested Readings:

1. Using Information Technology Complete Edition-Brian Williams, Stacey Sawyer, TMH
2. Fundamental of Computers-E. Balagurusamy, TMH
3. Computer Fundamentals-Dr. Larry Long- Wiley
4. Computer Fundamentals-Anita Goel, Pearson
5. Microsoft Office professional 2010 step by step –Joan Lambert III, Joyce Cox, Curtis Frye D., Microsoft Press
6. Electronic Commerce : A Manager's Guide– Ravi Kalakota, Andrew B. Whinston, Pearson Education

MBA104: RECORDING AND ANALYSIS OF BUSINESS OPERATIONS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Hours: 40

Course Objectives:

- To provide a comprehensive treatment of accounting principles, technique and practices.
- To get the students acquainted with fundamental concepts and processes of accounting.
- To have a basic understanding of significant tools and techniques of financial analysis, which are useful in the interpretation of financial statements.
- To have a brief knowledge about international accounting standards.
- To understand basics of fundamental analysis

Unit I (8 Hrs): Meaning and Scope of Accounting : Overview of Accounting, Users of Accounting, Accounting Concepts Conventions, Book keeping and Accounting, Principles of Accounting, Basic Accounting terminologies, Accounting Equation, Overview to Depreciation (straight line and diminishing method).

Accounting Standards and IFRS : International Accounting Principles and Standards; Matching of Indian Accounting Standards with International Accounting Standards, Human Resource Accounting, Forensic Accounting.

Unit II (10 Hrs): Mechanics of Accounting : Double entry system of Accounting, Journalizing of transactions; Ledger posting and Trial Balance, Preparation of final accounts, Profit & Loss Account, Profit & Loss Appropriation account and Balance Sheet, Excel Application to make Balance sheet, Case studies and Workshops.

Unit III(10 Hrs): Analysis of financial statement: Ratio Analysis- solvency ratios, Profitability ratios, activity ratios, liquidity ratios, Market capitalization ratios; Common Size Statement; Comparative Balance Sheet and Trend Analysis of manufacturing, Service & Banking organizations, Case Study and Workshops in analysing Balance sheet.

Unit IV (12 Hrs): Funds Flow Statement: Meaning, Concept of Gross and Net Working Capital, Preparation of Schedule of Changes in Working Capital, Preparation of Funds Flow Statement and its analysis; Cash Flow Statement: Various cash and non-cash transactions, flow of cash, difference between cash flow and fund flow, preparation of Cash Flow Statement and its analysis.

SUGGESTED READINGS:

Text Books:

1. Maheshwari S.N & Maheshwari S K – A text book of Accounting for Management (Vikas, 10th Edition)
2. Essentials of Financial Accounting (based on IFRS), Bhattacharya (PHI, 3rd Ed)
3. Ramachandran Kakani- Financial Accounting for Management (TMH, 3rd Edition).
4. PC Tulsian- Financial Accounting (Pearson, 2016)
5. Dhamija - Financial Accounting for managers: (Prentice Hall, 2nd Edition).

Reference Books:

1. Narayanswami - Financial Accounting: A Managerial Perspective (PHI, 5th Ed)
2. Dhaneshk Khatri- Financial Accounting (TMH, 2015)
3. Ambrish Gupta - Financial Accounting: A Managerial Perspective (Prentice Hall, 4th Edition)
4. Ramchandran & Kakani - Financial Accounting for Management (TMH, 2nd Edition).
5. Mukherjee - Financial Accounting for Management (TMH, 2nd Edition).

	COURSE OUTCOMES DESCRIPTION
C01	<i>Understanding the concepts and principles for their routine monetary transaction.</i>
C02	<i>Analyse the needs of accounting data and demonstrate the ability to communicate</i>
C03	<i>Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures.</i>
C04	<i>Prepare financial statements in accordance with Generally Accepted Accounting Principles and its excel application.</i>
C05	<i>Employ critical thinking skills to analyze financial data as well as the effects of differing financial accounting methods on the financial statements.</i>
C06	Ability to apply the knowledge of subject practically in real life situations

Employable skills	Measuring Tools
Ability to apply excel techniques for Balance Sheet and Profit and Loss Preparation	Exercise + Workshop
Ability to Analyze balance sheet	Exercise
Knowledge about Indian and International Accounting Standards	Presentation

MBA105: MICRO ECONOMICS AND ECONOMIC PLANNING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives: To identify the scope of economics in modern life, demand, supply and determination of price under different market conditions, to appreciate economic growth and taxation system in India.

Hours: 40

UNIT I (10 Hrs): Micro Economics

Scope of Economics in Modern Day World. Law of demand / elasticity of demand. Law of supply. Equilibrium of demand and supply. Production function/ returns of factors and returns to scales / economies of scale.

UNIT II (10 Hrs): Cost Curves and Price Determination

Fixed and variable cost, Marginal cost and Breakeven point. Cost and output relationship both in long run and short run. Concept of market, Market Competition –perfect and imperfect. Price and output determination in different forms of market.

UNIT III (10 Hrs): Public Finance and Banking

Concept of tax - indirect tax and direct tax. Government finance: central, state and local. Latest central government budget/economic survey of India. Fiscal policy. Commercial banks /types/functions. Central banking - functions. Credit control, monetary policy.

UNIT IV (10 Hrs): Economic Development and Planning

Economic growth and economic development. Human development index, inclusive growth. Economic planning – principles and historical perspectives – Indian experience. Consumer price index and Whole sale price index (CPI & WPI).

Suggested Readings:

1. A Textbook of Economic Theory- Alfred William Stonier, D.C Hague, Pearson Education
2. Managerial Economics- Geetika Ghosh, Roy Choudhury, (2nd Edition) TMH.
3. Managerial Economics - G.S. Gupta, Tata McGraw Hills, New Delhi
4. Managerial Economics - Dr.Atmanand, Excel books, New Delhi
5. Indian Economy - S.K. Mishra and V.K. Puri, latest edition, Himalaya publishing
6. Indian Economy - Ashwani Mahajan, Gaurav Datt, latest edition, S. Chand
7. Public Finance - H. L. Bhatia, Recent Edition, Vikas Publication, New Delhi.
8. Economic Survey, RBI Bulletin, GOI for Latest Updates.
9. India 2014 – A Reference Annual by Govt. of India.

	COURSE OUTCOMES DESCRIPTION
C01	Understanding <i>micro and macro-economic principles and ever changing demand and supply conditions.</i>
C02	<i>Analyse the tools and techniques to make effective economic decisions</i>
C03	Ability to appreciate the role of various monetary policy tools in controlling inflation
C04	Ability to analyse various market structures and demand forecasting
C05	<i>Employ critical thinking skills to analyze macroeconomic concepts and the volatility in the business world.</i>
C06	Ability to apply the knowledge of subject practically in real life situations

Employable Skills	Measuring tool
Ability to forecast demand	Exercise + Workshop
Ability to analyse various market structures	Exercise + Workshop
Ability to appreciate the role of various monetary policy tools in controlling inflation	Exercise + Workshop

MBA106: MANAGERIAL COMMUNICATION SKILLS

Teaching Scheme Lecture: 2 Hrs/Week Credits: 2	Examination Scheme End Semester Exam – 50 Marks
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Course Objectives:

- 1. To understand business communication and principles for effective communication in domestic and international business.*
- 2. To understand and apply modes of expression, i.e., descriptive, expositive, narrative, scientific, and self-expressive, in written, visual, and oral communication.*
- 3. To understand and apply basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument.*

Hours:20

Unit-I (10 Hrs): BASIC Conversation in English

BASIC Conversation in English- Greetings, Introducing Oneself, Invitation, Making Request, Expressing Gratitude, Complimenting and Congratulating, Expressing Sympathy, Apologizing, Asking for Information, Seeking Permission, Complaining and Expressing Regret, Role plays on real life situations.

Unit-II (10 Hrs): Comprehensive reading and Writing

Comprehensive reading and Writing – Purpose of writing – clarity in writing – principles of effective writing – approaching the writing process systematically: The 3X3 writing process for business communication: coherence – electronic writing process, Reading-Prescribe Text.

Text and Reference Books

1. Bovee & Thill – Business Communication Essentials A Skill – Based Approach to Vital, Business English, Pearson Education.
2. Bisen & Priya – Business Communication, New Age International Publication.
3. Kalkar, Suryavanshi, Sengupta-Business Communication, Orient Blackswan.
4. P D Chaturvedi, Mukesh Chaturvedi - Business Communication : Skill, Concepts And Applications, Pearson Education.
5. Asha Kaul, Business Communication, Prentice Hall of India. Short Stories- O Henry

	COURSE OUTCOMES DESCRIPTION
C01	Able to understand fundamentals of business communication strategies.
C02	Analyse basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument.
C03	Able to develop the proficiency in Language through reading, writing, listening and speaking.
C04	Ability to communicate via electronic mail and other technologies for business messages.
C05	Able to apply business communication strategies and principles to prepare effective communication for domestic and international business.
C06	Ability to apply the knowledge of subject practically in real life situations

Employable Skills	Measuring tool
Ability to Understand	Exercise + Workshop

MBA107: QUANTITATIVE SKILLS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To compute and understand Ratios, Compound interest, Matrix, Derivative, the measures of central tendency, symmetrical and asymmetrical distribution, patterns.
- Performing Correlation & Compute the equation of simple regression line from a sample data and interpret the slope and the intercept of the equation
- To understand the probability concepts and perform probability theoretical distributions
- Use Estimation Theory and Hypothesis Testing concepts & perform various parametric and non-parametric tests.

Hours:50

Unit I (8 Hrs): Ratio & Proportion, Percentage, Simple & Compound Interest, Concepts of Factorial, Permutations & Combinations; Simple Arithmetic and Geometric Progression; Concepts of Mathematical Induction. Introduction to set theory.

Unit II (10 Hrs): Definition and Types of Matrix, Algebra of Matrices, input-output analysis Transpose, Adjoint and Inverse of a Matrix; Determinants, Applications of Matrix in Business Problem. Derivative from first principle, derivative of sum, Product and Quotient of two functions, Basics of Integration, Integration by Parts, Applications of Integration in Business Problem.

Unit III (10 Hrs): Diagrammatic and Graphical presentation of data, Measures of central tendency, Measures of Dispersion, Skewness, Kurtosis. Basic concepts of correlation and regressions, Basic concept of Probability, Bayes' Theorem and its applications. Probability Theoretical Distributions: Concept and application of Binomial; Poisson and Normal distributions

Unit IV (22 Hrs): Estimation Theory and Hypothesis Testing: Sampling theory; Formulation of Hypotheses; Application of Z test, t-test, F-test and Chi-Square test. Association of attributes, Time series, Components of time series and its measurement. Introduction to Index Number.

Suggested Reading:

1. Fundamental of mathematical statistics - V K Kapoor and S C Gupta - Sultan Chand & Sons
2. Fundamental of Statistics (Vol. 1 and Vol. 2) - Goon Gupta and Dasgupta by Calcutta Press

	COURSE OUTCOMES DESCRIPTION
C01	Able to understand Estimation Theory and to develop understanding of hypothesis testing concepts & perform various parametric and non-parametric tests.
C02	Able to calculate and interpret Ratio, Arithmetic and Geometric mean, measures of central tendency, symmetrical and asymmetrical distribution, patterns.
C03	Able to interpret correlation coefficients & Formulate regression line by identifying dependent and independent variables.
C04	Calculate and interpret statistical values by using statistical tool (correlation & regression)
C05	Demonstrate an ability to apply various statistical tool to solve business problem
C06	Ability to identify and apply the knowledge of subject practically in real life situations.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions SPSS AND MS EXCEL

MBA151: MS OFFICE LAB

Teaching Scheme Lecture: 3 Hrs/Week Credits: 2	Examination Scheme End Semester Exam – 65 Marks
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HOURS:40

MS-Word Lab

- Intro to Word and screen layout
- Intro to the Ribbon
- Formatting Text
- Cut, Copy & Paste
- Formatting Paragraphs
- Bullets & Numbering
- Working with Imagery & Graphics
- Intro to Tables
- Advanced Table Option (Manual and Automatic Editing of Tables)
- Use of Tables for figures and footnotes
- Borders & Shading
- Header & Footer
- Mail-merge
- Printing

MS-Excel Lab

Unit I:

- Excel Environment
- Navigating within a Worksheet
- Navigating the Workbook
- Working with Cells
- Selecting items in Excel
- Entering Data
- Importing and Exporting of Data
- Formatting Text
- Formatting Numbers and values
- Formatting Columns and Rows
- Adding and Editing Borders
- Cutting, Copying and Pasting
- Inserting and Deleting
- Using Find and Replace
- Using Undo and Redo
- Entering Basic Formula and Functions
- Using Page Setup
- Headers and Footers
- Printing a Spreadsheet

Unit2:

- Worksheet management – comparing/moving/copying
- Conditional Formatting
- Linking excel data
- Paste Specials
- Freezing/Hiding Rows/Columns
- Absolute Cell Referencing
- Working with Formulas (SumIF, CountIF, CountA)
- Working with Date and Time Functions
- Sorting Data
- Data validation
- Filters & Advanced Filters
- Creating sub-totals
- Introduction to inbuilt functions
- IF and nested IF Functions
- V Lookups & H Lookups
- Creating and formatting Charts
- Pivot Tables

Unit3:

- Creating Tables in excel
- Advanced formulas and functions
 - Database Functions
 - Text Functions
 - Index and Match
- Advanced List management
- Drawing & Picture objects in Excel
- Solver and Data Analysis tool pack
- What If Analysis
 - Scenarios,
 - Data Tables,
 - Goal Seek
- Spreadsheet Security
 - Creating a Macro
 - Inserting a Macro
 - Assigning a macro to a button
- Forms and Form controls in Excel

MS-Power Point Lab

Unit1:

- Introduction to PowerPoint
- Quick Access Toolbar and Ribbon
- Presentations and Slides
- Formatting & Editing slides
- Formatting & Editing text
- Slide Design
- Drawings & Pictures

- Organisational Charts
- Using Tables and Charts
- Slide transition and animation
- Printing Presentation
- Presenting the Presentation

Unit2:

- Working with Text Content
- Using Slide Masters and templates
- Creating and managing Tables
- Using Charts in PowerPoint
- Organisation Charts & Smart Art
- Manipulating imagery
- Inserting objects, movies & sounds
- Advanced slide show animation
- Slide show management
- Publishing & Printing a Presentation

Google Docs

PDF

HTML

	COURSE OUTCOMES DESCRIPTION
C01	Understanding <i>Microsoft office and their application</i>
C02	Analyse <i>use of application software in business</i>
C03	Assessing the <i>concepts</i>
C04	Develop a <i>set of skills</i>
C05	Explain the <i>prospect of the knowledge</i>
C06	Apply the knowledge of subject practically in real life situations

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situation	Exercise Workshop

MBA152: MANAGERIAL COMMUNICATION LAB

Teaching Scheme Lecture: 3 Hrs/Week Credits: 2	Examination Scheme End Semester Practical Exam – 50 Marks
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- 1. To develop the proficiency in Language through reading, writing, listening and speaking*
- 2. To develop the ability to communicate via electronic mail and other technologies for business messages.*

Hours:30

UNIT I(10 Hrs): Presentation skills: Presentation skills – What is a presentation – elements of presentation – designing a presentation. Advanced visual support for business presentation types of visual aid.

Business letters and reports: Writing routine and persuasive letters – positive and negative messages, Writing memos. Reports – what is a report purpose, kinds and objectives of report writing.

UNIT II(10 Hrs): Group communication: Group communication – Meetings – Planning - objectives – participants – timing – venue of meetings – leading meetings. Media management – the press release, press conference, Seminars – workshop – conferences.

UNIT III(10 Hrs): Business Communication: Business Communication -Workshops and Communication Lab – Email Etiquette, SMS, Media Interview, Report Writing, Team Communication, Business Etiquette, Meeting Management, Public Speaking, Video Conferencing, Business Writing Course, Creative Problem Solving, Negotiation Training, Body Language Training, CV Preparation.

COURSE OUTCOMES DESCRIPTION	
CO1	Able to understand fundamentals of business communication strategies.
CO2	Analyse basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument.
CO3	Able to develop the proficiency in Language through reading, writing, listening and speaking.
CO4	Ability to communicate via electronic mail and other technologies for business messages.
CO5	Able to apply business communication strategies and principles to prepare effective communication for domestic and international business.
CO6	Ability to apply the knowledge of subject practically in real life situations

MBA201: MANAGEMENT SCIENCE

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./Week Credits: 2	Class Test – 6 Marks Teachers Assessment – 3 Marks Attendance – 6 Marks End Semester Exam – 50 Marks

Course Objectives:

- Understand the importance of the use of OR application in decision Making environment
- To formulate LPP and Obtain Graphical Solutions & Acquire General idea of the Simplex method.
- To understand and solve transportation & assignment models.
- To know optimal sequence model and understand concepts of queuing theory.
- To identify right time for replacement of equipment and understand project management techniques

Hours: 30

UNIT 1 (5 Hrs): Introduction– Why Management Science? Application of optimization techniques in practical situations. Models of operation research, Decision theory- under uncertainty and Risk, Decision tree approach.

UNIT II (10 Hrs): LPP Techniques– Formulation of model, Graphical solution, Maximization/Minimization – Simplex Algorithm. Application of Optimization techniques in practical business situations. Sensitivity analysis

Transportation method, Optimization using MODI Method & Stepping Stone Method. Assignment techniques through MS Excel

UNIT III (5 Hrs): Game Theory- Two person zero-sum game, 2×2 and 3×3 , solutions of $2 \times n$, $m \times 2$ and $m \times n$ games.

Queuing models - M/M/1 model with and without limitation of q-size M/G/1, single channel with poisson arrival rate and general service time

UNIT-IV (10 Hrs): Replacement Problem: Replacement of Assets that deteriorate with time with and without consideration of time value of money. Forecasting time series model.

Network Analysis - Rules for drawing network diagram, finding Critical path & application of CPM & PERT Techniques in Project Planning & Control.

Suggested Readings:

1. Quantitative analysis for management by Render B., Stair R.M., Henna M. E., Pearson Education
2. Quantitative Techniques in Management by Vohra, Tata McGraw Hill
3. Quantitative techniques by Kothari, Vikas Publication
4. Operation Research by J.K. Sharma, Pearson

5. Operation Research by Handy A. Taha, Prentice Hall India
6. Quantitative methods for business by Anderson, Sweeney and Williams, Thomson Publications

Course Outcomes: Upon the successful completion of this course, the student will be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</i>
<i>C02</i>	<i>Able to formulate linear programming problem and to find optimal solution by graphical simplex method</i>
<i>C03</i>	<i>Able to build and solve Transportation Models and Assignment Models also to solve game theory problems by understanding pure and mix strategies.</i>
<i>C04</i>	<i>Able to assign optimal sequence of difference jobs on different machines and develop understanding of queuing theory concepts.</i>
<i>C05</i>	<i>Demonstrate an ability to apply various tools in solving business problem</i>
<i>C06</i>	<i>Ability to implement replacement of equipment's at right time and able to implement project management concepts like CPM, PERT to reduce cost and time.</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA202: MARKET INTELLIGENCE

Teaching Scheme	Examination Scheme
Lectures: 3 hrs./Week	Class Test – 6 Marks
	Teachers Assessment – 3 Marks
	Attendance – 6 Marks
Credits: 2	End Semester Exam – 50 Marks

Course Objectives:

- To acquire skills to locate problem areas in organisational settings, and plan, organise, design, and conduct research to help solve the identified problems.
- To facilitate students in making their own research study.
- To make reader Understand and practice a good standard questionnaire.
- To learn use of statistical analysis in packages available in the market.
- To familiarize research reports; and develop skills and knowledge to prepare research reported in academic and business.

Hours: 25

Unit I (10 Hrs): Market Intelligence for competitive advantage. Defining market research problem and developing an approach; Problem identification- Translating marketing decision problem in to market research problem; Research design: exploratory, descriptive, and experimental research. Measurement & Scaling; questionnaire and form design;

Unit II (15 Hrs): Sampling-design & procedures; Fieldwork; Data Preparation-Editing, Coding, Transcribing, Data cleaning, Selecting a data analysis strategy. Data analysis, Frequency distribution; Cross Tabulation; Hypothesis testing; Chi-Square Test-Contingency coefficient, Phi Correlation Coefficient.

Mechanism of Report Writing- Report Preparation: Types, Report Structure: preliminary section, main report, interpretation of results, suggestions and recommendations, limitations of the study, Report formulation.

Suggested Readings:

1. Marketing Research- A South Asian Perspective by Churchill, Iacobucci, Israel, Cengage Learning, 9e
2. Market Research- An applied orientation by Malhotra N K, Pearson Education, 6e
3. Business Research Methods by Cooper and Schindler, Tata McGraw Hill, 9e
4. Research Methods for Business students by Saunders, Pearson Education, 2e
5. Marketing Research by Nargundkar, Tata McGraw Hill, 2ed

Course Outcome: Upon the successful completion of this course, the student will be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</i>
<i>C02</i>	<i>Able to formulate differentiate Research and management problem.</i>
<i>C03</i>	<i>Able to build in making their own research proposal.</i>
<i>C04</i>	<i>Able to prepare well-structured questionnaire in all respect.</i>
<i>C05</i>	<i>Ability to demonstrate not only theoretical/conceptual but also the knowledge in working with statistical packages.</i>
<i>C06</i>	<i>Ability to implement skill to convert the research into presentable article.</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 203 IDENTIFICATION, ADDITION AND DELIVERY OF VALUE

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objective:

- *To understand the role of Operations in overall Business Strategy of the firm.*
- *To understand the application of operations management policies and techniques to the service sector as well as manufacturing firms.*
- *To identify and evaluate the key factors and their interdependence of these factors in the design of effective operating systems.*
- *To familiarize the students with the techniques for effective utilization of operational resources and managing the processes to produce good quality products and services at competitive prices.*

Total: 40 Hrs

UNIT –I (7 sessions) Production Concepts: Introduction, meaning, nature and scope of production and operations management. Difference between production and operations management. Productivity, factors affecting productivity and productivity measurement. Work study— Method study and work measurement. Production Technology – Types of manufacturing processes. Plant location and types of plant layout.

UNIT –II (8 sessions) Operations Concepts: Services scenario in India, difference between product and service, characteristics of services, classification of services, product and service design, factors affecting service design, service designing process, service blueprinting, service capacity planning. Dimensions of quality in services, understanding service quality gap, measuring service quality using SERVQUAL model. Case Studies

UNIT-III (10 sessions) Material and Inventory Management: Types of production planning, process of production planning and control (PPC) – routing, scheduling and loading. Master production schedule, aggregate production planning. Types of inventories, inventory control techniques- EOQ, ABC, VED, FSN, HML and SDE (Simple numerical problems on Inventory control techniques). Just-in-time (JIT) and KANBAN. Case Studies

UNIT-IV (8 sessions) Supply Chain Management: Overview of supply chain management, conceptual model of SCM, supply chain drivers, measuring supply chain performance, core and reverse supply chain, global supply chain, inbound and outbound logistics, Bullwhip effect in SCM, push and pull systems, lean manufacturing, agile manufacturing, role of IT in SCM. Demand forecasting in supply chain—Simple moving average method, weighted moving average method, linear regression and exponential smoothing method. Case Studies

UNIT-V (7 sessions) Productivity and Quality: TQM, Deming's 14 principles, Juran's quality trilogy, PDCA cycle, KAIZEN, quality circles, 7QC tools and its 7 new management tools, ISO 9000-2000 clauses, six sigma, Total Productive Maintenance (TPM), 5S. Case Studies

SUGGESTED READING:

1. Mahadevan: Operation management: Theory and Practice, Pearson India
2. Chary-Production and Operations Management (Tata McGraw-Hill, 1997, 9th Edition)
3. Bisen & Singh-Operation & Logistics Management (Excel Books)
4. R.V. Badi & N.V. Badi - Production & Operation Management (Vrinda Publications 3rd Edition)
5. Raghuram G. (I.I.M.A.) - Logistics and Supply Chain Management (Macmillan, 1st Ed.)
6. Krishnan Dr. Gopal - Material Management, (Pearson, New Delhi, 5th Ed.)
7. Adam Jr Everett E. R J – Production and Operations Management (Prentice-Hall, 2000, 5th Edition)

Course Outcomes: Upon the successful completion of this course, the student will be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to understand the conceptual skills</i>
<i>C02</i>	<i>Able to understanding and application of tools and techniques of operations management in business practices in real time.</i>
<i>C03</i>	<i>Able to develop understanding and application of factors in the design of effective operating systems.</i>
<i>C04</i>	<i>Able to prepare concept of TQM perspectives.</i>
<i>C05</i>	<i>Ability to demonstrate not only theoretical/conceptual but also the knowledge in working with statistical packages.</i>
<i>C06</i>	<i>Ability to implement skill of material Management and Supply Chain Management.</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA204: ECONOMICS OF HUMAN RESOURCE

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To understand the context in which business decisions as they relate to Human Capital Management are made.
- To develop levels of analysis applicable to each situation.
- To gain a conceptual understanding of approaches to solving workplace difficulties that could otherwise cause the employer to face legal consequences.

Hours: 40

UNIT I (10Hrs): Understanding HR, Human Capital Index, Focusing on how human resource systems influence customer service, Understanding the economics of effective human-capital processes, Creating overall dynamic human systems. How to achieve organizational change through the human dimension.

Functions of HRM, Human Resource Planning, Job Analysis, People Management Practices. Recruitment- Design a recruitment advertisement for print/e/visual media.

UNIT II (10 Hrs): Selection- Design a selection process for two industries. Orientation- Design an orientation program. Training, Types of training, Design a training module, Design training evaluation form.

UNIT III (10 Hrs): Performance Appraisal, Types of Appraisal, Design a performance appraisal module. Compensation- Design an offer letter with components of salary.

UNIT IV (10 Hrs): Industrial Relation- Approaches, Grievance handling procedure- Concept of work committee, Arbitration, Conciliation. Factories Act 1948.

Suggested Readings:

1. Managing Human Resources by Bohlander, Thomson learning Books
2. Human Resource Management-Text and Cases by Ivancevich, Excel Books
3. Human Resource Management, by Beardwell, Macmillan
4. Managing Human Resource by Monappa, Macmillan
5. Human Resource Management by Dessler, Prentice Hall
6. Human Resource Management by Decenzo and Robbins, PHI

Course Outcomes: Upon the successful completion of this course, the student will be able to:

	COURSE OUTCOMES DESCRIPTION
C01	<i>Able to synthesize the role of human resources management as it supports the success of the organization including the effective development of human capital as an agent for organizational change.</i>
C02	<i>Able to understand ultimate impact of goals and strategies of the organization on HR</i>
C03	<i>Able to understand the role of employee benefits and compensation as a critical component of employee performance, productivity and organizational effectiveness.</i>
C04	<i>Ability to analyze, manage and problem solve to deal with the challenges and complexities of the practice of collective bargaining</i>
C05	<i>Ability to demonstrate not only theoretical/conceptual but also the knowledge in working with Corporates</i>
C06	<i>Ability to demonstrate knowledge of practical application of training and employee development as it impacts organizational strategy and competitive advantage.</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real corporate situations	Exercise Workshop Quiz Classroom Discussions

MBA206: FINANCIAL ISSUES

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To gain an understanding on the use of basic business financial management concepts and tools of analysis such as valuation.
- To gain an insight into various types of financing available to a firm.
- To have an understanding of various factors considered in designing the capital structure.
- To acquaint the students about key areas related to investment and Working Capital Management.
- To gain an insight into various techniques of dividend and retention ratio.

Hours: 40

UNIT I (10 Hours): Introduction: Introduction to financial management: objectives of financial management. Time value of money. Long term investment / Capital budgeting decision: Investment evaluation techniques traditional methods and discounted criteria, risk analysis of investment proposal

UNIT II (12 Hours): Capital Structure: Financing and capital structure decisions: Meaning and factors affecting capital structure, cost of capital. Leverage Analysis- operating, financial and combined leverage

Working Capital Management: factors affecting working capital, estimation of working capital requirement, Inventory, cash and receivables management.

Dividend decision: Dividend policies and dividend theories

UNIT III (8 Hours): Management Accounting: Management accounting: Definition, differences with Financial Accounting, Introduction to manufacturing costs and its classification, Elements of Cost, Unit costing, Relevant information for decision making, CVP and BEP analysis.

UNIT IV (10 Hours): Financial Decision Making: Decision making areas -special order, addition and deletion of product and services, optimal uses of limited resources, make or buy decisions. Standard costing and Variance analysis regarding materials and Labour.

Suggested Readings:

1. Management Accounting, by Atkinson, Pearson / PHI
2. Management Accounting, by Sudhindra Bhat, Excel Books
3. Management Accounting, by Sharma, Sashi K Gupta Kalyani
4. Financial management, theory and practice, by Prasanna Chandra, TMH.
5. Financial management, by M.Y. Khan and P.K. Jain, TMH.
6. Financial management, by I.M. Pandey, Vikas Publication.

Course Outcome : *Upon the successful completion of this course, the student will be able to:*

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to apply techniques to project financial statements for forecasting long-term financial needs.</i>
<i>C02</i>	<i>Able to explain the role of short-term financial management, and the key strategies and techniques used to manage cash, marketable securities, accounts receivable and inventory.</i>
<i>C03</i>	<i>Able to apply future value and present value concepts to single sums, mixed streams, and annuities.</i>
<i>C04</i>	<i>Ability to Identify relevant cash flows for capital budgeting projects and apply various methods to analyze projects.</i>
<i>C05</i>	<i>Able to explain the concept of leverage and the benefits and costs associated with debt financing and Apply techniques of dividend and retention ratio</i>
<i>C06</i>	<i>Ability to apply techniques for estimating the cost of each component of the cost of capital and understand how to assemble this information into a cost of capital and Capital structure</i>

Employable Skills	Measurement tool
Understanding of financial theory to enable students to enhance corporate financing decisions	Case Study
Understanding major techniques used in long term corporate investment management	Excel Analysis
Basic insight about schemes , interest rates of various sources of finance	www.bankrate.com + Newspaper

MBA207: DIGITAL MARKETING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

On successful completion of this Course, the learner will be able to:

- *Explain the role and importance of digital marketing in a rapidly changing business landscape*
- *Discuss the key elements of a digital marketing strategy*
- *Illustrate how the effectiveness of a digital marketing campaign can be measured*
- *Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs*

Hours: 40 Hrs

UNIT I (10 Hrs): Digital Marketing Fundamentals, Website Planning and Structure, Website Design using WordPress CMS

UNIT II (10 Hrs): Facebook Marketing for Business, Google AdWords' and PPC Advertising, YouTube and Video Marketing, E-mail Marketing for Business

UNIT III (10 Hrs): Content Creation and Promotion, Product Marketing (Google Ads, Instagram, Facebook, YouTube etc), Blogging and Bing Advertising, Freemium and Premium Digital Marketing Tools.

UNIT IV (10 Hrs): Lead Generation & marketing automation, GEO Marketing, Social Media Marketing, Optimization & Advertising, Search Engine Optimization (SEO).

Suggested Reading:

- Blanchard O. (2014) *Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization*
- Pulizzi, J. (2013) *Epic Content Marketing*
- *Marketing on Facebook – Best practice guide* (2015) Facebook Marketing Press
- Chaffey, D., & Ellis-Chadwick, F. (2012) *Digital Marketing: Strategy, Implementation and Practice*, 5/E, Pearson
- Tapp, A., & Whitten, I., & Housden, M. (2014) *Principles of Direct, Database and Digital Marketing*, 5/E, Pearson
- Tasner, M. (2015) *Marketing in the Moment: The Digital Marketing Guide to Generating More Sales and Reaching Your Customers First*, 2/E, Pearson

Course Outcomes: Upon the successful completion of this course, the student will be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>CO1</i>	<i>Develop a digital marketing plan that will address common marketing challenges</i>
<i>CO2</i>	<i>Articulate the value of integrated marketing campaigns across SEO, Paid Search, Social, Mobile, Email, Display Media, Marketing Analytics</i>
<i>CO3</i>	<i>Recognize Key Performance Indicators tied to any digital marketing program</i>
<i>CO4</i>	<i>Improve Return on Investment for any digital marketing program</i>
<i>CO5</i>	<i>Launch a new, or evolve an existing, career path in Digital Marketing</i>
<i>CO6</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA208: ANALYTICAL ABILITY AND PROFESSIONAL COMMUNICATION

Teaching Scheme Lecture: 3 Credits: 2	Examination Scheme End Semester Exam – 50 Marks
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Course Objectives:

The Professional communication course and Aptitude has been designed for the students with following objectives:

- *To Learn and practice principles essential for good oral and written communication*
- *To Speak, write, and listen with increased confidence and competence*
- *Develop teamwork skills and specific strategies to work effectively in teams*
- *To Plan and conduct information-gathering interviews*
- *To Research, organize, and deliver professional oral presentations*
- *To teach aptitude required for placement.*

Hours: 30

UNIT I (5 Hrs.): Understanding the Professional Communication in global Scenario

- Communication Challenges in a Diverse, Global Marketplace
- Collaborations, Interpersonal Communication and Business Etiquettes. Self-Awareness and Personal Effectiveness, Self-Introduction.
- Developing Positive Attitude, Ethics and Moral values, Completing Personality Tests
- Writing Professional Messages, Messages That Request or Persuade
- Formatting Professional Messages, Formatting Letters, Formatting Memos and E-mails
- Writing for Specialized Purposes, Writing Technical Documents, Writing for Social Media, Writing Reports
- Document Design, Crafting brief Business Messages

UNIT II (10 Hrs) : Simplification , Series , Equations: Short cuts to improve calculation that includes (multiplication , squares , cubes , etc.), Different concepts of sequence and series , Linear Equations and Quadratic Equations , etc.

Comparison of Quantities (Q1 & Q2) using Arithmetic: Percentage , Profit & Loss , Simple & Compound Interest , Ratio , Average , etc.

Data Analysis (Caselets) and Data Sufficiency: Venn Diagrams , Ratio , Percentage , Average and usage of other Arithmetical chapters.

UNIT III (15 Hrs) : Problem Solving / Puzzle-Solving: Different kinds of Arrangements (Circular or Square or Rectangular Table , Distributions , Quantitative Reasoning.

Data Interpretation: Data Interpretation is the process of making sense out of a collection of data that has been processed. This collection may be present in various forms like : (Pie Chart , Bar Graph , Line Graph or some tabular form or any other similar form and hence needs an interpretation of some kind).

Course Outcomes: Upon the successful completion of this course, the student will be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to understand importance of communication in the workplace</i>
<i>C02</i>	<i>Able to analyze factors that contribute to failure or success in professional writing;</i>
<i>C03</i>	<i>Able to demonstrate the ability to write for different business audiences;.</i>
<i>C04</i>	<i>Ability to demonstrate the ability to support messages and arguments with relevant research sources;</i>
<i>C05</i>	<i>Ability to assess the potential effects of organisational-level factors (such as structure, culture and change) on organisational behaviour.</i>
<i>C06</i>	<i>Critically evaluate the potential effects of important developments in the external environment (such as globalisation and advances in technology) on organisational behaviour.</i>

Reference Books:

1. How to Crack Test of Reasoning - Jaikishan and Premkishan (Arihant Publications)
2. How to prepare Quantitative Aptitude - Arun Sharma (Mcgraw Hills Publication)

MBA251: R LAB

Teaching Scheme Lab Practical: 2 Credits: 2	Examination Scheme End Semester practical Exam – 35 Marks
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Course objectives:

- The course focuses to bestow hands-on introduction to R programming language.
- To impart basic mathematical operations using R programming language.
- Based on the learned course, the learner will be able to explore R for catered needs of data visualisation.

Hours:25

UNIT I (10 Hrs): What is R and why R?, Libraries in R, Command line versus scripts, Basic mathematical calculations using R, Functions and matrix operations using R, Working with missing data & logical operators. Control structures in R, Use of repetition command in R, Sorting and ordering, Issues related to indexing of a vector, Variables and factors.

UNIT II (15 hrs): Display and formatting of strings -‘paste’ function, ‘cat’ function, splitting, replacement and manipulations with alphabets, matching of an expression in the string. Data set and data frames, importing data files of other software and redirecting output, writing to csv files.

Introduction to statistical functions-Introduction, Frequencies and Partition Values, Graphics and Plots, Central tendency and Variation, Boxplot, Skewness and Kurtosis, Bivariate and three-dimensional plots, Correlation.

Suggested Readings:

1. Introduction to Statistics and Data Analysis-With Exercises, Solutions and Applications by Christian Heumann, Micheal Schomaker and Shalabh, Springer, 2016.
2. The R Software-Fundamentals of Programming and Statistical Analysis-Pierre lafaye de Micheaux, Remy Drouilhet, Benouit Liquet, Springer, 2013.
3. A Beginner’s Guide to R (Use R) by Alain F, Zuur, Elena N. Leno, Erik. H.W.G. Springer, 2009.

Employable skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Lab practical

MBA252: SPSS LAB

Teaching Scheme Lab Practical: 2 Credits: 2	Examination Scheme End Semester practical Exam – 35 Marks
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Course Objective:

1. To give an overview of the capabilities of popular statistical software packages.
2. To train students in handling data files and carry out basics statistical analysis.
3. To give hands on experience about basic hypothesis testing using *t* tests, Chi Square tests and ANOVA.
4. To train students in using advanced tools such as regressions, MDS, Factor Analysis etc.

Hours: 25

UNIT I (7 Hrs): Introduction to various menus, Data file, Output file, Frequently –used dialog boxes, Editing output, Printing results. Creating and editing a data file – Variable and data view, Value Labels. Managing Data: Listing cases, replacing missing values, computing new variables, recording variables, exploring data, selecting cases, sorting cases, merging files, splitting files, Visual Binning. Frequencies: Frequencies, bar charts, histograms, percentiles, Graphs: Creating and editing graphs and charts

UNIT II (8 Hrs): Descriptive Statistics: Measures of central tendency, variability, deviation from normality, size and stability. Cross Tabulation and chi-square analyses, The means Procedure, Bivariate Correlation: Bivariate Correlation, Partial Correlations and the correlation matrix, The T-test Procedure: Independent –samples, paired samples, and one sample tests

UNIT III (10 Hrs): Non Parametric Tests: Chi-Square Test, 1 sample test, 2 independent samples test, k independent samples, 2 related samples test, k related samples, One Way ANOVA Procedure: One way analysis of variance, General Linear model: Two –way analysis of variance, General Linear model: three –way analysis of variance and the influence of covariates, Advanced Tools: Simple Linear Regression , Multiple regression analysis Multidimensional scaling, Reliability Analysis, Factor analysis, Cluster analysis.

Reference Books:

1. SPSS for Windows – Step by Step, 23.0, George and Mallery, Pearson, 10th Edition.
2. Ready, Set, Go! – A student Guide to SPSS for Windows by Pavkov and Pierce, TMGH Edition.
3. Discovering Statistics using SAS by Andy Field & Jerry Miles, Sage Publications, 2016.

Employable skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Lab practical

MBA253: WRITTEN ANALYSIS AND COMMUNICATION LAB

Teaching Scheme Lectures: 3 hrs./Week Credits: 2	Examination Scheme Class Test – 6 Marks Teachers Assessment – 3 Marks Attendance – 6 Marks End Semester Exam – 35 Marks
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Hours: 30

Listening, Reading, Speaking and Writing

- Listening and Reading, Listening with a Purpose, Listening Is a Skill, Active Listeners
- Reading with a Purpose, Reading Skills, Reading Techniques, Effective Reading, Speaking in the Workplace, exercises Speaking and Presenting
- Informal and Formal Presentations, Formal Presentations, Developing a Slide Presentation, Preparing and Evaluating the Presentation
- Interviewing Principles and Skills, Interviewing Types, Understanding the Interview Process, Preparing for a Job Interview
- Group Discussion
- Mock Interviews Sessions

EVALUATION RUBRIC FOR COMMUNICATION

	LEVEL 4	LEVEL 3	LEVEL 2	LEVEL 1
Delivery and Enthusiasm	Very clear and concise flow of ideas. Demonstrates passionate interest in the topic and engagement with the class.	Clear flow of ideas Demonstrates interest in topic and engagement with the class.	Most ideas flow but focus is lost at times Limited evidence of interest in and engagement with the topic	Hard to follow the flow of ideas. Lack of enthusiasm and interest.
Visuals	Visuals augmented and extended comprehension of the issues in unique ways	Use of visuals related to the material	Limited use of visuals loosely related to the material	No use of visuals.

Involvement of the class: -Questions -Generating discussion -Activities	<p>Excellent and salient discussion points that elucidated material to develop deep understanding</p> <p>Appropriate and imaginative activities used to extend understanding in a creative manner</p>	<p>Questions and discussion addressed important information that developed understanding</p> <p>Appropriate activities used to clarify understanding</p>	<p>Questions and discussion addressed surface features of the topic</p> <p>Limited use of activities to clarify understanding</p>	<p>Little or no attempt to engage the class in learning</p>
Response to Class Queries	<p>Excellent response to student comments and discussion with appropriate content supported by theory/research</p>	<p>Good response to class questions and discussion with some connection made to theory/research</p>	<p>Satisfactory response to class questions and discussion with limited reference to theory and research</p>	<p>Limited response to questions and discussion with no reference to theory/research</p>

MBA301: STRATEGIC MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To expose students to various perspectives and concepts in the field of Strategic Management
- The course would enable the students to understand the principles of strategy formulation, implementation and control in organizations.
- To help students develop skills for applying these concepts to the solution of business problems
- To help students master the analytical tools of strategic management

Hours:40

UNIT I (5 Hrs): Introduction: Concept of Strategy, Concept of Corporate Strategy, Strategic Management Process, Role of strategists, Impact of Globalization

UNIT II (10 Hrs): Environmental Appraisal: BOD- Role and Functions, Board functioning in Indian Context, Environment Scanning, Industry Analysis, Synthesis of External Factors, External factors Analysis Summary (EFAS), Internal Scanning, Value Chain Analysis, Synthesis of Internal Factors, Internal factors Analysis Summary (IFAS), Case Study 1

UNIT III (15 Hrs): Strategy Formulation, Strategic factors Analysis Summary (SFAS), Business Strategy, Corporate Strategy, Functional Strategy, Strategic Choice, Case Study 2. Blue Ocean Strategy and Fortune at the Bottom of the Pyramid Capability Approach and Strategy

UNIT V (10 Hrs): Strategy Implementation, 7-S framework, Organization Structure, Corporate Culture, Diversification, Mergers and Acquisition, Case Study 3. Evaluation and Control, Strategic Information Systems, Strategic Issues in Small and Medium Enterprises and Non-Profit Organizations

Suggested Reading:

1. Strategic Management Concepts and Cases- F.R. David, Prentice Hall of India
2. Business Policy and Strategic Management, Lawrence R. Jauch, Glueck William F., Frank Brothers & Co
3. Strategic Management- Pearce II John A. and Robinson J.R., Richard B. And Amita Mittal, McGraw Hill
4. Strategic Management and Business Policy- Wheelen Thomas L., Hunger J. David and RangarajanKrish, PHI
5. Cases in Strategic Management- Budhiraja S.B. and Athreya M.B., Tata McGraw Hill

6. Business Policy and Strategic Management- KazmiAzar, Tata McGraw Hill
7. Strategic Management: Concepts and Cases- Thomson and Strickland, TMH

Course Outcomes: *After reading this course students will be able to reach the following outcomes:*

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to Understand the strategic decisions that organisations make and have an ability to engage in strategic planning.</i>
<i>C02</i>	<i>Able to explain the basic concepts, principles and practices associated with strategy formulation and implementation</i>
<i>C03</i>	<i>Able to integrate and apply knowledge gained in basic courses to the formulation and implementation of strategy from holistic and multi-functional perspectives.</i>
<i>C04</i>	<i>Ability to analyze and evaluate critically real life company situations and develop creative solutions, using a strategic management perspective.</i>
<i>C05</i>	<i>Ability to conduct and present a credible business analysis in a team setting.</i>
<i>C06</i>	<i>Critically evaluate to understand the crucially important role that the HRM function plays in the setting and implementation of an organisation's strategy</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real corporate situations	Exercise Workshop Case Study Quiz Classroom Discussions

MBA302: EVENT MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test - 12 Marks Attendance – 8 Marks End Semester Exam – 40 marks Event Organization and Presentation – 40 Marks

Course Objective: The purpose of this subject is to enable the students to acquire a general knowledge about the "event management" and to become familiar with management techniques and strategies required for successful planning, promotion, implementation and evaluation of events.

Hours: 40

UNIT I (15 Hrs): Event Selection - Family, Social, Religious, Professional, Cultural, Associates, National and International. Role of the Event Manager.

Event Proposal Preparation- Develop a mission, Establish Objectives, Preparing event proposal, Use of planning tools, Quotation Preparation, Budgeting, Cost ascertainment of the Event, Relevant legislations, liquor licenses, trade acts, stake holders and official bodies, contracts

UNIT III (10 Hrs): Event Organization - Purpose, venue, timing, guest list, invitations, food & drink, Stage Management, Concept, theme, Fabrication, equipment, light & sound, guest of honour, speakers, media, photographers, podium, exhibition, Parking, safety and Security, Crowded Management, Protocols, Dress Codes.

UNIT II (10 Hrs): Event Execution – Self or outsourcing, Identification of Venders, Quality control, Pricing, Sponsorship, Major risks and emergency planning, Incident reporting, emergency procedures, Staffing and Coordination

UNIT IV (5 Hrs): Event Closer- Report Back to the Party, Image, Branding, Advertising, Promotional tools, Media tools, Celebrity endorsement, Ministerial/Presidential visits, personal image issues. Breakeven point, cash flow analysis.

Suggested Readings:

1. Successful Event Management by Anton Shone & Bryn Parry, Cengage Learning
2. Event management, an integrated & practical approach by Razaq Raj, Paul Walters &Tahir Rashid, Sage
3. Event management, a professional approach by AshutoshChaturvedi, Global India Publications
4. Event Management by Lynn Van Der Wagen & Brenda R Carlos, Prentice Hall

Course Outcomes: By the end of this course, you should be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to obtain a sense of responsibility for the multi-disciplinary nature of event management</i>
<i>C02</i>	<i>Able to gain confidence and enjoyment from involvement in the dynamic industry of event management</i>
<i>C03</i>	<i>Able to identify best practice in the development and delivery of successful conference and corporate gatherings</i>
<i>C04</i>	<i>Ability to identify the key elements of a conference and the processes involved in venue selection, registration, catering, accommodation, transport, theming, security and entertainment</i>
<i>C05</i>	<i>Ability to conduct and present a credible business analysis.</i>
<i>C06</i>	<i>Identify management essentials such as developing budgets, critical paths, work breakdown structures, risk mitigation and contingency planning.</i>

Employable Skills	Measurement tool
Understanding of various Events	Case Study
Organization of Events	Event Conduct
Sharing experiences	Presentation

MB303: ADVANCED DIGITAL MARKETING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives

- *To give students the opportunity to understand contemporary digital marketing from practical and academic perspectives.*
- *To facilitate study of the evolving strategies and techniques of contemporary digital marketing*
- *To Investigate the main forms of digital media and channels*
- *Master the concepts and language of digital marketing, and understand how digital media and tools function in an organisations*
- *To understand the specific and intricate aspects of digital advertising ad-words as well as campaign environment.*

Hours: 40

UNIT I (10 Hrs): E-Commerce and Payment Gateway, Remarketing Strategies – Advance Level, Google Plus for Business, LinkedIn and Twitter Marketing

UNIT II (10 Hrs): Google Analytics and Webmaster Tool, Affiliate Marketing & Google AdSense, Digital Marketing Plan & Budget Forecast.

UNIT III (10 Hrs): Market Research & Niche Potential, Competitor and Website Analysis, Digital Marketing Project Management.

UNIT IV (10 Hrs): Online Reputation Management, Website Data Analytics, Case Studies and Practical Assignments, Internationally Recognized Certification Guidance (Google, Microsoft Bing, and HubSpot).

Suggested Reading:

- Digital Marketing For Dummies by by Ryan Deiss, Russ Henneberry
- Blanchard O. (2014) *Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization*
- Pulizzi, J. (2013) *Epic Content Marketing*
- *Marketing on Facebook – Best practice guide* (2015) Facebook Marketing Press
- Chaffey, D., & Ellis-Chadwick, F. (2012) *Digital Marketing: Strategy, Implementation and Practice*, 5/E, Pearson

- Tapp, A., & Whitten, I., & Housden, M. (2014) *Principles of Direct, Database and Digital Marketing*, 5/E, Pearson
- Tasner, M. (2015) *Marketing in the Moment: The Digital Marketing Guide to Generating More Sales and Reaching Your Customers First*, 2/E, Pearson

Course Outcomes: By the end of this course, you should be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	Analyze all forms of digital marketing platforms for the underlying strategic and tactical objectives.
<i>C02</i>	Assess and evaluate different forms of Digital Marketing tools and strategy for functional relevance
<i>C03</i>	Demonstrate high level of understanding and application of the theoretical and managerial approaches to Digital Marketing
<i>C04</i>	Demonstrate functional proficiency in synthesizing and evaluating Digital
<i>C05</i>	Marketing strategies and tactics aligned Understanding of Digital Advertising. Usage of Ad words in managing Campaigns.
<i>C06</i>	Assess and evaluate different campaign environment.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA311: TAX PLANNING AND MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To acquaint the students with basic principles underlying the provisions of direct and indirect tax laws and to develop a broad understanding of the tax laws and accepted tax practices.
- To give an understanding of the relevant provisions of Direct Tax Code.
- To introduce practical aspects of tax planning as an important managerial decision-making process.
- Expose the participants to real life situations involving taxation and to equip them with techniques for taking tax-sensitive decisions.

Hours:40

UNIT I (06 Hrs): Introduction: Important definitions in Income tax act 1961, Basis of charge: Rates of Taxes applicable for different types of assesses, Concept of Assessment Year and Previous Year, Residential status and tax liability. Nature and Scope of Tax Planning, Tax Avoidance & Tax Evasion

UNIT II (16 Hrs): Individual tax assessment: Tax on Individual Income – Computation of tax under the heads of Salaries, Income from House Property, Profits & Gains of Business, Capital Gains & Income from Other Sources.

UNIT III (10 Hrs): TDS: Carry forward and set off losses, clubbing of income, Deductions u/s 80. Computation of income and tax liability of individuals, Tax deduction at source; Advance payment of Tax; Assessment procedures; Tax Administration: Authorities, appeals, penalties.

UNIT IV (8 Hrs.): Indirect Taxes: Concept of Indirect Taxes- Concept and features of Indirect Tax laws. **Goods and Service tax laws:** An Introduction including constitutional aspects, levy and collection of CGST and IGST- application of CGST/IGST law, concept of supply, charge of tax, exemption from tax, Input tax credit, registration and returns.

Suggested Readings:

1. Singhanian, Vinod K. and Monica Singhanian. Students' Guide to Income Tax, Taxmann Publications Pvt. Ltd., New Delhi.
2. Ahuja, Girish and Ravi Gupta. Systematic Approach to Taxation, Bharat Law House, Delhi.
3. V.S. Datey. *Indirect Tax Law and practice*, Taxmann Publications Pvt. Ltd., Delhi
4. Dr. Sanjeev Kumar. *Systematic Approach to Indirect Taxes*, Latest edition.
5. Pagare, Dinkar. Law and Practice of Income Tax. Sultan Chand and Sons, New Delhi.

Journals

1. Income Tax Reports. Company Law Institute of India Pvt. Ltd., Chennai.

2. Taxman. Taxman Allied Services Pvt. Ltd., New Delhi.

Course Outcomes: *By the end of this course, you should be able to:*

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	Able to ILLUSTRATE how online filling of various forms and returns can be done
<i>C02</i>	<i>Able to explain different types of incomes and their taxability and expenses and their deductibility.</i>
<i>C03</i>	CALCULATE Gross Total Income and Income Tax Liability of an individual assesses.
<i>C04</i>	<i>Ability to learn various direct and indirect taxes and their implication in practical situations.</i>
<i>C05</i>	ANALYZE and DISCOVER intrinsic value of a security.
<i>C06</i>	DESIGN/ DEVELOP / CREATE tax saving plan.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 312: SECURITY ANALYSIS & PORTFOLIO MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objective

- To providing an in-depth knowledge of the theory and practice of portfolio management.
- To understand Important theories, techniques, regulations and certain advancements in investment

HOURS: 40

UNIT I (6 Hours): Nature and scope of investment decision, Investment & speculation, type of investment, investment opportunities, Risk & Return in Investment, risk return trade off; Investment process

UNIT II (12 Hours): Equity Analysis & Valuation: General valuation framework, Time value of money, discounting & compounding, valuation of equity & preference shares different models, equity analysis, Risk and Return (mean variance criterion, Single Index Model), Fundamental Analysis, Technical Analysis, Efficient Market Hypothesis & its implications to investors.

UNIT III (12 Hours): Valuation of Bonds, Mutual Funds and Financial Derivatives

Bond Analysis Bonds: Characteristics, valuation, risk & return, Bond Price & interest rate relationship, bond theorems, Bond duration and immunization,

Valuation of derivatives- Meaning and definition of derivatives, valuation and pricing of Future, valuation of option using Binomial and Black Scholes model. Valuation of Mutual fund- Types of mutual fund, various mutual fund schemes and calculation of NAV and Expense ratio

UNIT IV (10 Hours): Portfolio Management: Nature and Scope, Traditional Vs Modern Portfolio Management, Portfolio Risk and Return –Diversification & Portfolio Risk, Portfolio Analysis, Portfolio Selection and Portfolio Theories – Markowitz Model and Capital Assets Pricing Model. Portfolio Revision and Performance Evaluation of Managed Portfolios-Sharp Ratio; Treynor Ratio; Jensen's Alpha.

Suggested Readings:

1. Sudhindra Bhat, Security Analysis And Portfolio Management, Excel Books
2. Fischer And Jordan; Security Analysis And Portfolio Management; Prentice-Hall
3. Prasanna Chandra; Investment Analysis And Portfolio Management; McGraw-Hill
4. Alexander & Bailey, Fundamentals Of Investments, PHI
5. Portfolio Management, Kevin, PHI

Course Outcomes: At the end of this course students should be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to</i> Analyse and evaluate financial markets, how securities are traded, mutual funds, investment companies, and investor behaviour.
<i>C02</i>	<i>Able to</i> Construct optimal portfolios and illustrate the theory and empirical applications of asset- pricing models.
<i>C03</i>	<i>Able to</i> Explain macro and industry analysis, equity valuation, financial statement analysis and technical analysis.
<i>C04</i>	<i>Ability to</i> Analyse bond prices and yields and fixed-income portfolios.
<i>C05</i>	<i>Ability to</i> Explain what options and futures are and their use as hedging instruments.
<i>C06</i>	<i>Able to</i> Characterize the implications of the market efficiency evidence on active portfolio

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA313: TECHNICAL ANALYSIS OF FINANCIAL MARKETS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objective

- The main objective of this program is to open new dimensions to forecasting by understanding the price movements with scientific principles & a plethora of tools & techniques making forecasting a logical process

Hours:45 hrs

UNIT I (10 Hrs): Introduction about Technical Analysis; What is technical analysis? The basis of technical analysis, Difference between technical vs fundamental analysis.

Type of Charts: Introduction about chart, The various types of price charts: Line chart, Bar chart, Candlestick chart, Kagi chart, Point & Figure chart, Renko chart, Three Line Break chart
Trend lines: What is the purpose of drawing trend lines? How to plot trend lines?

UNIT II(15 Hrs): Candlestick study; One candlestick pattern: Doji, Hammer / Hanging Man, Inverted Hammer / Shooting Star, Spinning Top, Marubozu; **Double candlestick pattern:** Bullish /Bearish Engulf, Bullish /Bearish Harami, Piercing pattern /Dark cloud cover, Tweezer Top & Bottom; **Triple candlestick pattern:** Morning star /Evening star, Three white shoulders / Three black crows, Abandoned body (Bullish & Bearish), Tasuki Gap (Bullish & Bearish)

Five candlestick pattern: Rising three methods & falling three methods; **Support & Resistance:** What is Support? What is Resistance? Change of support to resistance and vice versa

Charts patterns and their study: Four stages: Accumulation, Mark-up, Distribution and Panic liquidation; Chart patterns: Head & Shoulder, Inverted Head & Shoulder, Double top / bottom, Flag & Pennant, Symmetrical, Ascending, Descending Triangles, Wedge Patterns, Rounding top / bottom, Cup & Handle, Rectangles Bullish / Bearish, Triple top / bottom

UNIT III(10 Hrs): Gaps & Gaps Analysis; Types of Gaps: Common gap, Breakaway gap, Runaway gap, Exhaustion gap, Island cluster; **Oscillators & indicators;** What does a technical indicator offer? Why use indicators? Types of indicators: Leading indicator, Lagging indicator
Moving averages: Simple moving average (SMA), Exponential moving average (EMA), How to trade on moving averages; **MACD:** What is the MACD and how is it calculated? How to trade on MACD; **RSI:** What is momentum? Calculation of the RSI, Divergence, How to trade on RSI

UNIT IV(10 Hrs): On Balance Volume Overview; Calculation of OBV, How to trade on OBV

Stochastic Overview, Construction, How to trade on stochastic; **William %R** Overview, Signals, How to trade on William %R; **Bollinger bands**: Few rules for beginners, How to trade on bb, How to use multiple indicator; **Money Flow Index** Overview, How to trade on MFI **Trading strategy**; **The Dow Theory**, Background, Principal rule of the Dow theory; **Elliot Waves theory**, Elliot wave basics, How to trade on Elliot waves; **Fibonacci Sequence**, How to trade on Fibonacci retracement, How to trade on Fibonacci extension; **Trading psychology and how to manage the risk**

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	Able To understand trends and turning points.
<i>C02</i>	Able to develop self-trading platform by using a set of indicators.
<i>C03</i>	Understanding charts and their patterns for buy-sell decisions.
<i>C04</i>	Learn all candles, patterns and indicators and many more
<i>C05</i>	Able to use of techniques for successful intra-day and short term trading
<i>C06</i>	Learn how to generate calls in all segments either it is equity, commodity or currency.

MBA411: CORPORATE RESTRUCTURING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objective:

- The course would start with cost management issues- making students aware that cost consciousness is vital to sustain profitability.
- It would discuss several value creating strategies- creating shareholder value to unlocking shareholder value.
- Finally, we would study the linkage between employee performance and corporate objective- how employees can be motivated to act as owners.

Hours: 40

UNIT I (6 Hrs):

Corporate Restructuring and today's dynamic world, Need, Scope and Modes of Restructuring, Historical Background, Emerging Trends, Planning, Formulation and Execution of Various Corporate Restructuring Strategies - Mergers, Acquisitions, Takeovers, Disinvestments and Strategic Alliances, Demerger and Hiving off, Expanding Role of Professionals.

UNIT II(12 Hrs):

Legal, Procedural, Economic, Accounting, Taxation and Financial Aspects of Mergers and Amalgamations, Merger Aspects under Competition Law, Amalgamation of Banking Companies and Government Companies, Cross Border Acquisition and Merger. Corporate Demerger and Reverse Merger, Modes of Demerger, Tax Aspects and Reliefs Disclosure and open offer Requirements, Bail Out Takeovers and Takeover of sick units,, Takeover Defences, Cross Border Takeovers.

UNIT III(10 Hrs):

Funding of Merger and Takeover, Financial Alternatives; Merits and Demerits, Funding through various Types of Financial Instruments including Equity and Preference Shares, Debentures, Securities with Differential Rights, Swaps, Stock Options; ECBs, Funding through Financial Institutions and Banks, Rehabilitation Finance, Management Buyouts/Leveraged Buyouts, Factors involved in Post-Merger Reorganization, Integration of Businesses and Operations, Assessing Accomplishment of Post -Merger.

UNIT IV (12 Hrs):

Approaches to Valuation & Identifying Value Drivers, Estimating the discount rates, Growth rates and Cash flow, dividend discount model , FCFE Model,

Valuation Techniques-• Historical Earnings Valuation, Asset Based Valuation, Market Based Valuation.

Valuations for Different Strategies: Merger & Acquisition, Demerger, Slump Sale, Liquidation and Corporate Insolvency, Internal & External Restructuring, Valuation of Intangibles, Valuation of Securities.

Suggested Readings:

1. Guide to Companies Act, A.Ramaiya, LexisNexis Butterworths, Wadhwa, Nagpur
2. Guide to Company Law Procedures, M.C. Bhandari, LexisNexis Butterworths Wadhwa Nagpur
3. ICSI, Handbook on Mergers Amalgamations and takeovers.
4. Mergers/Amalgamations, Takeovers, Joint Ventures, LLPs and Corporate Restructure, K. R. Sampath, Snow White Publications
5. S. Ramanujam, Mergers et. al., Lexis Nexis Butter worths wadhwa Nagpur
6. Mergers and Acquisitions Strategy, Valuation and Integration Ray, , PHI

Course Outcomes: At the end of this course students should be able to:

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able To know current theory and knowledge in the field of finance</i>
<i>C02</i>	<i>Able To master valuation techniques and skills to deal with financial data</i>
<i>C03</i>	<i>Able To develop the ability to apply theory and analytical skills in finance to real-world financial decisions</i>
<i>C04</i>	<i>Ability to Analyze bond prices and yields and fixed-income portfolios.</i>
<i>C05</i>	<i>Able to develop global and regional outlook re- grading corporate investment strategy</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 412: BANKING OPERATIONS MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Objective: To enable the students to get acquainted with banking procedures and operations necessary for running business enterprise.

UNIT – I (10 Hours): *Indian Banking system- central Banking in India* - Functions of the Central Bank, Central Bank and the Indian financial System, Prudential Norms of RBI, Banking Sector reforms, Objectives, Functions & Organisational setup of Banks , Concept of Universal banking, development bank and Investment bank

UNIT – II (10 Hours): *Operational Aspect of commercial banks in India*- Relationship between Banker and customers, Types of customer a/c, Permitted activities of Commercial Banks in India ,Cheques, Endorsement, Presentment, Dishonour, Rights and liabilities of Paying and collecting Banker, Employment of funds by Commercial Banks, Types of securities, mode of creating charge, Bank guarantees, ,Opening of accounts for various types of customers, Principles of Lending, Credit management, Credit monitoring, NPA management

UNIT – III (10 Hours): Different types of documents - Documentation procedure, Stamping of documents, securities - different modes of charging - types of collaterals and their characteristics - Priority sector lending - targets, issues, problems - Financial Inclusion. Agriculture / SMEs / SHGs / SSI /Tiny sector financing - New products and services, Credit cards / Home loans /personal loans / consumer loans - Ancillary Services - Remittances, Safe Deposit Lockers etc.

UNIT – IV (10 Hours): Changing Patterns in Banking Operations: Core Banking, Electronic products – Electronic payment system, Mobile Banking, Internet Banking, Electronic fund transfer system: RTGS, NEFT & SWIFT, Merchandise banking, Credit cards and ECS, Global developments in banking technology, Computer audit, Banking security system, Consolidation of Banking, Financial inclusion

Suggested Readings:

1. Banking Law & Practice, by P.N. Varshney.
2. Banking Operations Management by Bimal Jaiswal
3. Banking Theory & Practice by M.L.Jhinghan
4. Practice & Law of Banking, by H.R. Suneja.
5. Practice & Law of Banking, by H.C. Agrawal.
6. Commercial Banking Vol. I & II, by Indian Institute of Bankers.

COURSE OUTCOMES DESCRIPTION	
CO1	RECALL the structure and components of Indian financial system through banking operations & Financial Markets.

C02	UNDERSTAND the concepts of financial markets, their working and importance.
C03	ILLUSTRATE the working and contribution of Banks and NBFCs to the Indian Economy.
C04	ANALYZE the linkages in the Financial Markets.
C05	EXPLAIN the various banking and accounting transactions.
C06	DEVELOP necessary competencies expected of a finance professional.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 413: FINANCIAL MARKET & SERVICES

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Objective: This subject is to give the students an insight into the principles, operational policies and practices of the prominent Financial Markets and Institutions, their structure and functioning in the changing economic scenario, and to make critical appraisal of the working of stock exchanges in India.

HOURS: 40

UNIT I(8 Hours): An overview of the Indian Financial Systems- The constituents of a Financial System Markets, Financial Market as a part of Financial System. Money Market-its components, instruments and Intermediaries, Capital Market – its components, instruments and Intermediaries

UNIT II(12 Hours): Management of Public offer- Market of new issues –Public Offer, Private Placement Rights Issue, Initial Public Offer (IPO), Book Building through Online IPO; ASBA, Eligibility to issue securities, Pricing of Issues- Fixed versus Book Building issues, Allotment of Shares-Basis of Allotment, Recent trends in public issues

UNIT III(10 Hours): Stock Exchange operation: Concept, characteristics and functions of secondary market- Types of stock exchange, different segments at stock exchange, trading mechanism at stock exchange, clearing and settlement process. Stock Market indices- Meaning, Purpose, and Consideration in developing index, Methods (Weighted Aggregate Value method, Weighted Average of Price Relatives method, Free-Float method)

UNIT IV(10 hours): Financial Services and Non Depository Institutions: Various fund based and fee based financial services- Leasing, Hire purchase, Factoring, Forfaiting, Merchant Banking, Credit rating, Custodial services etc. Mutual Funds: Types of mutual funds schemes, ETFs, hedge funds, venture capital funds, private equity funds and regulation.

Suggested Readings:

1. Kohn Meir, *Financial Institutions and Markets*, Oxford University Press.
2. Madura Jeff, *Financial Markets and Institutions*, South Western Cengage Learning.
3. Mishkin, Fredrick S. and Stanley G. Eakins, *Financial Markets and Institutions*, Pearson Education India.
4. Financial Institutions and Markets, Bhole LM, Tata Mc Graw Hill, 2008
5. Indian Financial System, Khan M Y., Tata Mc Graw Hill, 2009
6. Management of Indian Financial Institutions, Srivastava, R M ., Himalaya Publishing House, Mumbai, 2005
7. Investments and Securities Markets in India, Avadhani V A., Himalaya Publishing House, 2004

8. Development Banking in India and Abroad, Srinivasan NP and Saravanel, P., Kalyani Publications, Ludhiyana, 2001

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	Ability to understand the role and function of the financial system in reference to the macro economy
<i>C02</i>	<i>Able to demonstrate an awareness of the current structure and regulation of the Indian financial services sector</i>
<i>C03</i>	<i>Able to evaluate and create strategies to promote financial products and services.</i>
<i>C04</i>	<i>Ability to operational policies and practices of the prominent Financial Markets and Institutions</i>
<i>C05</i>	<i>Ability to mitigate and manage the credit risk as a professional risk manager</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA414: MUTUAL FUND

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

Mutual funds can play an important role in Indian Economy. The course aims to help the students in:

1. *Analyze the development of Mutual funds*
2. *Understanding the extent to which Investors are Protected*
3. *Analyze the Mutual fund Regulation*
4. *Know the recent developments in Mutual fund Industry*

HOURS:40

UNIT I (10 Hrs): Mutual Fund Structures; Fund of Funds, Exchange Traded Funds, Real Estate Mutual Funds, Venture Capital Funds, Private Equity Funds, International funds
Legal and Regulatory Environment of Mutual Funds; Regulatory Framework for Real Estate Mutual Funds, Investment Norms for Mutual Funds, SEBI Norms for Mutual Funds' investment in Derivatives, SEBI norms with respect to change in controlling interest of an AMC, Changes in Mutual Fund Schemes; Fund Distribution and Sales Practices, Internet and Mobile Technologies, Stock Exchanges

UNIT II (10 Hrs): Investment and Risk Management: Fundamental Analysis, Technical Analysis, Quantitative Analysis, Debt Investment Management, Issues for a Debt Fund Manager, Derivatives, Application of Derivatives
Valuation of Schemes: Equities, Debt, Non-Performing Assets and Provisioning for NPAs, Gold, Real Estate, Accounting; Net Asset Value, Investor Transactions, Distributable Reserves, Unique Aspects of Real Estate Schemes Accounting

UNIT III(10 Hrs): Taxation; Taxes for AMCs: Securities Transaction Tax and Income Distribution Tax, Taxes for Investors: Securities Transaction Tax, Taxes on Dividend, Capital Gains, Set-off, and Carry Forward of Losses, Dividend Stripping and Bonus Stripping.
Investor Services; New Fund Offer, Open-end Fund, Closed-end Fund, Exchange Traded Fund, Nomination and Pledge

UNIT IV (10 Hrs): Scheme Evaluation; Measures of Return, Measures of Risk, Benchmarks and Relative Returns, Risk-adjusted Returns, Limitations of Quantitative Evaluation
Asset Classes and Alternate Investment Products: Historical Returns, Perspectives on Asset Class Returns, Alternative Investment Products
Cases in Financial Planning, Practical Aspects of Financial Planning (cases/examples)
Ethics and Investor Protection, Safeguards in Mutual Fund Structure, Regulatory Steps for Protecting Investors Against Fraud

MBA 316: SALES AND DISTRIBUTION

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives: Upon completion of this subject, participants should have an ability to:

- Acquaint with the concepts which are helpful in developing and managing sales force and marketing channels to gain competitive advantage.
- Familiarize with the concepts, techniques and the practical aspects of the key decision-making variables in distribution channel management.

Hours: 40

UNIT I (12 Hrs): Introduction to Sales Management & Sales Control: Selling Vs Marketing- the argument continues, Psychology of selling-why people buy, Sales knowledge-customers, products and technologies, SPIN selling, Sales Negotiations, Role of Sales Manager, Time, territory and self-management, Sales Force Automation. Sales Territory: Concept and process of devising sales territories. Sales forecasting and Sales Potential, Sales Forecasting Techniques Sales Budget: Purpose and Procedure Sales Quotas: Concept and types.

UNIT II (08 Hrs): Managing the Sales Force: Concepts of sales force management: Recruitment and Selection of sales personnel. Sales Training: Areas of sales training: Company specific knowledge, product knowledge, industry and market trend knowledge, and customer education. Compensating and motivating sales force. Routing and scheduling of sales force. Sales audit

UNIT III (10 Hrs): Distribution Channel Strategies: Distribution Channels: Concept, Functions and Types. Distribution channel strategy and features of effective channel design. Channel Conflict: Concept and stages, conflict management International distribution strategy.

UNIT IV (10 Hrs): Logistics and Supply Chain Management: Definition & scope of logistics, Components of logistics. Inventory management decisions: Concept of EOQ, ROP, JIT, online inventory management Out bound Logistics: Transportation decision, location and

warehousing decisions Concept and scope of Supply chain management. Components of Supply Chain Management.

Suggested Readings

1. Sales Management: Principle, Process and Practice Donaldson B - (Palgrave) 2008, 3e
2. Sales & Distribution Management, Panda, Sahadev- (Oxford) 2009 (13th impression), 1e
3. Sales Force Management, Spiro - (Tata Mc Graw Hill) 2009, 11e
4. Sales Management: Decisions, Strategies and Cases Still Richard R, Cundiff Edward W. and Govoni Norman A.P - (PHI) 2008, 5e
5. Marketing Channels, Rosenbloom – (Cengage Learning) 2010, 7e
6. Marketing Channels, Coughlan A.T., Stern Louis W., EL-Ansary A.I. and Anderson E - (PHI/Pearson) 2009, 7e
7. Marketing Channels, Churchill, Ford, (TMH) 2009, 9e

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to illustrate the fundamentals of Distribution channels, Logistics and Supply Chain Management</i>
<i>C02</i>	<i>Able to Explain and discuss the general concepts of sales and distribution management.</i>
<i>C03</i>	<i>Able to Recognise and demonstrate the significant responsibilities of sales person.</i>
<i>C04</i>	<i>Able to Describe and Formulate strategies to effectively manage company's sales operations.</i>
<i>C05</i>	<i>Able to evaluate the role of Sales manager and his/ her responsibilities in recruiting, motivating, managing and leading sales team</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 317: SERVICE MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives: Upon completion of this subject, participants should have an ability to:

- Assess market opportunities in service organizations by analyzing their customers, competitors, collaborators, context, and strengths and weaknesses.
- Develop effective marketing strategies and skills to achieve organizational objectives in service marketing setup.
- To apply key service marketing terms and concepts in apply them in complex business situations.
- To utilize a framework for understanding the marketing challenges faced by service organizations doing business around the world.

UNIT I (10 Hrs): Understanding Service markets, products and customers; Augmented service marketing mix; New perspectives on marketing in service economy; Customer Behaviour in Service encounters, Understanding customer expectations and perceptions of Services; Customer Satisfaction & Service Quality, Service Quality Models.

UNIT II (10 Hrs): Segmenting, Targeting and Positioning Services in competitive market; Developing service concepts: core & supplementary elements; Service accessibility through physical and electronic channels; Service pricing and revenue management; Educating and engaging customers and promoting the value proposition.

UNIT III (10 Hrs): Designing and managing the customer interface: Service process, Service Encounter and Service Blue Print; Balancing Demand and capacity; Service Recovery and customer feedback; Crafting the service environment; Managing People for Service Advantage.

UNIT IV (10 Hrs): Managing Relationships and building Loyalty; Customer Profitability and Lifetime value; Service Leadership; Services in Global Perspective, Principal Driving Force in Global Marketing of Services, Key Decisions in Global Marketing.

Suggested Readings:

1. Services Marketing-Integrated Customer focus across the firm Zeithaml - (Tata Mc Graw Hill) 2004, 3e

2. Services Marketing: People, Technology and Strategy Love lock Christopher - (Pearson Education) 2009, 5e
3. Services Marketing, Rama Mohana Rao - (Person Education) 2009, 1e
4. Services Marketing, Govind Apte - (Oxford University Press) 2010, 1e (13th Impression)
5. Services Marketing, Rajendra Nargundkar - (TMH) 2004, 2e
6. Services: Marketing, Operations & Management, Jauhari & Dutta- (Oxford University Press) 2009, 1e

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to explain and discuss the general concepts of marketing in service marketing setups.</i>
<i>C02</i>	<i>Able to Understand the typical challenges faced in marketing of services and their resulting implications.</i>
<i>C03</i>	<i>Able to understand the nuances of buying behaviour in service marketing setup.</i>
<i>C04</i>	<i>Able to explain the concepts of segmentation, targeting and positioning in framing cutting edge marketing strategies in service marketing setup.</i>
<i>C05</i>	<i>Able to understand service marketing concepts and challenges in global setup</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA318: MARKETING OF FINANCIAL SERVICES

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

HOURS:40

UNIT I(10 Hrs): Financial Market Fundamentals: Equity Markets: Capital Markets, Role in the Economy, Brief History of BSE and NSE. Trade lifecycle of a financial instrument, Market Participants in the Equity markets with perspectives on 'Buy' side and 'Sell' side, Key terminologies related to the Equity markets. Bond Markets: Introduction to bond markets, how bond markets operate? Key terminologies related to the bond markets. Regulatory aspects of the Bond Markets, Key players in the Bond Markets (such as FIIs, Hedge Funds etc.) Debt Instruments: Debt instruments and their classification based on type of issuer, and basis characteristics. Money Market Instruments (such as Certificate of Deposit, Re-purchase "Agreements etc.)

UNIT II(10 Hrs): Insurance: Basics of Insurance: Basic understanding of insurance products, types of insurance policies – Role of IRDA, Insurance industry in India. General Insurance: Types of liabilities covered, extent of insurance value, and conditions. Life Insurance: Basic concept of Life Insurance, its beneficiaries and its types, Concept of Term Insurance and its various types, Traditional Life Insurance and its difference from Term Insurance, Whole Life Policy and Endowment Policy and the differences between them. ULIP and its comparison with conventional plans and Mutual Funds. Marketing Channels in Insurance Markets: Various channel members in the Industry such as Insurance Agents, Distributors, etc. Basic Understanding: Property and casualty/liability insurance, Commercial Insurance, Health Insurance.

UNIT III(10 Hrs): Other Financial Services: Leasing / Hire Purchase: Definition, meaning, types, process, advantages, limitations, financial implications. Housing Finance: Major institutions involved, types, rate of interest, advantages, scenario in India. Credit Cards: Meaning, types, growth, advantages and disadvantages, growth in India. Credit Rating Services: Origin, definition, advantages, credit rating agencies - global and Indian, symbols, CRISIL, ICRA, equity ratings, CIBIL, scope in India. Other Services: Factoring, forfeiting, bill discounting, consumer finance and venture capital.

UNIT IV(10 Hrs): Marketing of Financial Services: Importance of Financial Planning: identification of investment needs for retail investors, studying investment behavior - Household Vs. Institutional Investors. Alternate Investment Products: Introduction to Alternate Investments and their various products and services, Portfolio Management Services and their features, Tax

regulations from an Investment Advisor point of view. Career opportunities in Marketing of Financial Services.

Suggested Text Books:

1. Financial Services, M Y Khan, Tata McGraw-Hill
2. Financial Services & Markets, Dr. Punithavathy Pandian, Vikas Publication
3. Marketing of Financial Services, V.A. Avadhani, Himalaya Publishing House
4. Financial Services Marketing, Christine Ennew , Nigel Waite
5. Financial Services, Nalini Prava Tripathy, Prentice Hall of India Private Limited

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	RECALL and DESCRIBE the key terminology of Financial Services.
<i>C02</i>	DESCRIBE the various types of financial products and services.
<i>C03</i>	DEVELOP FAQs for each kind of financial products and services from an investment advisor's perspective.
<i>C04</i>	COMPARE and CONTRAST the various types of financial products and services and ILLUSTRATE their benefits and limitations.
<i>C05</i>	EVALUATE the financial products and services from an investment perspective for various kinds of investors.
<i>C06</i>	COLLECT the application forms for all kinds of investments and DISCUSS each of them.

319: PERSONAL SELLING LAB

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

HOURS: 40

UNIT I(10 Hrs): Personal Selling & Salesmanship: Defining Personal selling and salesmanship, Selling as a profession, Objectives and importance of personal selling, Essentials of Personal Selling, Traditional & Modern Selling Approach, Ethical and Legal Considerations in Personal Selling, Role of Selling in Marketing, Types of selling, Qualities of Winning Sales Professionals - Physical, Mental, Social and Character Traits. Theories of Selling: AIDA, Right set of circumstances theory of selling, Buying Formula theory of selling, Behavioral Equation theory, Career in Personal Selling / Sales; What Companies Look for in New Salespeople.

UNIT II(10 Hrs): Personal Selling Process: Prospecting- objectives, sources and methods, Lead Generation, Getting appointment, Sales Responsibilities and Preparation; Pre approach-step toward sales planning-elements of sales call planning; Customer need discovery & Analysis; Approach- sales presentation/ demonstration- selection of appropriate presentation method, essentials of presentation, sales presentation mix- persuasive communication, visual presentation and dramatization, Use of questions- Direct questions, non- directive questions, rephrasing, redirect questions; Sales Leads, Account Management, Building long-term partnership by Selling, Strategic Understanding of Company, Products, Competition, and Markets Strategic Understanding of Company, Strategic Understanding of Products.

UNIT III(10 Hrs): Personal Selling Process: Handling objection- hidden, stalling, no need, money objection, etc., objection handling techniques, Closing the sale- reading buying signals, closing techniques- the alternative choice, assumptive, the compliment, the summary, the continuous, the minor point, the tea account, the standing room and the probability; Follow up after sales- Discuss service requirements, handling complaints, Key Account Management. Customer services: meaning of Customer Service, Importance of Customer Satisfaction Customer Follow-Up Strategies, Customer Service Questionnaire, Evaluating Customer Service.

UNIT IV(10 Hrs): Personal Selling Skills: Negotiation, Body Language- Space, Moments, Eye Contacts & Postures, Follow up Calls, Writing Effective Sales Letters and e- mails, Communicating Effectively with Diverse Customers – Meaning of Communication, Developing Communication Skills, essentials of Effective Communicator, Communication Styles, making , Listening Skills, Presentation and Demonstration, , Positive Mental Attitude, Goal Setting, Effective Dressing, Managing Yourself, choice of Communication Style, Communication and Trust Building

Managing Time and Territory Self-Management Effectiveness and Efficiency Sales Activities, Setting Priorities Account And Territory Management, Cold Call Mechanism, Personal Selling

Applications and Situations: Selling of services- financial, IT and telecommunication, advertising, education; Selling of industrial products- raw material, capital goods, supplies; Selling of consumer goods- convenience, shopping and specialty goods; International selling; Selling in rural markets; Selling high and low involvement products; Selling to new and existing customers Market; Selling to end users, intermediaries, government departments and agencies; Selling individual and groups.

Suggested Text Books:

1. Fundamentals of Selling by Charles M. Futrell, Tata McGraw Hill 10th Edition
2. A B C' s of Selling by Charles M. Futrell, AITBS, New Delhi,
3. World Class Selling by Roy Chitwood, JAICO Publishing House
4. Successful Selling Solutions by Julian Clay, Viva Books
5. Value Added Selling by Tom Reilly, TMGH
6. Achieving Sales Excellence by Howard Stevens, Viva Books Pvt. Ltd.
7. Power Sales Presentation by Stephan Schiffman, Adams Media Corporations.
8. Sales Essentials by Stephan Schiffman, Avon Massachusset
9. Smarter Selling by Keith Dugdale& Lambert, Prentice Hall.
10. Successful Sales- Get Brilliant Results Fast by Pauline Rowson, Viva Books.
11. Successful Selling Skills by Richard Denny, The Sunday Times.
12. The Art and Science of Negotiation by Raiffa H, Cambridge: Belknap/Harvard Press
13. Getting to Yes by Fisher R and Ury W, Harmondsworth Middlesex, GB Penguin Books

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	LIST the key terms in selling and DESCRIBE the qualities of Winning Sales Professionals
<i>C02</i>	EXPLAIN the theories and concepts that are central to personal selling.
<i>C03</i>	Apply the interpersonal and team skills necessary in successful relationship selling.
<i>C04</i>	ILLUSTRATE the use of various sales techniques needed to achieve a profitable sale in a real world scenario for a real world product/ service / e- product / e-service.
<i>C05</i>	DEVELOP a customer plan that identifies all elements of personal selling, essential to creating successful sales in a real world scenario for a real world product/ service / e-product / e-service.
<i>C06</i>	CREATE sales presentation for a real world product/ service / e-product / e- service and for variety of selling situations.

**MBA 416: CONSUMER BEHAVIOUR & INTEGRATED MARKETING
COMMUNICATION**

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives: Upon completion of this subject, participants should have an ability to:

- Assess the nuances of consumer buying behavior, advertising and branding and further analyzing market opportunities by analyzing customers, competitors, collaborators, context, and strengths and weaknesses of a company.
- Develop effective marketing strategies and skills to achieve organizational objectives.
- To utilize a framework for understanding the marketing challenges faced by organizations doing business around the world.
- To acquire skills to locate problem areas in organisational settings, and plan, organise, design, and conduct research to help solve the identified problems.

Hours: 40

Unit-I (10 Hrs): Consumer Behaviour in 21st Century; Understanding Consumer Markets and Business Markets, Consumerism: consumer rights, consumer protection & dispute redressal, External influences on consumer behaviour: Cross cultural variations, family and households and group influence, Changing Indian society- values, demographics & social stratification.

Unit-II (10 Hrs): Individual determinates of consumer behaviour: Perception, Learning, Memory, Motivation, Personality and Attitude, Self-Concept & Lifestyle; Consumers as decision makers, Consumer decision process. Perceptual mapping.

Unit III (10 Hrs): IMC in 21st century, developing effective communications; Marketing communication mix, Managing IMC process, Events and experiences, Sales Promotion, Public Relations, Direct and interactive marketing, Word of Mouth & Personal Selling

Unit IV (10 Hrs): Developing and managing an advertising program, Campaign Planning, Message Creation, Copywriting, Advertising Appeals, Layout Design, Media Planning, Testing of Advertising effectiveness, Advertising Agencies.

Suggested Readings:

1. Consumer behavior - David, Loudan&Bitta, Tata McGraw Hill, 2002, 4th Ed.
2. Consumer Behavior - Leon Schiffman, Lesslie Lazar Kanuk-Pearson/PHI,2008, 8thEd.
3. Consumer Behavior - Hawkins, Best, Coney, TMH, New Delhi, 2002, 8th Ed.
4. Consumer Behavior - Michael R.Solomon, PHI, New Delhi, 2003, 5th Ed.
5. Brand Positioning Strategies for Competitive Advantage- Subrato Sengupta, Tata Mc Graw Hill, 2005, 2nd Ed.
6. Advertising Management- Aaker, David A et al. Prentice Hall, India, 1996, 5th Ed.
7. Advertising and Promotion Management- Rossiter, John R / Percy, Larry. Mc Graw Hill, 1997, 2nd Ed.

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to explain and discuss the general concepts about buying behaviour and integrated marketing communications</i>
<i>C02</i>	<i>Able to discuss consumer and buyer behaviour models as they influence customer purchase decision-making</i>
<i>C03</i>	<i>Understanding the application of the concepts of strategic marketing (segmentation, targeting and positioning) in framing cutting edge marketing strategies.</i>
<i>C04</i>	<i>Able to explain the prospect of the global market and application of digitalization to reach there.</i>
<i>C05</i>	<i>Able to understand service marketing concepts and challenges in global setup</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 417: RURAL MARKETING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives: Upon completion of this subject, participants should have an ability to:

- To understand nuances of Indian rural markets structure and system in India.
- Understand the typical rural buying behaviour of rural consumers, rural markets research, and rural market segmentation and targeting.
- Formulate the cutting-edge marketing strategies across product and service categories in rural market setup.

Hours: 40

UNIT I (10 Hrs): Rural Hinterland-Characteristics and Dimensions, Rural Urban dichotomy, Growing Corporate interest in rural market, Challenges in Rural Marketing; Assessing rural Market opportunities, Rural Demand Dimensions: Thomson rule of Marketing Index, MICA rating, Lin Quest.

UNIT II (10 Hrs): Strategic Marketing in rural context; rural market offerings: rural product and brand decisions, No-frills pricing for value maximization; Educating customers and building trust in rural Markets, Innovative distribution pattern and methods in rural markets.

UNIT III (08 Hrs): Rural Marketing Strategies: Rural Marketing of FMCG, Rural marketing of consumer durables; Marketing of agricultural products, Agricultural inputs and their types, Agricultural marketing, Marketed & Marketable Surplus, Marketing rural non-farm products, Different marketing agencies and institutions, New Trends in Indian agriculture.

UNIT V (12 Hrs): Rural development administration: New Panchayati Raj System, NGOs in rural development, Information technology and village development, e-governance, New

Economic reforms & rural development; Agricultural and non-agricultural finance, Sources of finance, NABARD, RRBs and rural development banks, constraints in credit delivery system.

Suggested Readings:

1. Rural- Marketing- Text & Cases, Krishnamacharyulu C S G, Ramakrishnan Lalitha - (Pearson) 2011, 2 e
2. New Perspectives in Rural & Ahicultural Marketing, Ramakishen Y-: Jaico publishing 2011, 2 e
3. Rural Marketing Concepts & Practices, Dogra Balram, Ghuman Karminder- (Tata Mc Graw-Hill) 2009, 4th Reprint, 1e
4. Rural Marketing- Environment Problems & Strategies, Gopalaswamy T P- (Vikas Publishing House) 2009, Revised 3 e
5. Rural Marketing- Targeting the Non-urban consumer, Velayudhan Sanal Kumar- (Response, SAGE Publication) 2002, 1 e

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to explain and discuss the general concepts about rural marketing management and the rural marketing process</i>
<i>C02</i>	<i>Able to assess the challenges and opportunities in the field of rural marketing in India and expose the students to the rural market environment</i>
<i>C03</i>	<i>Able to apply adaptations to the unique rural marketing mix elements to meet the needs of rural consumers</i>
<i>C04</i>	<i>Able to understand the concept and methodology for conducting the research in rural market.</i>
<i>C05</i>	<i>Able to understand challenges in global setup</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 418:INTERNATIONAL MARKETING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives

- *To develop knowledge and understanding of key issues associated with international marketing:*
 1. *Importance of global and international marketing*
 2. *Motives to internationalization*
 3. *The influence of macro-environment on market selection*
 4. *Market entry modes*
 5. *Specific international issues affecting the 4Ps*
 6. *Financial, ethical, and organizational issues involved in international marketing*
- *To develop skills in researching and analyzing international marketing opportunities*

Hours: 40

Unit I(10 Hrs): Why go global- drivers of globalization, Internationalization stages and international marketing orientation; Dynamic environment of international trade: Socio-cultural dynamics in assessing global markets, International politico-legal environments-playing by the rules, economic environments.

Unit II(10 Hrs): Assessing Global Market opportunities: Developing worldwide vision through market intelligence; Global Marketing strategies for strategic advantage: International market offerings for consumers and business: International product decisions, developing international brands, Pricing and revenue management for international market, Ensuring accessibility through international marketing channels, Educating and engaging international customers and promoting the value proposition.

Unit III(10 Hrs): Global entry and operating strategies - exporting; turnkey projects; licensing; contract manufacturing; foreign Assembly, foreign production; joint ventures; production in free areas; third country location; counter trade; strategic alliance; Trade in services.

Unit IV(10 Hrs): International marketing organization - export department, subsidiary; foreign branches/offices, global organization; Multinational corporations; Trends, problems and prospects of globalization of Indian business; Negotiating with international customers, partners and regulators.

Suggested Reading:

1. International Marketing - P.K. Vasudeva, Excel
2. International Business- competing in the Global market Place- Charles W.L. Hill- TMH
3. International Marketing- Jain, Subhash., South – Western Thomson Learning
4. International Marketing- Cateura Philip and Graham John, Tata McGraw Hill

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to developed an understanding of major issues related to international marketing</i>
<i>C02</i>	<i>Able to developed an understanding of major issues related to international marketing</i>
<i>C03</i>	<i>Able to developed skills in researching and analyzing trends in global markets and in modern marketing practice.</i>
<i>C04</i>	<i>Able to assess an organization's ability to enter and compete in international markets.</i>
<i>C05</i>	<i>Able to understand challenges in global setup</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA419: MARKETING ANALYTICS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Hours:40

UNIT I(10 Hrs): Segmentation Analytics: Market Segmentation Variables, Market Segmentation Types, Marketing Data Landscape, Data for Segmentation, Analytics for Need Based Segmentation - Voice of the Customer, Managing “Voice of the Customer” Data, Customer Co-Creation, RFM Analysis, Life Cycle Segmentation, Cross Tabulation Segmentation, Regression based segmentation, Clustering, Conjoint Analysis Segmentation, The Cluster Analysis + Discriminant Analysis Approach

UNIT II(10 Hrs): Approaches to Choosing Target Segment/s: Rationale for Segment Targeting, Analytics for Perceptual Mapping and Product Positioning, Product Positioning, Multi Dimensional Scaling (MDS) and Factor Analysis, Relevance of Mapping for Product Positioning, Preference Mapping, Incorporating Preferences in Perceptual Mapping. Analytics for Product/Service Design: The Relevance of Trade-off Approaches, Conjoint Analysis, Approaches to Conjoint Analysis, Interpreting Conjoint Results, Optimizing Design using Conjoint Results.

UNIT III(10 Hrs): Analytics for Tracking Customer Growth: Rationale for Customer Analytics, Customer acquisition cost, Customer Churn, Customer Attrition models, Customer lifetime value, Net promoter score, Calculating the number of new customers, Calculating average customer age & Days to convert, Calculating customer acquisition cost & Average purchases, Calculating touch points & Lead conversion, Analysing age demographics, First contact with customer, Customer satisfaction, Understanding customer engagement, Diffusion Models - The Bass Model.

UNIT IV(10 Hrs): Modelling New Marketing Initiatives: Introduction to modelling, Evaluating new ad channels, Modelling tips and best practices, Projecting ad revenue, Projecting organic follower revenue, Projecting expenses, Calculating net profit and breakeven, Understanding ROI, Calculating returns, Creating a single-variable sensitivity table, Creating a multi-variable sensitivity table.

Suggested Text Books:

1. Marketing Analytics: Data-Driven Techniques with Microsoft Excel, Wayne L. Winston
2. Marketing Analytics: Strategic Models and Metrics, Stephan Sorger

3. Marketing Analytics: A Practical Guide to Improving Consumer Insights Using Data Techniques, Mike Grigsby
4. Cutting-edge Marketing Analytics: Real World Cases and Data Sets for Hands on Learning, Paul Farris, Rajkumar Venkatesan, and Ronald T. Wilcox

Course outcomes: On successful completion of the course the learner will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	DESCRIBE the use of Voice of the Customer data in making data driven marketing decisions
<i>C02</i>	DEMONSTRATE an understanding of utility theory to measure customer preferences and choices.
<i>C03</i>	IDENTIFY what customers' value in a product, and assess what they are willing to pay for it.
<i>C04</i>	ILLUSTRATE the use of various tools and frameworks to solve strategic marketing problems using marketing data.
<i>C05</i>	DETERMINE the most effective target markets.
<i>C06</i>	DESIGN a study that incorporates the key tools of Marketing Analytics.

MBA321: ORGANIZATIONAL CHANGE & DEVELOPMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To understand the nature of the developmental process in organizations.
- To comprehend the main derives and approaches of the change.
- To realize and apply the stages of the organizational development process.
- To equip students with knowledge & skills required for effective change and organizational development.
- To Provide students with knowledge of resistance to change and techniques of handling it.

Hours: 40

UNIT I (10 Hours): Introduction: Concept of organization, function of organization, Typology of organization, Virtual Organization, Organizational Development, Evolution: Kurt Lewin, Robert, McGregor Change: Introduction, meaning, need, implications. Understanding personal change, components of personal change: Self-awareness, Self-analysis, Self-efficacy, Self-esteem, Organizational roles – making organizational and personal role effective

UNIT II (10 Hours): Change Theory: Organizational Change: Force Field Analysis, Managerial approaches for implementing change. Change management: facilitating change, dealing with individual and group resistances, intervention strategies. Organizational Culture & Change: formal & informal components of organizational culture, functions, creating & sustaining culture, designing strategy for cultural change.

UNIT III (10 Hours): Organizational Design: Organizational Design, Work Organization: Analysing and Organising Work, Emerging Issues of Work Organisation and Quality of Work Life Balance.

UNIT VI (10 Hours): Organizational Analysis: Organizational Analysis: Organisational Diagnosis-Tools and Techniques, Questionnaire and Interview as Diagnostic Tools, Workshops, Task-forces and Other Methods.

Suggested Readings:

1. Change & Knowledge Management -R.L. Nandeshwar, Bala Krishna Jayasimha, Excel
2. Management of Organizational Change -K Harigopal, Response Books
3. Managing Organizational Change -V Nilkant, S Ramnarayan Response Books
4. Managing organizational change -Palmer, Dunford, Akin, Tata McGraw Hill
5. Organization Change and Development- Kavith Singh, Excel Books.

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to gain knowledge about organizational development process.</i>
<i>C02</i>	<i>Able to understand change and development of organizations</i>
<i>C03</i>	<i>Able to understanding of the change management model.</i>
<i>C04</i>	<i>Able to gain skills needed to develop an action plan for the development process.</i>
<i>C05</i>	<i>Able to understanding of change resistance and how to handle it</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 322: TRAINING & DEVELOPMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To give a detailed overview of the concept of training and development.*
- *To familiarize the students with the methods of training and development.*
- *Making the students understand the usefulness of training in an organization.*
- *To make them aware about types of training.*
- *Describing in detail the process of training need assessment.*
- *To discuss the latest trends and methods in training and development.*

Hours: 40

UNIT I (10 Hrs): Concept and nature of training, Training, Development and Education. Objective of Training, Need and importance of training, Types of Trainers, Principles of Learning. Training Need Assessment, Training needs Analysis (Person, Task, and Organization), Methods and processes.

UNIT II (10 Hrs): Training: Types of training, methods of training, Vestibule training, Simulation Development techniques, Management Development Programme: Meaning and nature, Methods of Executive Development, Job rotation, Sensitivity Training, Simulation methods of Executive development

UNIT III (10Hrs): Training Program: Trainer Identification, Designing a training module for any sector, Budgeting of Training, Preparation of short project on designing a training module with hypothetical budget, Technology in Training: CBT, Multimedia Training, E-Learning/Online Learning, Distance Learning, Evaluation of Training Program: Kirkpatrick Model of Evaluation, CIRO Model, Cost-Benefit Analysis, ROI of Training.

UNIT IV (10Hrs): Human Resource Development: Concept, HRD Vs Personnel Function, HRD culture and climate, HRD Matrix, HRD Sub-system, OCTAPACE Culture.

Text and Reference Books

1. Training for Development- Sahu R. K., Excel Books
2. Training & Development Concepts & Application- Tapomoy Deb, Ane Books
3. Employee Training and Development- Raymond Noe, McGraw-Hill Companies
4. 360 Degree Feedback, Competency Mapping and Assessment Centre- Radha Sharma, McGraw-Hill.

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to gain knowledge about concepts of training and development</i>
<i>C02</i>	<i>Able to understand the typical challenges faced by companies and employees during the training programme.</i>
<i>C03</i>	<i>Able to understand the various methods of training and development</i>
<i>C04</i>	<i>Able to gain knowledge of Training Need Assessment.</i>
<i>C05</i>	<i>Able to understand changing trends in the field of training and development.</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employability Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA421: EMPLOYEES WELFARE AND LABOUR LEGISLATIONS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives

- *To know the development and the judicial setup of Labour Laws.*
- *To learn the salient features of welfare and wage Legislations.*
- *To learn the laws relating to Industrial Relations, Social Security and Working conditions.*
- *To understand the laws related to working conditions in different settings.*

Hours: 40

UNIT I (10 Hours)

Concept of IR, Role of Three Actors to Industrial Relations – State, Employer & Employees, Causes for poor IR, Idea of trusteeship.

The Industrial Disputes Act, 1947: Causes and Types of Industrial disputes, Prevention of Industrial disputes, Settlement of Industrial disputes, Strike, Lock-out, Lay-off and Retrenchment and unfair labour practices.

UNIT II (10 Hours)

Trade union and collective bargaining: Trade Union, kinds, Problems, Functions, and Registration, Types of bargaining – Collective bargaining in India, Grievance redressal & Disciplinary procedure.

UNIT III (10 Hours)

THE FACTORIES ACT, 1948: Salient features, working hours and leaves.

THE EMPLOYEE'S PROVIDENT FUND AND MISCELLANEOUS PROV. ACT, 1952: Salient features, determination of contribution, deposit and withdrawal from the PF account.

THE PAYMENT OF GRATUITY ACT, 1972: Salient features

THE PAYMENT OF BONUS ACT, 1965: Salient features, eligibility and disqualification for Bonus, calculation and payment of Bonus.

UNIT IV (10 Hours)

The employees compensation act, 1923: Important features, types of incapacities or disabilities and amount of compensation paid therefor. commissioner and his power, The employees' state insurance act, 1948: Silent features, Benefits provided under this Act: sickness benefit, maternity benefit, disablement benefit, dependent's benefit, medical benefit council and its duties, regional boards, local committee

Suggested Readings:

1. Industrial Relations – B.D Singh, Excel Books
2. Labour and Industrial Law Manual-Central Law Agency
3. Labour and Industrial Law -S.N. Mishra, Central Law Publication, Allahabad.
4. Labour & Industrial Laws by P L Malik, Eastern Law Publication.

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	ENUMERATE the key concepts of the subject matter.
<i>C02</i>	INTERPRET and relate legislations governing employee relations.
<i>C03</i>	IDENTIFY the applicability of various legislations to variety of real world organizations.
<i>C04</i>	EXAMINE the traditional concept of labour welfare in the industry.
<i>C05</i>	EXPLAIN the conditions of labour and their welfare and social security needs in the country.
<i>C06</i>	ELABORATE upon the perspective of labour problems and remedial measures in the country as well as discuss the relevant provisions of various Labour Legislations.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA422: STRATEGIC HUMAN RESOURCE MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To explores the relationship between the management of people and pursuit of an organisations strategic goals and objectives.
- To understand link between human resource planning and strategy, job analysis and job design, equipment and selection, performance appraisal and performance-related pay.
- To understand learning and career management, employment relations, diversity management and international human resource management.

Hours: 40

UNIT I (10 Hours)

CHANGING ENVIRONMENT AND STRATEGIC RESPONSES: Introduction, Changing Environment, Business Complexities, Portfolio, process and structure related strategic responses. Significance of HRD, HRD and complexities advantage, Business Strategy and HRD Business Policy and HRD, Life Cycle of organizations and HRD, Organisational Performance and HRD.

UNIT II (10 Hours)

Strategic HRD system practices: SHARD fundamentals, SHRD initiatives, working conditions & family welfare, HR Dept. / function. Training PA, Job Enrichment, Career planning, communication, empowerment Facilitators: Concerns of Management, Concerns of Trade unions. Concerns of Frontier Officers / Supervisors, concerns of workers, IR Scenario, Trainability, Outsourcing.

UNIT III (10 Hours)

Alignment of HRD system and responses: Portfolio related strategic responses and Strategic HRD system. Process related strategic responses and Strategic HRD system, and Structure related strategic responses and Strategic HRD system.

UNIT IV (10 Hours)

Strategic responses of Indians most valuable companies: Profiles of study organization, strategic responses of study organizations. Strategic HRD system in study organizations, relationship between practices and facilitator, alignment between responses and Strategic HRD systems, blocks of alignment and their solutions.

Suggested Readings:

1. Strategic Human Resource Development - Srinivas R Kaudula, PHI, 2001.
2. Strategic Human Resource Development - Rothevell & Kazauas, PHI, 1989.
3. Managing Human Resource - Wagen F Cascio, TMH, 6th ed. 2003.
4. Strategic Management, Thomson & Strickland, Tata McGraw Hill, 2003.

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to understand link between human resource planning and strategy, job analysis and job design, equipment and selection, performance appraisal and performance-related pay.</i>
<i>C02</i>	<i>Able to Analyse problems and develop managerial solutions to employment relations problems at both national and workplace level.</i>
<i>C03</i>	<i>Able to demonstrate the application of problem solving and evaluation skills in HRM through exercises and case study work</i>
<i>C04</i>	<i>Able to apply critical thinking skills in analysing theoretical and applied perspectives of strategic HRM</i>
<i>C05</i>	<i>Able to communicate knowledge of SHRM and employment relations in both written and verbal formats reactive to both audience and purpose</i>
<i>C06</i>	<i>Able to investigate and communicate the professional values of HRM including the ethical problems inherent in HRM, including managers and consultants</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 423: PERFORMANCE APPRISAL AND COMPENSATION MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To understanding of the role of performance management in supporting the strategic objectives of the organisation*
- *To examine and design of performance management systems that aim to transform organisational performance outcomes*
- *To identifies the knowledge and skills needed for effective performance review processes that are fair, ethical and improve people performance in modern organisations.*
- *It will equip learners with the necessary skills and a critical understanding of the performance review process*

Hours: 40

Unit I (10 Hours): Introduction to Performance Management: Meaning, need, features, Performance Benchmarking. Component of performance management, performance management Vs performance appraisal, Competence and Competency Analysis, Job Competency Assessment, Measuring performance: Balance Scorecard, Economic Value Added, Performance Review, Performance management documentation, Evaluating Performance Management System, Implementing Performance Management System.

Unit II (10 Hours): Introduction to Appraisal System: Concept, Features, Objectives, Importance and Barrier. Appraisal System, Methods of Appraisal: Designing of various traditional methods performance appraisal form.

Unit III (10 Hours): Compensation: Meaning and component of compensation, Base and Supplementary Compensation. Compensation Management: Meaning, Objectives, Principles, Basic elements of a compensation management. Compensation Policies: Types of compensation policies, General compensation policy, Pay Structure policy. Components of Compensation: CTC and CIH (Cash in Hand), Study of hypothetical compensation structure. Base Wage, Time Wage System, Piece wage system, DA and Fringe Benefit

UNIT IV (10 Hours): Designing of hypothetical Offer Letter with compensation structure, Payroll Accounting System, Need of Payroll Accounting, Complexity of payroll accounting, Scope of payroll accounting. Contemporary issues in compensation management: Salary Increase, Attrition rates, Impact of high labour cost.

Suggested Readings:

1. Performance Management- Dixit Varsha, Vrinda Publication
2. Performance Management- Herman Aguinis, Pearson Education
3. Performance Management- Cardy Robert L., PHI
4. 360 degree feedback & Performance Management- TV Rao, Excel Books
5. Performance Management System- Sahu R.K., Excel Books
6. Strategies for Performance Management- Srivastava K. Dinesh, Excel Books
7. Performance Management and Appraisal Systems- Rao, T.V., Sage Publication
8. Performance Management- Michael Armstrong & Baron Angela, Jaico Publishing

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to demonstrate the communication skills required when managing achievement and underachievement.</i>
<i>C02</i>	<i>Systematically decide and communicate strategic performance aims, objectives, priorities and targets</i>
<i>C03</i>	<i>Able to Plan effective performance management policies and practices to improve organisational and employee performance</i>
<i>C04</i>	<i>Able to devise and sustain arguments for using appropriate performance management techniques, rewards and sanctions to improve performance</i>
<i>C05</i>	<i>Able to Critically evaluate the effectiveness of performance management</i>
<i>C06</i>	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA424: HR ANALYTICS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

HOURS:40

UNIT I(10 Hrs): Workforce Analytics – Overview: Workforce Analytics: definition, evolution, function of Workforce analytics, Use of Workforce / People / HR metrics to measure results in HR - Process vs Outcome, Efficiency vs Effectiveness, Lead vs Lag, challenges in measuring human capital, HR Business Framework, Concept of Balanced Score Card, Identifying key workforce questions, Strategic Case for Workforce Analytics, Data Sources, Power of combining data sources, Good, Important & Key Metrics.

UNIT II(10 Hrs): Recruitment Metrics: Fill-up ratio, Time to hire, Cost per hire, Early turnover, Termination during probation, Channel efficiency mix in terms of Direct hires, Employee referral hires, Agency hires & Lateral hires, Offer reject and renege, Fulfilment ratio, Quality of hire, Recruitment to HR cost. Diversity Metrics: Workforce diversity index, Gender mix, Differently abled index, Implementation challenges.

UNIT III(10 Hrs): Talent Metrics: Retention index, Voluntary and involuntary turnover, Turnover by department, grades, performance, and service tenure, Internal hired index. Learning & Development Metrics: Training need identification, Make or Buy Model, Training effectiveness evaluation, Percentage of employee trained, Internally and externally trained, Training hours and cost per employee, ROI calculation. Internal Mobility Metrics: Career Progression Indices - Promotion index, Rotation index, Career path index, Level wise succession readiness index. People Deployment Metrics: Employees per manager, Employee service profiling, Workforce age profiling, Workforce service profiling, Churn index, Separation clearance time.

UNIT IV(Hrs): HR Cost Metrics: Revenue per employee, Operating cost per employee, PBT per employee, HR cost per employee, HR to operating cost, Compensation to HR cost, HR budget variance, HR ROI. HR KPI Dashboard: Calculating HR KPI, Scorecard based on recruitment, training and development, Calculating HR KPI, Scorecard based on employee retention, and turnover. HR Predictive Analytics: Regional and country level differences in turnover data, Predicting individual and team turnovers, Turnover costs for business implications, Selection decisions from previous performance data, Predictive modelling of individual and team performance, Identifying flight-risk candidates, Report generation.

Suggested Text Books:

1. The Practical Guide to HR Analytics: Using Data to Inform, Transform, and Empower HR Decisions, Shonna D. Waters, Valerie N. Streets, Lindsay Mcfarlane, Rachael Johnson-Murray
2. HR Analytics: Understanding Theories and Applications , Dipak Kumar Bhattacharyya
3. Doing HR Analytics - A Practitioner's Handbook With R Examples Lyndon Sundmark

Course Outcomes: On successful completion of the course the learner will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	ENUMERATE the use of Workforce Analytics.
<i>C02</i>	UNDERSTAND the process of creating and using HR analytics
<i>C03</i>	USE dashboards, pivot tables for data driven decision making in HR.
<i>C04</i>	ILLUSTRATE the use of various tools and frameworks for predictive analytics.
<i>C05</i>	DERIVE a variety of metrics and quantify key outcomes in multiple areas of HR.
<i>C06</i>	BUILD value for HR departments by showing clear links between HR and Business outcomes.

MBA 336: BUSINESS INTELLIGENCE USING DATA MINING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *Approach business problems data-analytically by identifying opportunities to derive business value from data.*
- *Know the basics of data mining techniques and how they can be applied to extract relevant business intelligence*
- *To analyse data, choose relevant models and algorithms for respective applications.*
- *To study spatial and web data mining.*
To develop research interest towards advances in data mining.

Hours: 40

UNIT I(10 Hours): Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining. Data Pre-processing: Needs, Pre-processing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Introduction to data warehousing: Data Warehouse and OLAP Technology for Data Mining, Data Warehouse, Design of data using Multidimensional Data Models, Data Warehouse Architecture, From Data Warehousing to Data Mining. Data Mining Primitives.

UNIT II (10 Hours): Definition, History, Business and Technical Drivers, Decision Makers and Decision Making Process, Role of Decision Support Tools. Components of BI solutions: BI Solutions with Backend Data Warehouse Solutions, Different Types and Uses of BI-Statistical Analysis, OLAP, Association Rule Mining, Correlation analysis, Classification and prediction, Cluster Analysis, Text Mining for Unstructured Data.

UNIT III (10 Hours): BI from Organizational and Business Perspective, Understanding Business Process, Process Reengineering, Customization, BI Testing, Deployment. BI Development Process: Agile process, Different Stages of BI Development Process.

UNIT IV (10 Hours): Emerging Technology, BI Search and Text Analytics, Advanced Visualization, Rich Report lets. **BI Package:** Pentaho Business Analytics , Data integration, Analysis, Services, Reporting, Data Mining, Dash Board, Work Flow, ETL.

Suggested Readings:

1. Successful Business Intelligence, Indi Howson, McGraw-Hill, 2nd Edition, 2007.
2. Data Mining -Concepts and Techniques, Han, Kamber, Harcourt India, 2006.
3. Business Intelligence for Dummies, Swain Scheps, John Willy & Sons, 1st Edition, 2008.
4. Business Intelligence, Ramesh Sharda, Prentice Hall, 1st Edition, 2007.

COURSE OUTCOMES : After completion of this course, the student will be able to

	COURSE OUTCOMES DESCRIPTION
C01	<i>Ability to examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system</i>
C02	<i>Ability to discover interesting patterns from large amounts of data to analyse and extract patterns to solve problems, make predictions of outcomes.</i>
C03	<i>Able to apply and analyse data mining for Business Intelligence Application.</i>
C04	<i>Ability to compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining</i>
C05	<i>Able to experiences towards research and innovation. integration.</i>
C06	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA337: E-COMMERCE

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To provides an introduction to information systems for business and management.*
- *To familiarize students with organizational and managerial foundations of systems.*
- *To understand the technical foundation for understanding information systems.*

Hours: 40

UNIT I (10 Hours): Introduction: What is E-Commerce, Forces behind E-Commerce Industry Framework, Brief history of E-Commerce, Inter Organizational E-Commerce Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce.

Network Infrastructure for E-Commerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broad band Telecommunication.

UNIT II (10 Hours): Mobile Commerce: Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices, Web Security.

Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security.

UNIT III (10 Hours): Encryption: World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption, Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues. Electronic Payments: Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking.

UNIT IV (10 Hours): Net Commerce: EDA, EDI Application in Business, Legal requirement in E-Commerce, Introduction to supply Chain Management, CRM, issues in Customer Relationship Management.

Suggested Readings:

1. E-Commerce, Greenstein and Feinman, TMH
2. Frontiers of Electronic Commerce, Ravi Kalakota, Andrew Whinston, Addison Wesley
3. The E-Business Revolution, Denieal Amor, Addison Wesley
4. E-Commerce, Diwan, Sharma, Excel
5. E-Commerce: The Cutting Edge of Business, Bajaj & Nag, TMH

COURSE OUTCOMES : *After completion of this course, the student will be able to*

	COURSE OUTCOMES DESCRIPTION
C01	<i>Ability to understand the basic concepts and technologies used in the field of management information systems.</i>
C02	<i>Ability to discover Knowledge of the different types of management information systems</i>
C03	<i>Able to understand the processes of developing and implementing information systems</i>
C04	<i>Ability to aware of the ethical, social, and security issues of information systems</i>
C05	<i>Able to experiences towards research and innovation. integration.</i>
C06	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA437: IT PROJECT MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To make them understand the concepts of Project Management for planning to execution of projects.*
- *To make them understand the feasibility analysis in Project Management and network analysis tools for cost and time estimation.*
- *To enable them to comprehend the fundamentals of Contract Administration, Costing and Budgeting.*
- *Make them capable to analyse, apply and appreciate contemporary project management tools and methodologies in Indian context.*

Hours: 40

UNIT I (10 Hours): Fundamentals of IT Project Management, Need Identification, Vision and Scope document, Project Management Cycle, PM Objectives, Management Spectrum, Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Project Management Plan, IT project estimation. **Project Organization:** Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel.

UNIT II (15 Hours): Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts. **Project Monitoring and Control:** Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking,

Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming

UNIT III (10 Hours): Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, SEICMM, SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Clean room process. **Testing:** Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing. Automation & Testing Tools.

UNIT IV (10 Hours): Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control. **Risk Management:** Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Project Management Tools: CASE Tools, Planning and Scheduling Tools.

Suggested Readings:

1. Software Project Management, M. Cotterell, Tata McGraw-Hill Publication
2. Software Project Management, Royce, Pearson Education
3. Software Project Management, Kieron Conway, Dreamtech Press
4. Software Project Management, S. A. Kelkar, PHI Publication

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Ability to Understand project characteristics and various stages of a project.</i>
<i>C02</i>	<i>Ability to Understand the conceptual clarity about project organization and feasibility analyses Market, Technical, Financial and Economic.</i>
<i>C03</i>	<i>Ability to analyze the learning and understand techniques for Project planning, scheduling and Execution Control</i>
<i>C04</i>	<i>Ability to apply the risk management plan and analyse the role of stakeholders.</i>
<i>C05</i>	<i>Able to understand the contract management, Project Procurement, Service level Agreements and productivity</i>
<i>C06</i>	<i>Able to understand the How Subcontract Administration and Control are practiced in the Industry</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA438: DATA COMMUNICATION AND NETWORKING SECURITY

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To understand the basic concepts of data communication, layered model, protocols and inter- working between computer networks and switching components in telecommunication systems.*
- *Discuss the nature, uses and implications of internet technology.*
- *To understand the functioning of Frame Relay, ATM.*
- *An overview of security issues related to data communication in networks.*

Hours: 40

Unit I(10 Hrs): Introduction – Data Communication, Networks, Internet, Intranet, Protocols, OSI & TCP/IP Models. Transmission Media, Switching, Connecting Devices, Backbone networks, Concept of VLAN Network Layer Logical addressing IPv4 Addressee & classless address, NAT Addressing.

Unit II(10 Hrs): Data Link Control & Protocol, Multiple Access, Channelization, Wired LAN, Ethernet, Ethernet frame, Addressing, Wireless LAN, Bluetooth, Cellular telephony,

Unit III(10 Hrs): Network layer protocol – internetworking, IPv4 protocol, IPv6 Protocol, Routing Protocols, Transport Layer – Process to process delivery, UDP, TCP Congestion Control, Application Layer – DNS, Remote Logging (Telnet), SMTP, FTP, WWW, HTTP.

Unit IV(10 Hrs): Introduction to system and network security, Cryptography, Network Security, Security at Application Layer, Security at Transport Layer, Security at Network Layer (IPSec) Firewall and Intrusion Detection

Suggested Readings:

1. Data Communication and Networking, Forouzen, TMH
2. Computer Networks, A.S. Tanenbaum, Pearson Education
3. Data and Computer Communication, W. Stallings, Macmillan Press
4. Computer Networks Anuranjan Misra, Acme Learning
5. Essential of TCP/ IP, G. Shanmugarathinam, Firewall Media

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to understand the basics of data communication, networking, internet and their importance.</i>
<i>C02</i>	<i>Ability to analyse the services and features of various protocol layers in data networks</i>
<i>C03</i>	<i>Ability to differentiate wired and wireless computer networks</i>
<i>C04</i>	<i>Able to analyse TCP/IP and their protocols.</i>
<i>C05</i>	<i>Able to recognize the different internet devices and their functions.</i>
<i>C06</i>	<i>Able to identify the basic security threats of a network.</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA436: BIG DATA ANALYTICS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *Understand the Big Data Platform and its Use cases*
- *Provide an overview of Apache Hadoop*
- *Provide HDFS Concepts and Interfacing with HDFS*
- *Understand Map Reduce Jobs*
- *Provide hands on Hadoop Eco System*
- *Apply analytics on Structured, Unstructured Data.*
- *Exposure to Data Analytics with R.*

Hours: 40

UNIT I (10 Hrs): Introduction to Big Data Analytics, DBMS Overview, Introduction to R and RStudio, Basic analysis in R, Intermediate R, Intermediate analysis in R.

UNIT II (10 Hrs): Visualization and Data Exploration, K-means Clustering, Independent Sample Tests, Basic Association Analysis, Association Rule Speedup, Linear regression part 1, Linear regression part 2, Logistic regression.

UNIT III (10 Hrs): Naïve Bayes, Decision trees part 1, Decision trees part 2, Introduction to Hadoop and HDFS, Using R with Hadoop, First R/Hadoop program, Intermediate R/Hadoop programming

UNIT IV (10 Hrs): Pig, Hive, and HBase, Discussion of rmr2 Project, Support Vector Machines Part 1, Support Vector Machines Part 2

Suggested Readings:

1. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses by Michael Minelli , Michele Chambers, Ambiga Dhiraj, by, Wiley
2. The Culture of Big Data, Mike Barlow, by Oreilly
3. Real time Big Data Analytics; Emerging Architecture, Mike Barlow, by Oreilly
4. Planning for Big Data, Edd Dumbill, by Oreilly
5. Big Data Analytics; Frank J. Ohlhorst, by Wiley

6. Big Data aow; Edd Dumbill, by Oreilly

COURSE OUTCOMES : *After completion of this course, the student will be able to*

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to Identify Big Data and its Business Implications.</i>
<i>C02</i>	<i>Able to List the components of Hadoop and Hadoop Eco-System</i>
<i>C03</i>	<i>Ability to access and Process Data on Distributed File System</i>
<i>C04</i>	<i>Able to Develop Big Data Solutions using Hadoop Eco System</i>
<i>C05</i>	<i>Able to Analyse Infosphere Big Insights Big Data Recommendations.</i>
<i>C06</i>	<i>Able to apply Machine Learning Techniques using R</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA327: EXIM PROCEDURES AND DOCUMENTATION

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To understand importance and procedural & documentation aspects of export-import of goods and services*
- *To impart knowledge of governments, departments, international institutions involved in EXIM.*
- *To teach an Export Manager to develop a systematic methodology to handle exports*
- *To understand the relevance and importance of various government policy measures for export as well as import.*

Hours: 40

Unit I (10 Hours): Need of documentation in export, Exim Policy, Infrastructural Support for India's Foreign Trade, Export Promotion Councils, Commodity Boards, Import/ Export Inspection Agencies.

Unit II (10 Hours): Export Procedure: Setting up Export Company, Export Sales Contracts, Processing of Export Order, Central Excise, Custom clearance, Role of clearing and forwarding Agents, Shipment of Export Cargo, Duty draw-backs, Special Issues: Export by post parcel and by Air.

Unit III (10 Hours): Import Procedure: Replenishment licensing, Import/Export passbook, Procurement for Exports, Custom Clearance of Imports, Duty Exemption Schemes. Commercial and regulatory Documents: Performa Invoice, Commercial Invoices, Packing List, Inspection Certificate, Certificate of Origin, Shipping Bills, AR4 Form, Mate's Receipt, GR Form, Marine Insurance Policy, Bill of Exchange, Bank Realization Certificate, Bill of lading, Airway Bill, BSP Certificate /Special Consular Invoice.

Unit IV (10 Hours): EXIM Bank and Commercial Banks, Export Credit and Foreign Exchange Covers, ECGC, Trading House: Export/Trading/ Star trading/Superstar trading houses, EOU/FTZ /EPZ/SEZ units: Policy

Suggested Readings:

1. Export Policy Procedures and Documentation -M. I. Mahajan, Snow White Publications,
2. Export What Where How, Paras Ram, Anupam Publishers
3. EXIM policy 2009-14, Ministry of Commerce, Government of India
4. International Business: text and cases, Francis Cherunilam, PHI
5. International Payments, Edward G. Hinkelman, World trade Press
6. Handbook of Import–Export Procedures, Ministry of Commerce, Government of India

COURSE OUTCOMES : After completion of this course, the student will be able to

	COURSE OUTCOMES DESCRIPTION
C01	<i>Able to understand and create the documents required for completing export and import transactions.</i>
C02	<i>Able to understand the procedure for export and import clearance</i>
C03	<i>Able to understand the role of key government organizations like Customs and Excise, RBI, etc. in facilitating export transactions</i>
C04	<i>Able to examine the foreign trade policy framework to best utilize the opportunities available to organizations</i>
C05	<i>Able to impart knowledge of governments, departments, international institutions involved in EXIM.</i>
C06	<i>Ability to identify and apply the knowledge of subject practically in real life situations</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA426: INTERNATIONAL FINANCIAL MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To focuses on the theoretical and practical knowledge required for the management of financial and investment functions of multinational corporations.*
- *To discover how the international capital markets, foreign exchange markets*
- *To learn about derivatives market can be used to manage transaction and operating risks facing the multinational firm.*
- *To learn through hands-on case studies and empirical evidence how to manage multinational companies' investment and financing activities.*
- *To understand relevance of country risk and international corporate governance in cross-border investments will also be examined.*
- *To manage of opportunities and risk relating to international investments, exchange rate fluctuations, international financial markets and government policy changes.*

Hours: 40

Unit I (10 Hours): Environment of international Finance Importance of international finance; The determination of exchange rates and Balance of payments; The international monetary system; International financial markets and instruments.

Unit II (10 Hours): The Foreign Exchange Markets The foreign exchange market; The foreign exchange market in India; Purchasing power parity theory; Interest rate parity theory; currency forecasting.

Unit III (10 Hours): Currency Derivatives Forwards; Currency options; Currency futures; Special financial vehicles; Interest rate and currency swap.

Unit IV (10 Hours): Foreign Exchange Risk and management Foreign exchange risk and exposure management; measuring and managing transaction and translation exposure; Measuring and managing economic exposure; Management of interest rate exposure. Global

Financial management International Portfolio investment; Financing of international trade; International working capital management; International project appraisal.

Suggested Readings:

1. Eitman, David K., Stonehill, Arthur, Moffet, Michael H., Multinational Business Finance, Pearson Education, 2007
2. Madura, Jeff, International Corporate Finance, Cengage (Thomson) Learning, 2007
3. Levi, Maurice, D., International Finance (2nd Ed), McGraw Hill, 1990
4. Shapiro, Alan, C., Multinational Financial Management, 8th ed. Wiley
5. Apte, P.G., International Financial Management, Tata McGraw Hill, 2006

COURSE OUTCOMES : After completion of this course, the student will be able to

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	<i>Able to understand international capital and foreign exchange market</i>
<i>C02</i>	<i>Able to identify and appraise investment opportunities in the international environment</i>
<i>C03</i>	<i>Able to Identify risk relating to exchange rate fluctuations and develop strategies to deal with them.</i>
<i>C04</i>	<i>Able to Identify and evaluate foreign direct investment and international acquisition opportunities.</i>
<i>C05</i>	<i>Able to develop strategies to deal with other types of country risks associated with foreign operations.</i>
<i>C06</i>	<i>Ability to express well considered opinion on issues relating to international financial management</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA428: INTERNATIONAL LOGISTICS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To understand Marketing logistics concept, objective, scope and its elements.*
- *To understand Interface between international marketing and logistics & supply chain management.*
- *Role of transport in logistics.*
- *Concept of customer service.*

Hours: 40

UNIT I (10 Hours): Introduction Objectives, Key tasks of logistics, Role of Government in controlling international trade and its impact on Logistics, Different type of Ships, Shipping Routes, Operating Ships-Linear and Tramp, Organization of Shipping Company

UNIT II (10 Hours): Volume and value of World Trade, World Tonnage, Flags of Convenience, Conference System, Chartering, Principles of Freight Rates, Linear Freight Structure, Tramp Freight Structure, Shipping Agents, Freight Brokers, Freight Forwarders Stevedores

UNIT III (10 Hours): Ports in India, Ports Infrastructure Development, Shipping Association, Shipment of Govt. Controlled Cargo, Concept of Containerization, Classification of Constraints in Containerization, I.C.D's

UNIT IV (10 Hours): Concept of Air Transport, Air Cargo, Tariff Structure, I.A.T.A. Air freight insurance, International air freight tariffs, AWB (Air Waybill), Main airports of the world, International Contracts, Terms of Payment, Incoterms.

Suggested Readings:

1. International Logistics, Pierre David, Biztantra
2. Logistic Management, Donald & David, Tata McGraw Hill

3. Strategic Logistic Management, Lambert, D et al, Tata McGraw Hill

COURSE OUTCOMES : *After completion of this course, the student will be able to*

	COURSE OUTCOMES DESCRIPTION
C01	<i>Able to understand marketing logistics concept, objective, scope and its elements.</i>
C02	<i>Able to understand Interface between international marketing and logistics & supply chain management..</i>
C03	<i>Able to demonstrate an understanding of the role of logistics management in international supply chains.</i>
C04	<i>Able to Identify the activities, which go to make up the 'links' in an international supply chain.</i>
C05	<i>Able to evaluate the relative merits of using each of the most commonly used transport modes and judge which is most appropriate in different circumstances</i>
C06	<i>Ability to describe multi-modal logistics and demonstrate an understanding of when it is appropriate.</i>

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 332: HOSPITALITY AND TOURISM PLANNING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- The course will expose students to the Tourism policy of India, and those of a few famous Indian states.

Hours: 40

UNIT I (10 Hrs): Understanding tourism markets & travellers experience; Tourism service marketing mix; New perspectives on tourism marketing; Destination branding- tools & techniques; Tourist buying behaviour, travel purchase; Travel agents & tour operators; Tourism Marketing Research and Information Forecasting.

UNIT II (10 Hrs): Strategic Marketing of tourism Services in competitive market; Developing tourism service concepts: core & supplementary elements; Ensuring accessibility of tourism products through physical and electronic channels; Tourism pricing and revenue management; Educating and engaging customers and promoting the value proposition.

UNIT III (10 Hrs): Designing and managing the tourism service customer interface: Service process, Service Encounter and Service Blue Print; Balancing Demand and capacity; Tourism Service Recovery and customer feedback; Crafting the Tourism service environment; Managing People for Tourism Service Advantage.

UNIT IV (10 Hrs): Identifying, acquiring & Managing Relationships in tourism sector; Service Leadership; Tourism in Global Perspective, Principal Driving Force in Global Marketing of Tourism services; Contemporary trends in tourism marketing, Role of India Tourism development Corporation; Overseas promotion-Incredible India, IBEF.

Suggested Readings:

1. Tourism Marketing, Choudhary - (Oxford Higher Education) 2015
2. Marketing for Hospitality & Tourism, Kumar Prasanna - (Mc Graw Hill) 2015

Course outcomes:

- *Expose the students how to formulate the tourism policy.*
- *Discuss the different phases of Indian tourism policy making journey.*
- *Provide Knowledge of making plans and steps of planning for tourism development.*
- *To make the students understand the nature of international tourism agreements.*
- *To critically examine the role and need of public, private partnership in tourism sector.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA431: TRAVEL AGENCY AND TOUR OPERATORS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course objective: The course aims at imparting basic knowledge about travel industry to students with the skills to deal with travel agencies and travel operations.

Hours: 40

UNIT I (10 Hrs): The Tourism Organizations: Objectives, Role & function of: Government Organizations: DOT, ITDC, MTDC, ASI, TFCI. Domestic Organizations: TAAI, FHRAI, IATO. International Organizations: WTO, IATA, PATA. NGO: Role of NGO in making responsible tourists.

UNIT II (10 Hrs): The Travel Agency: Meaning & Definition of Travel Agent. Types of Travel Agent: Retail & Wholesale. Functions of Travel Agent. Provisions of Travel Information, Ticketing, Itinerary Preparation, Planning & Costing, Settling of Accounts, Liaisons with service providers, Role of Travel Agent in promotion of Tourism.

UNIT III (10 Hrs): The Tour Operator: Meaning & Definition, Types of Tour operator: Inbound, Outbound & Domestic, Tour Packaging – definition, components of a tour package. Types of Package Tour: Independent Tour, Inclusive Tour, Escorted Tour, Business Tour, Guides & escorts – Their role and function Qualities required to be a guide or escort.

UNIT IV (10 Hrs): Travel Formalities & Regulations, Passport – Definition, issuing authority, Types of Passport, Requirements for passport. Visa – Definition, issuing authority, Types of visa Requirements for visa. Health Regulation – Vaccination, Health Insurance. Economic Regulation – Foreign Exchange

Itinerary Planning: Definition, Steps to plan a Tour, Route map, Transport booking, Accommodation reservations, Food facilities, Local guide / escort, Climate / seasonality, Shopping & cultural show, Costing

Assignments

1. Preparation of Itinerary – 2 days, 7 days for well known tourist destinations.
2. Preparation of passport, visa, requirements
3. Field visit to a Travel Agency, Airport etc.

Suggested Readings:

1. Introduction to Travel & Tourism-Michael M. Cottman Van Nostrand Reinhold New York, 1989

2. Travel Agency & Tour Operation Concepts & Principles-Jagmohan Negi - Kanishka Publishes, Distributors, New Delhi, 1997
3. International Tourism – Fundamentals & Practices -A. K. Bhatia –Sterling Publishers Private Limited, 1996
4. A Textbook of Indian Tourism -B. K. Goswami & G. Raveendran -Har – Anand Publications Pvt. Ltd.
5. Dynamics of Modern Tourism -Ratandeep Singh -Kanishka Publishes, Distributors, New Delhi, 1998
6. Tourism Development, Principles and Practices -Fletcher & Cooper-ELBS

Course outcomes:

- *knowledge and skills on the operations and management of tour and travel segments of tourism industry including trends and contemporary issues in the travel industry.*
- *knowledge about the various factors influencing the tour operator industry including setting up of travel agencies and legal aspects in travel and tour operations.*
- *knowledge and skills of tour operator's products which includes travel, transfer and accommodation planning.*
- *knowledge about the various active organisations involved in the active development of the travel and tour operations across the globe.*
- *Equip them with skills of how to manage tour and travel related procedures and activities enabling them to become effective managers.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA432: HOSPITALITY INFORMATION SYSTEM

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *Help to prepare students to meet the challenges associated with Hospitality Information Systems with in the Hospitality Industry.*
- *Gain an insight into workings of computer systems used in the hospitality industry*
- *Identify the use and knowledge in the significance of information technology to an enterprise.*
- *Introduce and apply training on Point of Sale Systems.*

Hours: 40

UNIT I (10 Hours): Understanding Information Systems, Computer Hardware for Hospitality, Computer Software for Hospitality: Word processing programs, Spread-sheet application programs, Database Programs, General-Purpose application programs, Business Software for Hospitality Organizations.

UNIT II (10 Hours): Computer networks for Hospitality: Introduction, Networking Data Resources, Computer Networks-Topologies, Network Connections, Telecommunications Media, Network Operating Systems-Intranets and Extranets.

UNIT III (10 Hours): Hospitality Management and Internet: E-Commerce, E-Information and Distribution =Systems, E- Business Strategies and Solutions.

UNIT IV (10 Hours): Hospitality Functional Applications-Computer Reservation Systems (CRS) and Global Distribution Systems (GDS), Property Management Systems & Point-of Sale Systems, Accounting Control and Production Systems.

Suggested Readings:

1. Hospitality Information Systems and E-commerce- Dana V. Tesone , John Wiley and Sons , 2005 1st Ed.
3. Management Information System - James O' Brien, Tata McGraw Hill, 2008,12th Ed.
4. E-Commerce and Information Technology in Hospitality and Tourism- Zong Qing
5. Zhou, Delmar learning – a division of Thomson learning incorporation , 2003 ,1s

Course Outcomes:

- *Identify and describe the functions and features performed by a central reservation system and the reservation system of a property management system.*
- *Describe and interpret management reports that pertain to reservation systems.*
- *Identify features and functions of an energy management system, point of sale system, call accounting system, electronic locking systems, guest operated devices and relevant interface systems*
- *Identify describe and explain the features and functions of the Food and beverage applications, and accounting applications*
- *Identify describe and explain the purpose of information management as it pertains to the industry, how systems are selected and what are the requirements of these.*
- *Identify environmental, electronic, and operational threats to information systems and how to implement systems security.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA433: TOURIST PRODUCT DESIGN & DESTINATION DEVELOPMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Objective : To help students to understand about tourism planning process, strategy, and policies and about importance of tourism planning and marketing at national level and understand problems relating to tourism and its development in India.

Hours: 40

Unit I(10Hrs): Tourism product development: conceptual background. Tourism product designing, development issues and considerations. Marketing considerations for sustainability of tourism product- interpretation.

Development of destination. Principles of destination development. Concerns for destination planning. Stages in destination designing and management.

Unit II (10 Hrs): Cultural tourism product: designing, development, issues and considerations
Religious tourism product: designing, development, issues and considerations
Heritage tourism product: designing, development, issues and considerations.

Unit III (10 Hrs): Medical and health tourism product: designing, development, issues and considerations.
Special interest tourism product: designing, development, issues and considerations
Cruises as tourism product: designing, development, issues and considerations.

Unit IV (10 Hrs): Ecology and wildlife tourism product: designing, development, issues and considerations.
Adventure tourism product: designing, development, issues and considerations.
Beaches and islands as tourism product: designing, development, issues and considerations.
Resorts, types of resorts. Resort as a tourism product: designing, development, management, issues and considerations.

Suggested Readings:

1. Tourism Planning: Basic, Concepts and Cases, C.Gunn, Cognizant Publications,2002
2. Destination branding: Creating the Unique Proposition, Nigel Morgan, Annette Pritchard, Roger Pride, Butterworth and Heinemann.,2001
3. The Tourism Area Life Cycle v. 1: Applications and Modifications', Richard W.Butler, Channel View Publications, 2006
4. Tourism SMEs, Service Quality and Destination Competitiveness' Claire(Edt) Haven Tang, Eleri Ellis(EDT) Jones, CABI Publishing,2005
5. Tourism in Destination Communities, Shalini (EDT) Singh, Dallen J.Timothy, Ross Kingston Dowling, CABI Publishing, 2003

6. The Competitive Destination : a sustainable tourism perspective, Geoffrey Ian Crouch, JR Brent Ritchie, Horst-Herbert G Kossatz, CABI Publishing,2003
7. Tourism and recreation Development C.B.I. Baud Bovy Munuel and Lawson (1976) Pub.6
8. In the wake of Tourism special places in Eight countries, The Conservation Foundation, Bosselman Fred P.1979, Washington D.C.
9. Tourism & Development Bouyden Jahn N. Cambridge University Press, London. 1978
10. A Plan for Managing Tourism in Bahamas Islands Checa K. Co.. Washington D.L. 1969

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 341: RETAIL SCIENCE

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To give a detailed overview of the Retailing Industry in India.
- To familiarize the students with the practices related to retailing.
- Making the students understand the importance of retailing in current context.
- To make them aware about models of retailing.
- Describing in detail the differences between online and offline retail.
- To discuss the latest trends prevalent in the retail industry.

Hours: 40

Unit-I (10 Hrs):

New dimensions of retail sale, Developing and Sustaining Relationship in Retailing, Organized Vs Unorganized Retailing, Contemporary Retail Strategies, Changing retail landscape-Impact of Socio-cultural, Demographic, Economic variables, Trading Area Analysis, Store Location and Site, Retail Buying Strategies.

Unit-II (10 Hrs):

Retail Aesthetics, Store Atmospherics- moments of truth, physical evidence, Store Design, Store Fittings, Management of Floor space, Visual Merchandising, Product Range Management, Consumerism. Ethics in Retailing, Multichannel Retailing, Impact of Retailing on Human Resource and Career growth in Retailing.

Unit-III (10 Hrs):

Financial Objectives and Dimensions, GMROI, Strategic Profit Model, Success of Private Labels Brands and its role the success of Retail Store.

Unit-IV (10 Hrs): Corporate Social Responsibility, Retail Research and Audit, Insurance, Consumer Protection Act, Torts Harassment, Health, Safety, Security Hazards – Material, Equipment's, Cash, Pilferage, External Threats, Safety Gadget.

Text and Reference Books

1. Retail Management: A Strategic Approach, Barry Berman & Joel R. Evans PHI, 2007, 11th Ed.
2. Retailing Marketing, David Gilbert, Prentice Hall - Pearson Education 2007, 2nd Ed.
3. Retail Management, Gibson G. Vedamani, Jaico Publishing House 2004, 9th Ed.
4. Retailing Management, Michael Levy, Barton A. Weitz & Ajay Pandit:, TMH 2008, 2nd Ed.
5. Retailing Management- Swapna Pradhan: TMH 2009, 3rd Ed.

Course Outcome:

- *Explain and discuss the general concepts of organized and unorganized retailing.*
- *Understand the typical challenges faced by retailers in India.*
- *Understand the nuances of buying behaviour of consumers towards retail buying.*
- *Explain the concepts of segmentation, targeting and positioning in framing cutting edge marketing strategies in the retail set-up.*
- *Understand online and offline retailing.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 342: PRICING AND BRANDING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To give a detailed overview of Pricing in the Retail Industry in India.
- To familiarize the students with the practices related to pricing and branding.
- Making the students understand the importance of pricing in retailing.
- To make them aware about methods and strategies of branding.
- Describing in detail the various pricing strategies.
- To discuss various implications of in effective pricing methods and strategies.

Unit-1

Pricing Policies Concept and Strategies, Factors influencing Pricing, Mark ups and Mark downs, Price Awareness, Price Sensitivity, Cost and Price decisions.

Unit-2

Differential Pricing, Promotional Pricing, Pricing and PLC, Product Line Pricing, Transfer Pricing, Bundle Pricing, Retail Pricing: A Deep Cut Strategy, an Alternative Strategy, Charm Prices, Trading Stamps

Unit-3

Price Management and Psychology, Vertical Price Management, Bait and Switch Pricing, Retail Price Management: Pricing of Individual Items, Price Management and Cross-Product Effects, Price Promotions in Retail, The Role of Price Image of stores.

Unit-4

Retail Positioning and Branding, Role of Retail Brands, Store Brands, Positioning and Proposition of a Brand, Counterfeit or Copy Cat Brands, Corporate Branding, Brand Extension

Text and Reference Books

1. Pricing - F. Livesey: The Macmillan Press Ltd. (Unit I &II)
2. Price Management - Hermann Simon: Elsevier Science Publisher B.V. (Unit III)
3. Retail Store Management Problems Donald Kirk David, M.B.A.: - A. W. Shaw Company
4. Retail Management: A Strategic Approach Barry Berman & Joel R. Evans: - PHI 2007
5. Retailing Marketing David Gilbert, , Prentice Hall - Pearson Education 2007(Unit IV)
6. Retailing Management, Michael Levy, Barton A. Weitz& Ajay Pandit -TMH, 2008

Course Outcomes:

- *Explain and discuss the general concepts of retail pricing.*
- *Understand the typical challenges faced by retailers with respect to pricing.*
- *Understand various strategies of pricing.*
- *Explain various methods of pricing and branding.*
- *Understand pricing in online and offline retailing.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 441: INTERNATIONAL RETAILING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- *To understand various aspects of international retailing and trends.*
- *To developing skills in the identification, analysis and solution of the problems encountered.*
- *To understand theories and practice of international retailing abroad and its subsequent effects in India.*

Hours: 40

UNIT I (10 Hrs): International retailing growth prospects, Products and Services Retailing in International Market, Branding Decisions- International Products and Services Strategies, International Retail Structure, Motives and Reasons for Internationalization, Direction of Expansion, Market Entry methods, Typology of International Expansion

UNIT II (10 Hrs): Shopping at World Class Stores, Cultural Influence on International Retailers, International Management, Emerging Themes and Niches, Market Selection and Growth, Stages of Internationalization, Internal Opportunities, Entry Strategies: Export, Franchising/Licensing, Acquisitions and Mergers, Joint Ventures, Organic Growth

UNIT III (10 Hrs): International Market Environment: PESTL, Motives for International Retailing, Marketing Research: Factors, Problems, Process, Marketing Planning for Differing International and Regional Requirements

UNIT IV (10 Hrs): Competing and Competitive Advantages in Foreign Market, Career in Foreign Markets, Attitude Scaling Techniques- Multi Attribute model- Multidimensional Scaling- Conjoint analysis

Suggested Readings:

1. Globalization of Business- Practice and Theory Abbas J Ali, Jaico Publishing House, 2003, 2nd Ed.

2. International Retailing Nicolas Alexander: Blackwell Business Publishers Ltd, 1997, 2nd Ed.
3. International Retailing S.L. Gupta & Arun Mittal: Excell Books, 2010, 1st Ed.
4. Principles of Retail Management Rosemary Varley & Mohammed Rafiq: Macmillan 2005, 2nd Ed.
5. Retail Management - A Strategic Approach-Barry Berman & Joel R. Evans: PHI, 2007, 11th Ed.
6. Retailing Marketing, David Gilbert: Prentice Hall - Pearson Education 2007, 2nd Ed.
7. Retail Management - Gibson G. Vedamani: Jaico Publishing House 2004, 9th Ed.
8. Retailing Management- Michael Levy, Barton A. Weitz& Ajay Pandit, TMH 2008, 2nd Ed.

Course Outcomes:

- *Identify the key concepts and issues pertaining to retail environment of firms and their retail marketing strategies including store composition, location, target customers, merchandise management, human resource and logistical needs.*
- *Analyze retail opportunities or problems globally using trading area analysis, site selection procedures, merchandise management & planning and marketing research techniques.*
- *Apply adaptations to the marketing mix to meet the needs of retail management. Design the retail business in various sectors.*
- *Identify the various back-end aspects of retail business.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA442: MERCHANDISING AND MALL MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objective:

- *Detailed outline of Malls and its design and retail components.*
- *Special emphasis is given to the practical aspects.*
- *To impart skills necessary for taking up positions in Mall administration.*

Hours: 40

UNIT I (10 Hrs): Merchandise Assortments, Role and Responsibilities of Merchandiser, Forecasting Sales, Developing Assortment Plans, Merchandising Planning System: Stale Merchandise, Fashion Merchandise, Bin Management, Beginning of the Month (BOM), End of the Month (EOM) Merchandiser Skills and Profile

UNIT II (10 Hrs): Buying Merchandising: Methods of Planning and Calculating, Merchandise Sourcing & Allocation, Evaluating Merchandise Performance, Multiple Attribute Methods and Category Management

UNIT III (10 Hrs): Inventory Levels, Fashion, Season, Theme, Pattern, Support Services, Merchandise Budget, Vendor Negotiating in Purchase, In Store Merchandise Handling, Buying for Chain Stores, Non Store, Single/Independent Store, Visual Merchandising and its Role, Shrinkages

UNIT IV (10 Hrs): Introduction to Malls: History, Types, Growth, Dynamics, Concepts in Mall Design, Site Selection, Market Analysis, Commercial Lease, Tenant Mix, Maintenance Management
Entertainment in Shopping, Shopping Centres, Aspects in Security, Aspects in Quality Management, Quantifying Mall Performance

Suggested Readings:

1. Mall Management, Abhijit Das: - Taxmann's, 2006, 2nd Ed.
2. Retail Management, Barry Berman & Joel R. Evans: A Strategic Approach, PHI 2007, 11th Ed.
3. Retailing Marketing, David Gilbert: Prentice Hall Pearson Education, 2007, 2nd Ed.
4. Retail Management, Gibson G. Vedamani: Jaico Publishing House, 2004, 9th Ed.
5. Retailing Management Michael Levy, Barton A Weitz & Ajay Pandit: - TMH, 2008, 2nd Ed.
6. Retailing Management- Swapna Pradhan: TMH, 2009, 3rd Ed.

Course Outcomes:

- *Develop skill to manage the products in retail store.*
- *Develop detail understanding of merchandising & its importance*
- *Prepare to make merchandise plan.*
- *To enable to procure right merchandise*
- *Able to perform categorization in the merchandise*
- *Comprehend the mall architecture and mall project handling*
- *Selecting the mall locations and identify the catchment areas*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA 443: ACQUIRING MAINTAINING AND RETAINING CUSTOMER

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Hours: 40

UNIT I (10 Hrs): New Dimensions of Relationship Management in Business, Transactional Marketing to Relationship Marketing, Understanding Customer, CRM as a Strategic Marketing tool, Customer Life Cycle management, Methods and Tools for Customer Acquisition, ACTMAN model

UNIT II (10 Hrs): Sustaining relationship with Customer, CRM Structures, CRM Cycle, Stakeholders in CRM, CRM Comprehension and Implementation Model, e CRM, Managing Customer Satisfaction, Customer Satisfaction Models and Practices, Rationale of Customer Satisfaction, Measuring Customer Satisfaction, KANO Model Loyalty Ladder, Loyalty and its relationship with customer satisfaction, RaiSrivastava model of customer loyalty formation

UNIT III (10 Hrs): Managing Customer Retention, Customer retention and Brand Loyalty, customer recall strategies, customer experience management, Implication of Employee-Customer Affinity, Customer Engagement, Employee-Organisation Relationship, Employee-Customer Linkage, Factors effecting employee's customer oriented behaviour, Essentials of building employee relationship

UNIT IV (10 Hrs): Dynamics of Information Technology in developing and sustaining relationship with Customers, e CRM, Rural CRM, customer relationship management practices in retail industry, Customer Service Initiatives

Suggested Readings:

1. Customer Relationship Management: Concepts and Cases Alok Kumar Rai : (Second Edition)- PHI Learning
2. Customer Relationship Management Simon Knox, Adrian Payne, Stan Maklan: - Routledge Inc.
3. Customer Relationship Management Bhasin- (Wiley Dreamtech)
4. Customer relationship management handbook Dyche- prentice hall
5. Customer relationship management Peelan- prentice hall

6. Customer relationship management Kristin Anderson, Carol Kerr :, McGraw-Hill Professional
7. Customer Relationship Management Chaturvedi- (Excel Books)
8. Customer relationship management Concepts, Tools, & Applications Sheth J N, Parvatiyar A. and Shainesh G., Emerging, Tata McGraw-Hill Education
9. Customer Relationship Management Lumar- (Wiley India)

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA444: RETAIL ANALYTICS

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

HOURS:40

UNIT I(10 Hrs): Retailing in the Digital Era: New Age Retailing, Digital Consumers Characteristics –interconnected , involved, interconnected, co-creation, collaboration, Customer Data – Big Data, Business Analytics, Customer Insights, Data Characteristics - Variety, Volume, Velocity, Veracity. Critical issues in Modern day Retail, The Digital organization, Retail analytics for decision making, Informed and Risk-Aware Decisions , Benefits of Retail Analytics – Informed Decisions, Risk mitigation, Gaining visibility , Retail Analytics for Strategic – Tactical and Operational decisions.

UNIT II(10 Hrs): Marketing in a Consumer-Driven Era: Understanding Consumer Buying Behaviour and Trends , Leveraging customer data, Putting information in context, Clicking with consumer communities, Keeping content in mind, From personalization to commerce. Data sources: Customer, Retailer, Supplier, Market, Web, Mobile, Social, Call Centres,. Looking at Unstructured Data: The unstructured data challenge, Recognizing the untapped analytics opportunity, Customer-Driven Decision Making, Content Analytics in Action, Understanding Affinities between Products and Customers, Advanced affinity analysis, Market basket analysis, Understanding customer preferences , Anticipating the customer’s next move, Improving Retail Promotions.

UNIT III(10 Hrs): Merchandising Analytics: Assortment planning , Geospatial Analytics, Product placement, Space Optimisation, Product adjacency, Aligning store-level assortment with demand, Category Intelligence, Developing dynamic retail assortments, Prioritization of Product categories.

Marketing Analytics: Marketing Mix ROI, Promotions – Promotional Maturity Curves, Pricing – Price per segment, Margin, Profitability, Personalisation, Campaigns, Marketing Return Curves, Scenario Analysis, Driving better P&L analyses, Managing Incentive Compensation.

UNIT IV(10 Hrs): Supply Chain Analytics: Creating a Demand-Driven Supply Chain, Gaining Visibility across the Supply Chain, Resolving Operations Problems Primitively , Logistics, Inventory, Supplier performance, Demand forecasting, Vendor Intelligence, Vendor Rankings, Fulfilment Intelligence, Inventory Diagnostics, Shrinkage, Optimization opportunities.

Store operations analytics : Using Analytics to Optimize Staffing Plans, Drilling into HR analytics, Customer Traffic, Store Performance Dashboards, Local Market Analytics, Online Offline Analytics, Sales Trends, Brand Performance, Account Performance Forecasts.

Customer View: Customer Insights, Omni channel insights, Personalization, merchandise Data sources, including operations and supplier.

Suggested Text Books:

1. Retail Analytics – The Secret Weapon, Emmett Cox
2. Behaviour Analytics in Retail, Ronny Max Mahogany Beckford
4. The New Science of Retailing: How Analytics are Transforming the Supply Chain and Improving Performance, Fisher and Raman
5. The Strategy and Tactics of Pricing: A Guide to Growing More Profitably, Nagle, Hogan and Zale, Prentice-Hall
6. Competing on Analytics, Davenport, Harris
7. The New Rules of Retail: Competing in the World's Toughest Marketplace, Lewis and Dart
8. Sales Promotions, Neslin, Marketing Science Institute

	<i>COURSE OUTCOMES DESCRIPTION</i>
<i>C01</i>	ENUMERATE the characteristics, opportunities and challenges of New Age Retailing and Digital Consumers.
<i>C02</i>	UNDERSTAND Consumer Buying Behaviour and Trends in new age retailing.
<i>C03</i>	USE various kinds of data for performing Retailing Analytics.
<i>C04</i>	ILLUSTRATE the use of various tools and frameworks for predictive retail analytics.
<i>C05</i>	DERIVE a variety of metrics and quantify key outcomes in multiple areas of Retail.
<i>C06</i>	BUILD value for Retail and Marketing by deriving Marketing ROI metrics.

MBA351: HOSPITAL PLANNING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To expose students to modern hospital planning techniques, including quality, application, and implementation.
- To focuses on hospital infra & extra structure and departments in health care and public health organizations.

Hours: 40

Unit-I (10 Hrs): Types of Hospital Organisation & Statutory Requirements for Planning, Steps in Hospital Planning: Need Assessment, Appointment of Planning Teams/Consultants, Appointment of Architect, Size of the Hospital, Design of the Hospital, and Selection of the Contractor

Unit-II(10 Hrs): Preparation of Architect's Brief Selection of the Size, Preparation of the Master plan, Preparation of Schedule of Accommodation Layout, Grouping, Zoning & Phasing of Activities, Circulation & Movements of Patients, Staff, Visitors.

Unit-III(10 Hrs): Planning for: Out Patient Department/Accident/Emergency, Indoor accommodation, Ward design, Bed wise planning, special requirements of certain departments such as ICU, OT, Paediatric, Maternity ward.

Unit-IV (10 Hrs): Planning for Water supply, Electricity, Drainage & Sewage disposal, Planning for equipment's & Purchase. Planning for various categories of Staff, Administrative action for Appointment, Training

Suggested Readings:

1. Hospital Planning & Administration – WHO Monograph Series 54 – By R. Llewelyn, Davis & H.M.C. Macaulay – Indian Edition – Jaypee Brothers, New Delhi.
2. Hospital & Nursing Homes : Planning, Organisation, & Management – By Syed Amin Tabish – Jaypee Brothers, New Delhi.
3. Principles of Hospital Administration & Planning – By B.M. Sakharkar – Jaypee Brothers.
4. Hospital Administration – By C.M. Francis & Marioc Desouza – Jaypee Brothers, New Delhi.
5. Hospital Administration & Planning – By A.G. Chandorkar – Paras Medical Publisher.
6. Hospitals Planning, Design & Management – By Kunders&Gopinath.
7. Healthcare System & Management – By S.L. Goel – Deep & Deep Publisher.

8. Management of Hospital – By S.L. Goel& R. Kumar – Deep & Deep Publisher.

Course Outcomes:

- *Hospital planning & Management candidate are involved in the business aspects of health care service delivery.*
- *Duties vary and may include planning and coordinating department activities in personnel and staffing, purchasing, public relations, fund raising, accounting, and program evaluation.*
- *They develop and implement budgets, analyze all types of data, and assure compliance with regulatory agency requirements or others work in marketing, finance, insurance, and information systems in health care and related organizations.*
- *By the end of the course, you will have learned how to develop, implement, and evaluate a strategic plan for a healthcare facility, and you will have gained advanced skills for organizational success, leadership, and effectiveness and efficiency techniques.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA451:HOSPITAL ADMINISTRATION

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

- To make understand the principles and practice of management.
- To review basic theories of management and management process.
- To understand basic concepts of health, healthcare, health services, healthcare organizations, hospitals, history and types.
- To understand role of healthcare managers, need and importance of hospital administrator and structuring of healthcare besides the emerging concepts / current issues in healthcare.

Hours: 40

Unit-I (10 Hrs): Routine Admission/Discharge Procedures/Discharge Summary, Hospital Utilisation Statistics: Average Length of Stay (ALS), Bed Occupancy, Rare, Turn Over Interval. Daily Reports / Returns: Hospital Census, Matron's Report, Medical Officer's Report, Casualty Report, Medico-Legal Cases, Report from ICU / ICCU, Security Report, Maintenance Department Report: OT List

Unit-II (10 Hrs): Patient's Complaints, Medical Certificates. Hospital Committees: Role, Composition, Frequency of Meetings, Minutes of the Meetings, Follow up Actions. Patient Satisfaction Survey: Interviews, Questionnaires, Observations, Group Discussions, Patient Opinion Polls, Report Writing. Duty Roster of various categories of Staff, Availability of Materials: Critical Items, Stock Level, Procurement Methods. Administration of Patient Related Schemes: Medical Insurance (Cashless Benefit), CGHS, ECHS, CSMA, TPA, ESI.

Unit-III (10 Hrs): Front Office: Duties & Responsibilities: Duties & Responsibilities of the Hospital Administrator/CEO- In Profit Making Hospitals and In Non-Profit Making Hospitals Disaster Management/Disaster Plan, Marketing of Hospital, Telephone Courtesy, Guest Lectures, Organisation of Camps, Seminars, Workshops, Continuous Medical Education, Public Participation.

Unit-IV (10 Hrs): Hospital Security: Staff, Patients, New born babies, Female staff/Patients, Stores. Application of Hospital Information System (HIS) & Management Information System (MIS), Negotiation Skills: Purchase of Stores / Equipment, Union Matters, Collective Bargaining. Hospital Waste Management, Methods of Infection Control, Fire Fighting, Dealing with Crisis Situation like Mob violence, Bomb threat, Terrorist strike, Mass casualties, Political agitation, Prisoners. Standard Operating Procedures (SOPs).

Suggested Readings:

1. Sana's Guidelines for Hospital Infection Control – By Mohd. S. Khan – Jaypee Brothers, New Delhi.
2. Hospital Waste Management & its Monitoring – By Madhuri Sharma – Jaypee Brothers, New Delhi.
3. Medical Stores Management – By Shakti Gupta & Sunil Kant - Jaypee Brothers, New Delhi.
4. Medical Records, Organisation & Management – By G.P. Mogli – Jaypee Brothers, New Delhi.
5. Emergency Medical Services & Disaster Management – By D.K. Dave & Shakti Gupta – Jaypee Brothers, New Delhi.
6. Hospital Waste Management – By A.G. Chandorkar – Paras Medical Publisher.
7. Hospital Infection Control – By S.A. Tabish – Academia, New Delhi.

Course Outcomes:

- *Accept professional management practice in healthcare.*
- *Understand the theories of management.*
- *Understand the management process and integrated approach in management Manage service organizations by accepting the inbuilt challenges.*
- *Manage hospitals by understanding the complexity, levels and role of hospital administrator.*
- *Understand the current issues that have an implication in administration Practice hospital administration.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA452: LAWS RELATED TO HOSPITAL & MEDICAL SERVICES

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. Learn the basic legal terms applicable to hospitals and healthcare
2. Understand the code of medical ethics and medical negligence
3. Be aware of the different Acts related to patient management

Hours: 40

Unit-I(10 Hrs): Introduction & Legal Procedures: Court, Affidavit, Evidence, Complaint, Investigation, Oath, Offence, Warrant, Summons. Medico Legal Aspects of Emergency Services, Inquest: Police Inquest, Magistrate's Inquest.

Criminal Courts in India & their Powers: General Important Legal Knowledge Pertaining to IPC, CRPC, Civil PC, Evidence Act.

Unit-II(10 Hrs): Introduction to Indian Constitution: Preamble, Fundamental Rights, Rights & Responsibilities of Medical Person, Hippocratic Oath, Declaration of Geneva.

List of Offences & Professional Misconduct of Doctors, as per Medical Council of India, Organisational & Procedural Laws: Indian Contract Act, Nursing Home-Registration Act, Birth-Death Registration Act, Labour Laws Applicable to a Hospital, Indian Trade Union Act 1926/Industrial Dispute Act 1947, The Bombay Shops & Establishment Act, The Workmen's Compensations Act, The Industrial Employment (Standing Orders) Act 1946.

Unit-III(10 Hrs): Medical Establishment, Professional Negligence, Errors & Commission, Insurance Policy, General Claims Procedure, Laws Related to Medical Procedures: Medical Termination of Pregnancy Act 1971(MTP Act), Prenatal Diagnostic Techniques, Regulations & Prevention of Misuse Act 1994 (PNDT Act), Consumer Protection Act 1986, Medical Negligence & Compensation, Medical Ethics/Doctor Patient Relationship.

Unit-IV (10 Hrs): Preventive Steps for Doctors/Hospitals to Avoid Litigation: Consent Form, Life Support, Dying Declaration, Death Certificate, High Risk, Post Mortem. Illustrative Cases of Medical Negligence in India: Surgery, OBST/GYNAEC, Medicine, Paediatrics, Other Disciplines/Anaesthesia, Legal Requirements of Licences/Certificates for a Hospital.

Suggested Readings:

1. Parikh's Text Book of Medical Jurisprudence & Toxicology – By Dr. C.K. Parikh – CBS Publications.
2. Medical Negligence & Compensation – By Jagdish Singh – Bharat Law, Jaipur.
3. Medical Negligence & Legal Remedies – By Anoop K. Kaushal – Universal.
4. Medical Termination of Pregnancy Act.
5. Preconception & Prenatal Diagnostic Techniques (Prohibition of sex selection) Act 1994.
6. Organ Transplant Act.
7. The Consumer Protection Act 1986.
8. Indian Trade Union Act 1926.
9. Industrial Dispute Act 1946.
10. Medico-legal Aid to Hospitals & Doctors, with Consumer Protection Law – By M.S. Pandit & Shobha Pandit – Pandit Publications.
11. Opening the Domains of Laws – By Adv. Seema Bapat.
12. Modi's Book on Medico Jurisprudence & Toxicology.

COURSE OUTCOMES

- *Acquaint the students about the death certificate issuing procedure and its content, importance of death certificate.*
- *Know about malpractice in health care CO3: Understanding about medical jurisprudence*
- *Know about patient's Rights and provider's responsibility.*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA453: HEALTH CARE & ADMINISTRATION OF CLINICAL & NON-CLINICAL SERVICES

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Hours: 40

UNIT I (10Hrs): Health Administration in India, Health Care Delivery System, National Health Policy, National Health Programmes: Tuberculosis's control Programme, Dots, Programme for control of Blindness, Family welfare programme, AIDS control programme, role & functions of, National AIDS Control Organisation (NACO).

UNIT II (10Hrs): Epidemiological Triad, Levels of Disease Prevention: Research Methodology, Radiology Services, Pathology & Clinical Laboratory, Central Sterile Supply Department, Laundry & Linen Services, House Keeping Services, Disposal of Biomedical Waste

UNIT III (10Hrs): Kitchen Canteen Services, Medical Records Department, Engineering Services: Maintenance of Building, Campus & Utilities, Biomedical services, Fire safety.

UNIT IV (10Hrs): Quality Management in Health Care: Quality control, ISO, ISO standards, Hospital Accreditation, Role of Quality Council of India (QCI), National Accreditation Board of Hospitals (NABH). Billing, Clamming, Insurance Companies/Employers, Public Relations

Suggested Readings:

1. Park's Text Book of Preventive & Social Medicine –By K. Park - BanarasidasBhanot, Jabalpur.
2. Essential of Hospital Support Services & Physical Infrastructure – By Madhuri Sharma – Jaypee Brothers, New Delhi.
3. Hospital Services Management – By S.K. Parthsarathi – K.J. Hospital, Madras.
4. Medical Records Organisation & Management – By G.P. Mogli – Jaypee Brothers, New Delhi.
5. Management Information System – By Waman s. Javdekar – McGraw Hill.
6. Total Quality Management – By V.V. Gopal – ICFAI University Press.
7. Marketing – RegeraKerin& Steven W. Hartcey – McGraw Hill.
8. Methods of Bio-statistics – By Rao.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA371: PROJECT FORMULATION AND APPRAISAL

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

OBJECTIVE:

To study and understand the formulation, costing of construction projects, appraisal, finance and private sector participation.

HOURS:40

UNIT I (10 Hrs): PROJECT FORMULATION: Project – Concepts – Capital investments - Generation and Screening of Project Ideas - Project identification – Preliminary Analysis, Market, Technical, Financial, Economic and Ecological - Prefeasibility Report and its Clearance, Project Estimates and Techno-Economic Feasibility Report, Detailed Project Report – Different Project Clearances required.

UNIT II (05 Hrs): PROJECT COSTING : Project Cash Flows – Time Value of Money – Cost of Capital.

UNIT III (15 Hrs): PROJECT APPRAISAL: NPV – BCR – IRR – ARR – Urgency – Pay Back Period – Assessment of Various Methods – Indian Practice of Investment Appraisal – International Practice of Appraisal – Analysis of Risk – Different Methods – Selection of a Project and Risk Analysis in Practice.

UNIT IV (10 Hrs): PROJECT FINANCING AND PRIVATE SECTOR PARTICIPATION: Project Financing – Means of Finance – Financial Institutions – Special Schemes – Key Financial, Indicators – Ratios. Private sector participation in Infrastructure Development Projects - BOT, BOLT, BOOT -Technology Transfer and Foreign Collaboration - Scope of Technology Transfer.

REFERENCES:

1. Barcus, S.W. and Wilkinson.J.W., "Hand Book of Management Consulting Services", McGraw Hill, New York, 1986.
2. Joy P.K., "Total Project Management - The Indian Context", New Delhi, Macmillan India Ltd.,1992
3. Prasanna Chandra, "Projects – Planning, Analysis, Selection, Implementation Review", McGraw Hill Publishing Company Ltd., New Delhi. 2006.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA372: CONSTRUCTION PLANNING, SCHEDULING AND CONTROL

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

OBJECTIVE:

To study and understand the concept of planning, scheduling, cost and quality control, safety during construction, organization and use of project information necessary for construction project.

HOURS: 40

UNIT I(10 Hrs): CONSTRUCTION PLANNING: Basic Concepts in the Development of Construction Plans – Choice of Technology and Construction Method – Defining Work Tasks – Defining Precedence Relationships among Activities – Estimating Activity Durations – Estimating Resource Requirements for Work Activities– Coding Systems.

UNIT II(10 Hrs): SCHEDULING PROCEDURES AND TECHNIQUES: Construction Schedules – Critical Path Method – Scheduling Calculations – Float – Presenting Project Schedules – Scheduling for Activity-on-Node and with Leads, Lags, and Windows – Scheduling with Resource Constraints and Precedences – Use of Advanced Scheduling Techniques – Scheduling with Uncertain Durations – Calculations for Monte Carlo Schedule Simulation – Crashing and Time/Cost Tradeoffs – Improving the Scheduling Process.

UNIT III(10 Hrs): COST CONTROL, MONITORING AND ACCOUNTING: The Cost Control Problem – The Project Budget – Forecasting for Activity Cost Control – Financial Accounting Systems and Cost Accounts – Control of Project Cash Flows –Schedule Control – Schedule and Budget Updates – Relating Cost and Schedule Information.

UNIT IV(10 Hrs): QUALITY CONTROL AND SAFETY DURING CONSTRUCTION: Quality and Safety Concerns in Construction – Organizing for Quality and Safety – Work and Material Specifications – Total Quality Control – Quality Control by Statistical Methods – Statistical, Quality Control with Sampling by Attributes – Statistical Quality Control with Sampling by Variables– Safety.

REFERENCES:

1. Calin M. Popescu, Chotchai Charoenngam, "Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications", Wiley, New York, 1995.
2. Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control", McGraw-Hill Publishing Company, New Delhi, 1998.
3. Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamental Concepts for Owners, Engineers", Architects and Builders, Prentice Hall, Pittsburgh, 2000.

4. Halpin, D. W., "Financial and Cost Concepts for Construction Management", John Wiley & Sons, New York, 1985.
5. Willis, E. M., "Scheduling Construction Projects", John Wiley & Sons, 1986.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA471: CONSTRUCTION PERSONNEL MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

OBJECTIVE:

To study the various aspects of manpower management such as man power planning, organization, human relations, welfare and development methods in construction.

UNIT I MANPOWER PLANNING

Manpower Planning process , Organizing, Staffing, directing, and controlling – Estimation, manpower requirement – Factors influencing supply and demand of human resources – Role of HR manager – Personnel Principles.

UNIT II ORGANISATION

Requirement of Organization – Organization structure – Organization Hierarchical charts – Staffing Plan - Development and Operation of human resources - Managerial Staffing – Recruitment – Selection strategies – Placement and Training.

UNIT III HUMAN RELATIONS AND ORGANISATIONAL BEHAVIOUR

Basic individual psychology – Approaches to job design and job redesign – Self managing work teams – Intergroup – Conflict in organizations – Leadership-Engineer as Manager – al aspects of decision making – Significance of human relation and organizational – Individual in organization –Motivation – Personality and creativity – Group dynamics, Team working – Communication and negotiation skills.

UNIT IV WELFARE MEASURES

Compensation – Safety and health – GPF – EPF – Group Insurance – Housing - Pension – Laws related to welfare measures. Managing New Technologies – Total Quality Management – Concept of quality of work life – Levels of change in the organizational Development – Requirements of organizational Development – System design and methods for automation and management of operations – Developing policies, practices and establishing process pattern – Competency up gradation and their assessment – New methods of training and development – Performance Management.

REFERENCES:

1. Carleton Counter II and Jill Justice Coutler, "The Complete Standard Handbook of Construction Personnel Management", Prentice-Hall, Inc., 1989.
2. Charles D Pringle, Justin Gooderi Longenecter, Management, CE Merrill Publishing Co. 1981.
3. Dwivedi R.S, "Human Relations and Organizational Behavior", Macmillian India Ltd.,2005.
4. Josy.J. Familiaro, "Handbook of Human Resources Administration", McGraw-Hill International

Edition, 1987.

5. Memoria,C.B., "Personnel Management", Himalaya Publishing Co., 1997.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA472: CONSTRUCTION PROJECT MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

OBJECTIVES:

To study the various management techniques for successful completion of construction projects.
To study the effect of management for project organization, design of construction process, labour, material and equipment utilization, and cost estimation.

UNIT I THE OWNERS' PERSPECTIVE

Introduction - Project Life Cycle - Types of Construction - Selection of Professional Services - Construction Contractors - Financing of Constructed Facilities - Legal and Regulatory Requirements - Changing Environment of the Construction Industry - Role of Project Managers.

UNIT II ORGANIZING FOR PROJECT MANAGEMENT

Project Management – modern trends - Strategic Planning - Effects of Project Risks on Organization - Organization of Project Participants - Traditional Designer-Constructor Sequence – Professional Construction Management - Owner-Builder Operation - Turnkey Operation - Leadership and Motivation for the Project Team.

UNIT III DESIGN AND CONSTRUCTION PROCESS

Design and Construction as an Integrated System - Innovation and Technological Feasibility - Innovation and Economic Feasibility - Design Methodology - Functional Design - Construction Site Environment.

UNIT IV LABOUR, MATERIAL AND EQUIPMENT UTILIZATION

Historical Perspective - Labor Productivity - Factors Affecting Job-Site Productivity - Labour Relations in Construction - Problems in Collective Bargaining - Materials Management - Material Procurement and Delivery - Inventory Control - Tradeoffs of Costs in Materials Management. - Construction Equipment - Choice of Equipment and Standard Production Rates - Construction Processes Queues and Resource Bottlenecks.

REFERENCES:

1. Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control", Tata McGraw-Hill Publishing Company, New Delhi, 1998.
2. Choudhury S , "Project Management", McGraw-Hill Publishing Company, New Delhi, 1988.
3. Chris Hendrickson and Tung Au, "Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders", Prentice Hall, Pittsburgh, 2000.
4. Frederick E. Gould, "Construction Project Management", Wentworth Institute of Technology,

Vary E. Joyce, Massachusetts Institute of Technology, 2000.

5. George J.Ritz , "Total Construction Project Management" - McGraw-Hill Inc, 1994.

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA473: PROJECT SAFETY MANAGEMENT

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

OBJECTIVES:

To study and understand the various safety concepts and requirements applied to construction projects.

To study the of construction accidents, safety programmes, contractual obligations, and design for safety.

UNIT I CONSTRUCTION ACCIDENTS

Accidents and their Causes – Human Factors in Construction Safety – Costs of Construction Injuries – Occupational and Safety Hazard Assessment – Legal Implications.

UNIT II SAFETY PROGRAMMES

Problem Areas in Construction Safety – Elements of an Effective Safety Programme – Job-Site Safety Assessment – Safety Meetings – Safety Incentives.

UNIT III CONTRACTUAL OBLIGATIONS

Safety in Construction Contracts – Substance Abuse – Safety Record Keeping. Owner's responsibility for safety – Owner preparedness – Role of designer in ensuring safety – Safety clause in design document

UNIT IV DESIGNING FOR SAFETY

Safety Culture – Safe Workers – Safety and First Line Supervisors – Safety and Middle Managers

– Top Management Practices, Company Activities and Safety – Safety Personnel – Sub contractual Obligation – Project Coordination and Safety Procedures – Workers Compensation.

REFERENCES:

1. Jimmy W. Hinze, "Construction Safety", Prentice Hall Inc., 1997.
2. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA478: RURAL AND AGRICULTURAL FINANCING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

HOURS:40

UNIT I (10 hrs): Rural and Agricultural Financing – Introduction and brief overview, Scenario of Rural and Agricultural Financing in India, Credit Facility System in the hinterlands of our country, problems and bottlenecks.

UNIT II (10 hrs): Rural and Agricultural Financing – Institutions and Organizations supporting rural credit facility systems, their methods and structure, problems faced by these organizations, Emerging trends in the Rural and Agricultural Financing in India, Expanding the scope and gambit of the concept of Financial Inclusions.

UNIT III (10 hrs): Rural and Agricultural Financial Awareness and Literacy among the masses, Transparency in the Rural Financial System, Bringing an inclusive approach to the concept of Rural and Agricultural Financing.

UNIT IV (10 hrs): Self Help Groups and their role in the overall functioning of the Rural credit facility system, eliminating the role of corrupt money lenders from the rural financial system, various policies launched by the government for the improvement of the rural financial system.

References

1. **Balaram Dogra & Karminder Ghuman**, RURAL MARKETING: CONCEPT & CASES, *Tata McGraw-Hill Publishing Company, New Delhi, 2008*
2. **A.K. Singh & S. Pandey**, RURAL MARKETING: INDIAN PERSPECTIVE, *New Age International publishers, 2007*
3. **CSG Krishnamacharylu & Laitha Ramakrishna**, - RURAL MARKETING, *Pearson Education Asia. 2018*
4. **Philip Kotler**, MARKETING MANAGEMENT, *Prentice - Hall India Ltd. New Delhi*
5. **Agarwal A.N**, INDIAN ECONOMY, *Vikas Publication, New Delhi.*
6. **Ruddar Dutt Sundaram**, INDIAN ECONOMY, *Tata McGraw Hill. Publishers, New Delhi*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

MBA476:DISTRIBUTION STRATEGIES FOR RURAL AND AGRICULTURAL MARKETING

Teaching Scheme	Examination Scheme
Lectures: 4 hrs./Week Tutorials: 1 hrs./Week Credits: 4	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

HOURS: 40

UNIT I (10 hrs): Rural Distribution prevalent in the hinterlands of the country, Introduction to the concept of rural and agricultural distribution, basic terminologies and philosophies, current scenario of rural distribution, problems and challenges.

UNIT II (10 hrs): Types of Distribution strategies commonly used in Rural India their problems and challenges, Innovation in the choice of distribution strategies used by companies for targeting rural customers, unconventional choice and selection of methods used by companies for rural distribution.

UNIT III (10 hrs): Establishing new interfaces of rural distribution – myths and realities, challenges faced by companies to sufficiently enter the rural landscape and methods used by them to solve his problem.

UNIT IV (10 hrs): Conjoint and Collateral Distribution, Parallel Group Analysis, Experimental and Non-experimental methods of rural distribution.

References

- 1. Balaram Dogra & Karminder Ghuman**, RURAL MARKETING: CONCEPT & CASES, *Tata McGraw-Hill Publishing Company, New Delhi, 2008*
- 2. A.K. Singh & S. Pandey**, RURAL MARKETING: INDIAN PERSPECTIVE, *New Age International publishers, 2007*
- 3. CSG Krishnamacharylu & Laitha Ramakrishna**, - RURAL MARKETING, *Pearson Education Asia. 2018*
- 4. Philip Kotler**, MARKETING MANAGEMENT, *Prentice - Hall India Ltd. New Delhi*
- 5. Agarwal A.N**, INDIAN ECONOMY, *Vikas Publication, New Delhi.*
- 6. Ruddar Dutt Sundaram**, INDIAN ECONOMY, *Tata McGraw Hill. Publishers, New Delhi*

Employable Skills	Measuring Tools
Ability to identify and apply the knowledge of subject practically in real life situations	Exercise Workshop Quiz Classroom Discussions

Marks

BFD101 History of Fashion-I	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD201 History of Fashion-II, BFD351 Fashion Art and Design – I , BFD451 Fashion Art & Design-II , BFD456 Minor Project , BFD651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of history of Indian clothing with different periods
2. To give an overview of different methods of period's clothing
3. To explain the difference between Indian and International fashion history
4. To describe all textile and jewelers of different periods
5. To give the knowledge of importance of clothing

Detailed Syllabus

Module I: Origin of clothing theories Protection, Modesty and Adornment of clothing
Module II: Indus valley civilization & Vedic Period Indus valley civilization: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Indus Valley. Vedic Period: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Vedic Period.
Module III: Clothing during the rise of Sunga Period & Kushan Period Sunga Period: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Sunga Period. Kushan Period: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Kushan Period.
Module IV: Satvahana Period & Gupta Period Satvahana Period: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Satvahana Period. Gupta Period: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Gupta Period.
Module V: Mughal Empire, Rajput Empire & British Raj Mughal Empire: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Mughal Empire.

Rajput Empire: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of Rajput Empire.

British Raj: Detailed study of dates, significant developments, men's and women's costumes, jewelry, hairstyles and footwear of British Raj.

Text and References books:

1. Ancient Indian Costumes, By RoshanAlkazi
2. The history of costumes, By Blanche Dayne, GeilelWinakor& Jane Farrell -Beck

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types of clothing's of men's and women's
2. Understand the style features of various fashionable accessories
3. Understand about the different terminology related to historical fashion styles.
4. Understand the different ancient fabrics and textiles
5. Understand the basic themes, concepts, chronology and the Scope of Indian History of fashion
6. Understand the history of countries other than India with comparative approach

BFD102 Introduction to Apparel Manufacturing Techniques- I

Teaching Scheme

Lectures: 1 hr./ week

Tutorials: Nil

Credits: 2

Examination Scheme

Class Test: 6 Marks

Teachers Assessment: 3 Marks

Attendance: 6 Marks

End Semester Exam: 35 Marks

Prerequisite: BFD401 Fashion Forecast-II, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of garment export house
2. To give an overview of different departments
3. To explain the difference between sampling and merchandising department.
4. To describe all department of working process
5. To give the knowledge of pressing and fusing
6. To explain the all cutting machine and stitching machine

Detailed Syllabus**Module I: Introduction to Garment manufacturing process**

Introduction to different departments, working principles of various departments

Introduction Sewing, cutting & finishing department

Different machinery used; comparative analysis; (demonstration of machineries in action)

Module II: Introduction to Sewing Technology

Basic sewing machine, various parts, types & functions of sewing machines

Understanding the simple problems of sewing machine and its maintenance

Module III: Sewing machines

Different sewing machines used- different bed types, their uses and comparative analysis

Different stitch and seam types, properties & use

Stitch and seam Class Series diagrams, their comparative analyses

Module IV: Cutting Machines

Straight knife, Band knife, End cutter, Auto cutter, Die cutter, Round knife, Drilling machine, Notching machine & Hot drill

Module V: Fusing & Pressing Technology

Machinery, equipment & process of Fusing Technology

Machinery, equipment & process of Pressing Technology

Text and References books:

1. A Guide to Fashion Sewing, By Amaden-Crawford
2. Introduction to clothing production management, By A J Chuter

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types of cutting machine and sewing machine
2. Understand the work process of garment export house
3. Understand
4. Understand the different ancient fabrics and textiles
5. Understand the basic themes, concepts, chronology and the Scope of Indian History of fashion
6. Understand the history of countries other than India with comparative approach

BFD 151: BASIC DRAWING AND SKETCHING

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD252- Flat pattern making-II, BFD251- Fashion art and illustration-II, BFD254- Element of Design -II, BFD 456 Minor project, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of **basic of drawing, sketching and coloring tools.**
2. To give an overview of different methods of 3D and perspective drawing with their different types.
3. To explain the concept of **composition making and there elements.**
4. To give knowledge of **different medium of colors** with their use and techniques.

Detailed Syllabus

Module I: Introduction to basics of sketching & drawing and coloring.

Line drawing, freehand drawing, 3D Geometrical drawing. Floral design and color rendering.

INRODUCTION to different art theories and its application

Importance of Basic Drawing in fashion industry

Module II: Introduction to create a Composition.

Composition of 3D geometrical object and floral design. (Black& white and in different color medium)

Module III: Basics concept of Perspective

TERM USED IN Perspective Drawing type of perspective and perspective drawing

METHODS of perspective Drawing ad its application

Module IV: Perspective composition.

Composition of different fashion accessories, composition of an indoor room or out door with Multiple objects.

Module V: Introduction to still life drawing

What is still life, Still life drawing (single and easy object) in black & white and different color Medium.

Module VI: Still life drawing

Still life composition like hairstyles, jewelry, book and glass, fruits in cluster, flower with vases.

Module VII: Introduction of drapery in different color mediums.

Text and References books:

1. IL Figurino di Moda, By Fernando Burgo
2. Fashion Rendering, By Ranjana Singhal & Kannaki Bharali

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of Basic Drawing
2. Understand about the various tools and equipment's used for Basic Drawing
3. Understand how we can creatively display our work
4. Understand the principles of design and its application in the fashion industry
5. Understand the different elements of design features and their appropriate use according to space and material available.
6. To increase the observation power of the students.

BFD 152: FLAT PATTERN MAKING-I

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12 Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 252 Flat Pattern making-II, BFD 352, BFD 452 Advance Pattern Making -I and II, BFD 552 Men's Wear, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of pattern making and different tools and equipment's use.
2. To give an overview of different methods of pattern making for basic garments and their elements
3. To explain the difference between the pattern of different sleeves
4. To give knowledge of patterns of different variations of collars
5. To explain the difference between dart and dart less children garments

Detailed Syllabus

Module I: Introduction to pattern making

Terms used in pattern making: Pattern drafting, flat pattern making, working pattern, production pattern,

Pattern making methods, Type of patterns, basic pattern set, landmark terms, Symbol and keys

Importance of pattern making in fashion industry

Module II: Basic elements to make patterns

Measurements: Standard body measurements;

Tools & equipment's used for making pattern: Measuring, marking, cutting, finishing tools

Giving details in pattern- grain, notches, style marks, dart marks, balance marks, seam allowances, turnings etc.

Module III: Pattern making of child bodice block

Basic fitted bodice block; Easy fitting bodice block; Dart less bodice block

Module IV: Pattern making of child basic skirt block: dart less and with dart patterns

Module V: Pattern making of basic sleeve and its variation

Introduction: Development of basic sleeve block,

Sleeve Terminology: Sleeve length variation,

Types of sleeves: Set-in-sleeves, Puff at crown, Short and Long Lantern, Bishop, Bell, Legomutton sleeve; Grown on sleeve-Kimono, Raglan

Module VI: Pattern making of Collars

Introduction to collars

Collar: Terminology and classifications

Types of sleeve: Flat Peter Pan collar, Roll Peter pan collar, Mandarin collar, Flat sailor's collar, Shawl collar, men's shirt collar

Text and References books:

Armstrong, H.J., "Pattern making for fashion design", Pearson, 5th edition 2018.

Holman, G., "Pattern cutting made easy: A Step-by-Step Introduction, 2013
Cooklin, G., "Pattern cutting for women's outerwear", 1994
Rajput, C., A professional Approach to Garment Construction and Pattern Making (Fashion Designing), 1st edition, 2001

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of pattern making
2. Understand the symbols and keys and notation
3. Understand about the various tools and equipment's used for pattern making
4. Understand how body measurements are taken
5. Differentiate between dart and dart less bodices, skirt pattern and types of sleeve and collar
6. Understand the different elements of design features and their appropriate use according to garment style

BFD 153: GARMENT CONSTRUCTION

Teaching Scheme Lectures: 1 hr./ week Practical: 1hrs/week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 marks End Semester Exam: 35 Marks
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Prerequisite: BFD 253, BFD 353, BFD 452, BFD553 Garment Construction-I, II, III, IV, BFD 552 Men's Wear, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge about the working of different sewing machine
2. To give knowledge about the tools and equipment's use in cutting and stitching.
3. To explain how the design, pattern and construction of garments are correlated
4. To explain the use of different needles and stitches according to the fabric and garment.
5. To explain the difference between hand and machine stitches
6. To give actual demonstration: how to work on sewing machine with different embroidery stitches.

Detailed Syllabus

Module I: Introduction to garment construction: Definition, basic terminologies; fabric terms, sewing terms and importance of garment construction in fashion industry.
Module II: Relationship amongst design, pattern making and garment Construction
Module III: Tools & equipment's used in garment construction: Measuring, marking, cutting, sewing, finishing Sewing machine: Its parts and their functions
Module IV: Knowledge of size of needle, threads and stitches according to the Fabric
Module V: Hand stitches Running, Basting, slip stitch, Hemming (visible/ invisible), Back stitch, Overcasting, Catch stitch, Buttonhole & button attachment
Module VI: Sewing demonstration Machine practice (paper/ fabric), Motif designing using sewing machine
Text and References books: Editor of Reader Digest., "A New complete guide to sewing", 2010 Muller, C., "The Timeline of World Costume: From Fig Leaf to Street Fashion", 1993, 01 edition, Thames & Hudson Ltd. Peacock, J., "The Chronicle of Western Costume: From the Ancient World to the Late Twentieth Century", 2019., 01 edition Thames and Hudson Ltd. Johnston, L ., "19th-Century Fashion in Detail: 1800 - 1900 (Victoria and Albert Museum)" 2016., 01 edition., Thames and Hudson Ltd. Beukel, D.V., "A Pictorial History of Costume (Pepin Press Design Books)" 1998, 1st Edition,

Pepin Press.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various terms related to sewing.
2. Understand the working of sewing machine and its parts.
3. Understand about the various tools and equipment's used for garment construction
4. Understand the basic relation between design, its pattern and construction.
5. Differentiate between hand and machine stitches and knowledge of how to operate and work on industrial sewing machine
6. Knowledge of selection of needle, thread and stitches according to fabric type and garment

BFD 154: FASHION ART ILLUSTRATION-I

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD255- Fashion Model Drawing, BFD456- Minor Project, BFD651- Graduation Design Collection

Course Objectives:

1. To give complete knowledge of basic of fashion illustration and their use.
2. To give an overview of different principles of Good design.
3. To knowledge about different fashion styles and accessories available in fashion world.
4. To give knowledge of different rendering medium and techniques.

Detailed Syllabus

Module I: Characters of a Good Design

Consideration of aesthetic, structural and functional aspects, general principles of fashion Illustration, concept development, categories of fashion apparels.

Module II: Detailed Drawing of Basic styles

Styles of necklines and collars, sleeves, silhouettes, skirts and trousers, yokes & waistlines and its details; Tucks, frills and pleats; cuffs; pockets.

Module III: Introduction to garment drawing

Drawing of basic tops, skirts, dresses, lingerie, coats and waistcoats.

Module IV: Rendering techniques like velvet, embossed effect, marble effect, denim effect, chiffon effect

Text and References books:

1. Fashion Source Book, By Kathryn McKelvey,
2. Fashion Prints: How to design & Draw (fashion and textiles), By Elisabetta Druid
3. Fashion designs and illustrations
4. Introduction to fashion design, By Patrick John Ireland
5. Inside fashion design Simplicity

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of basic Fashion Illustration
2. Understand about the various tools and equipment's used for Fashion illustration
3. Understand the concept of different fashion style available.
4. Understand the principles of design and its application in the fashion industry
5. Understand the different elements of design features and their appropriate use according to the current fashion trends.
6. Understand how we can present our idea on paper first.

BFD 155 ELEMENT OF DESIGN-I

Teaching Scheme

Lectures: 1 hr./ week
Tutorials: Nil
Credits: 4

Examination Scheme

Class Test: 12Marks
Teachers Assessment: 6 Marks
Attendance: 12 marks
End Semester Exam: 70 Marks

Prerequisite: BFD251 Fashion Art Illustration-II, BFD254 Elements of Design-II, BFD456 Minor Project , BFD651 Graduation Design Collection

Course Objectives:

1. To give an overview of elements of design.
2. To give complete knowledge of different types of lines and color.
3. Overview knowledge of different texture made by different techniques.
4. Explain the difference between tint, tone and shade.
5. To describe all color scheme and placement of design.
6. To give the knowledge of motifs.

Detailed Syllabus

Module I: Introduction to Elements of Design Meaning, applications & different elements of design; Line, shape, Form, Color value (tint and shade), Texture, Space and light& shade

Module II: Line Types, directions & applications, Relevance of line as an important element of structure to determine visual interest of a design.

Module III: Space 2D & 3D object with space

Module IV: Color Primary, Secondary and Tertiary colors; Process and Pigment color wheels; Color intensity wheel; Color chart; Spectrum colors, Use of color wheel, Monochromatic color scheme; polychromatic color scheme; Analogous color scheme; Achromatic color scheme; Complementary color scheme. Tint, tone and shade

Module V: Texture Types of textures, use & creation of different textures thread pulling, paper folding, thread rolling, thread crumple, paper crush, stencil, wax drop , crayon rubbing, smoke, blade, leaf/flower print, thumb impression, salt/sugar sprinkle, onion, lady finger, ink blow, etc

Module VI: Form 3D design, Introduction of motif, Development of motif from taking inspiration- Geometrical, floral, natural and abstract

Module VII: Light and shade

Module VIII: Placements of Designs Horizontal, Vertical, Diagonal, all over, Full Drop, Half Drop, Mirror Repeat, Brick Laying, Checks, Twill, Satin, Turn Over, Ogees, Random

Text and References books:

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types of lines and color.
2. Understand the style features of design and motifs.
3. Figure out the all texture by using techniques.
4. Understand the structure of line.
5. Understand the all knowledge of placement of design with motifs.
6. Understand the knowledge of 2d and 3d shape

BFD156: COMPUTER APPLICATION

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD456- Minor Project, BFD 651- Graduation Design Collection

Course Objectives:

- 1) To give complete knowledge of computer application.
- 2) To give an overview on different software involved in computer application.
- 3) To explain the concept of database and networking system.
- 4) To give knowledge of different computer fundamentals.

Detailed Syllabus

Module I: Computer fundamentals: Brief history of development of computers, Computer system concepts, Computer system characteristics, Types of computers, Generations of computers, Basic components of a computer system - Control unit, ALU, Input/output functions and characteristics, Input /Output devices, Primary and Secondary memories. Basic Number System: Binary, octal, decimal, hexadecimal and conversion. ASCII and EBDIC codes

Module II: Computer software: Software and its Need, Types of Software - System software, Application software, System Software: Operating System, Principal of programming: algorithm, flowchart, Introduction to MS-Office: word document creation, formatting, handling, inserting table, handling document, Excel: basic functions of excel, sorting ,merging of table, shortcut keys, Power point: creation of slide show, using effect and animation.

Module III: Database system concept: query, repots, and forms handling, Data Communication and network:
Introduction to internet: History of internet, WWW, browser, LAN, MAN, WAN, topologies (ring, star, bus, mesh), protocols.

Text :

1. Computer Fundamentals (sixth edition) By PradeepK.Sinha&PritiSinha.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of computer application.
2. Understand about the various principles of computer application.
3. Understand how we can use the different software used in computer application.
4. Understand the principles of different internet procedure.
5. Understand the different data base system.
6. Understand the different behavior of computer software.

BFD201 History of Fashion-II	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD351 Fashion Art and Design – I, BFD451 Fashion Art & Design-II, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of history of International clothing with different periods
2. To give an overview of different methods of era's clothing
3. To explain the difference between Indian and International fashion history
4. To describe all textile and jewelers of different periods
5. To give an art and craft of different era
6. To give the knowledge of impotence of clothing

Detailed Syllabus

Module I: Ancient Egypt Era & Greek Era

Detailed study of dates, significant developments, men's and women's costumes, jewellery, hairstyles and footwear

Module II: Rome Era & Byzantine Era

Detailed study of dates, significant developments, men's and women's costumes, jewellery, hairstyles and footwear

Module III: Renaissance Era

Detailed study of dates, significant developments, men's and women's costumes, jewellery, hairstyles and footwear

Module IV: 19th & 20th century

Detailed study of dates, significant developments, Men's and Women's costumes, jewellery, hairstyles and footwear

Module V: Prepare a paper dress based on era

Text and References books:

1. Ancient Indian Costumes, By RoshanAlkazi
2. The history of costumes, By Blanche Dayne, GeilelWinakor& Jane Farrell -Beck

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types of clothing's of men's and women's
2. Understand the style features of various fashionable accessories
3. Understand about the different terminology related to historical fashion styles.
4. Understand the different ancient fabrics and textiles
5. Understand the basic themes, concepts, chronology and the Scope of Indian History of fashion
6. Understand the history of countries other than India with comparative approach

BFD 202: FUNDAMENTAL OF TEXTILES

Teaching Scheme Lectures: 3 hrs./ week Practical: Nil Tutorials: 1hr./week Credits: 4	Examination Scheme Class Test: 12 Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 402 Fabric Studies, BFD 355, BFD 455 Surface Ornamentation-I&II, BFD 454 & 653 Draping Techniques-I & II, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge about the different sector of textile industry.
2. To give knowledge about the fiber, yarn and fabric.
3. To explain difference between natural and synthetic fibers.
4. To give complete knowledge about the types of spinning processes.
5. To give knowledge about the different yarns and their specification.
6. To give knowledge about different fabric production techniques.

Detailed Syllabus

Module I: The Overview of Textile Industry

Introduction to textiles, major segments of the textile industry, market planning for apparels, primary and secondary sources of fabric buying and selling of finished fabric.

Module II: The Textile Fibers

Definitions of fibers, sources of fibers, classification of fibers on the basis of origin and length.

Module III: Natural and Manmade Fibers

Natural Fibers & Manmade fibers - properties, end uses and identification of fibers.

Module IV: Introduction to Yarns

Spinning Process: mechanical and chemical spinning, Classification of yarns; Spun, Filament, Single, Ply yarns, Novelty yarns, textured yarns, loop, boucle, knot, knop, chenille, Mixtures and Blends.

Yarn twist & Yarn count.

Module V: Introduction to fabric production techniques

Weaving, Knitting, Non-woven, Crocheting, Braiding, Felting, tufting

Text and References books:

1. Gohl E.P.G. & Vilensky, L. D. Textile Science. 1983. Longman Cheshire.
2. Joseph M. L. Essentials of Textiles. 1988. 4th Edition. Holt, Rinehart, and Winston.
3. Dhantyagi, S. Fundamentals of textiles & their Care, 1983, Orient Longman.
4. [Gillow](#), J. and [Sentance](#), B. World Textiles: A Visual Guide to Traditional Techniques, 2004, Thames & Hudson.
5. Phyllis Tortora, P.G., Understanding Textiles, 1992, Maxmillan Publishing Company.

EBook:

1. Textiles & Clothing - <http://www.textbooksonline.tn.nic.in/books/11/stdxi-voc-textiles-em.pdf>
2. Fiber to Fabric - <http://www.nios.ac.in/media/documents/Sec>

Course Outcomes:

After completing the course, students will be able to:

1. Understand the segmentation of textile industry.
2. Understand the importance of fiber in manufacturing of yarn and fabric
3. Understand about the various natural and synthetic fibers and their properties.
4. Understand the spinning process.
5. Differentiate between various types of yarn and fabrics and knowledge of fabric manufacturing techniques.
6. Understand the importance of fiber, yarn and fabric in fashion and textile industry.

BFD 203 TRADITIONAL INDIAN EMBROIDERIES

Teaching Scheme Lectures: 1 hr./ week	Examination Scheme Class Test: 12Marks
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Tutorials: Nil Credits: 3	Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD355 Surface Ornamentation-I, BFD351 Fashion Art and Design – I, BFD453 Garment Construction-III, BFD451 Fashion Art & Design-II, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To give the knowledge of all traditional embroidery.
2. Describe the all techniques of embroidery.
3. To introduce the difference between motifs.
4. To give the knowledge of different type of embroidery threads.
5. To explain the fabric knowledge according the embroidery.
6. Explain the all processing methods of embroidery.

Detailed Syllabus

Module I:

Kantha of Bengal:

Basic techniques of kantha, type of thread used, how to create different motif and design by this embroidery.

Phulkari of Punjab:

Basic stitches, Type of thread used, how to create different type of design by this embroidery.

Module II:

Chikankari of Uttar Pradesh:

Basic techniques of chikankari, type of threads used, how we can create some new design by using the embroidery.

Kasuti of Karnataka:

Basic techniques of Kasuti, how to create different motif and design by this embroidery.

Module III:

Kashida of Kashmir:

Basic techniques of kashida, type of thread used, how to create different design by using this embroidery.

Embroidery of Gujarat& Rajasthan

Module IV: Visit to museum

Text and References books:

1. Embroidery in Asia Sui Dhaga, KapilaVatayayan
2. Traditional Embroideries of India, By Dr. Shailaija D. Naik

Course Outcomes:

After completing the course, students will be able to:

1. Understand the all knowledge of traditional embroidery according to states wise.
2. Understand about the threads, colors and motifs of embroidery.
3. Understand the working process of all embroidery.
4. Understand about the all techniques of traditional methods of embroidery.
5. Understand about the fabrics according embroidery.
6. Understand the advance knowledge of traditional craft and art.

BFD 251: FASHION ART ILLUSRATION-II	
Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks

Tutorials: Nil Credits: 4	Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 353- Garment Construction-II, BFD456- Minor Project, BFD 651- Graduation Design Collection.

Course Objectives:

1. To give complete knowledge of basic of fashion illustration and their use.
2. To give an overview of different garment categories.
3. To give knowledge about different fashion styles and accessories available in fashion world.
4. To give knowledge of different rendering medium and techniques on croquies.

Detailed Syllabus

Module I: Designing of casual shirts and tees for teenagers
Module II: Designing of casual and formal skirts for teenagers
Module III: Designing of casual and formal trousers for teenagers
Module IV: Designing of uniforms
Module V: Designing of beachwear and lingerie
Module VI: Designing of denim wear
Module VII: Designing of casual and formal one-piece dresses for teenagers
Module VIII: Designing of Nightwear
<i>Text and References books:</i> <ol style="list-style-type: none"> 1. Fashion Source Book, By Kathryn McKelvey, 2. Fashion Prints: How to design & Draw (fashion and textiles), By Elisabetta Druid 3. Fashion designs and illustrations 4. Introduction to fashion design, By Patrick John Ireland 5. Inside fashion design Simplicity

Course Outcomes:

After completing the course, students will be able to:

7. Understand the various techniques or methods of Fashion Illustration
8. Understand about the various tools and equipment's used for Fashion illustration
9. Understand the concept of different fashion style available.

10. Understand the principles of human anatomy by draping it.
11. Understand the different elements of design features and their appropriate use according to the current fashion trends.
12. Understand the different types of rendering involved in fashion illustration.

BFD 252: FLAT PATTERN MAKING-II	
Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil	Examination Scheme Class Test: 12 Marks Teachers Assessment: 6 Marks Attendance: 12 marks

Credits: 4	End Semester Exam: 70 Marks
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Prerequisite: BFD 352, BFD 452 Advance Pattern Making -I and II, BFD 552 Men's Wear, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of pattern making of five basic patterns and torso.
2. To explain the difference between dart manipulation techniques.
3. To give knowledge of patterns development for princess line.
4. To explain the difference between princess line and styles lines.
5. To explain knowledge about variation of skirts and lehenga.

Detailed Syllabus

Module I: Pattern making of adult basic pattern set
Module II: Pattern making of Torso Combined bodice and skirt to produce torso shift.
Module III: Dart manipulation Other forms of suppression; darts, tucks, gathers, pleats, flares etc. Development of styles through dart manipulation; connecting darts to create seamlines, Style developments. Yokes: shoulders, midriff and hip yoke
Module IV: Princess Line foundation Pattern development for princess line foundation, A-line princess.
Module V: Skirt variations and lehenga adaption
References Norma R. H and Carolyn J. K. Pattern Making by the Flat-Pattern Method.1998. 8 th Edition. Prentice Hall Mortimer-Dunn , G. Pattern designs for children clothes.1996. B T Batsford Ltd. Armstrong, H.J., "Pattern making for fashion design", Pearson, 5 th edition 2018. Knowles , L. A., "Practical Guide to Patternmaking for Fashion Designers: Juniors, Misses and women", 2005, Fairchild Books Holman,G ., "Pattern cutting made easy: A Step-by-Step Introduction, 2013 Cooklin, G., " Pattern cutting for women's outerwear", 1994 Rajput, C., A Professional Approach to Garment Construction and Pattern Making (Fashion Designing), 1 st edition, 2001

Course Outcomes:

After completing the course, students will be able to:

1. Understand the pattern making procedure of basic pattern
2. Understand the different dart manipulation techniques
3. Understand about the princess line and style line patterns
4. Understand about variation in skirt
5. Understand about the basic pattern making technique.
6. Understand the importance of pattern making in fashion industry.

BFD 253: GARMENT CONSTRUCTION-I	
Teaching Scheme Lectures: 1 hr./ week Practical: 1hrs/week Tutorials: Nil	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 marks

Credits: 2

End Semester Exam: 35 Marks

Prerequisite: BFD 352, BFD 452, BFD553 Garment Construction- II, III, IV, BFD 456 Minor Project, BFD 552 Men's Wear, BFD 651 Graduation Design Collection

Course Objectives:

1. To impart knowledge about the stitching of different elements of garment
2. To explain how different seam are finished and stitched.
3. To explain the stitching of pleats, tucks, gathers and darts for fabric manipulation
4. To impart knowledge about finishing of neckline through different ways.
5. To give knowledge about stitching and finishing of collar and plackets.
6. To explain the stitching of 5 basic block.

Detailed Syllabus

Module I: Seams and seam finishes

Plain seam, Lapped seam, French seam, Welt seam, Mock French seam, Run and fell seam.

Module II: Fabric manipulation like darts, pleats, gathers and tucks

Types of Pleats: knife, box, accordion, inverted box, kick pleats, Types of tucks- pin, space, cross, shell and release.

Module III: Necklines

Various types of necklines and their finishes

Module IV: Plackets

Various types of plackets and their finishes

Module V: Constructions of collar

Various types of collars and their finishes

Module VI: Construction of basic pattern set

Text and References books:

Editor of Reader Digest., "A New complete guide to sewing", 2010

Muller, C., "The Timeline of World Costume: From Fig Leaf to Street Fashion", 1993, 01 edition, Thames & Hudson Ltd.

Peacock, J., "The Chronicle of Western Costume: From the Ancient World to the Late Twentieth Century", 2019., 01 edition Thames and Hudson Ltd.

Johnston, L ., "19th-Century Fashion in Detail: 1800 - 1900 (Victoria and Albert Museum)" 2016., 01 edition., Thames and Hudson Ltd.

Beukel, D.V., "A Pictorial History of Costume (Pepin Press Design Books)" 1998, 1st Edition, Pepin Press.

Ebooks:

Practical Sewing and Dress Making -

http://brittlebooks.library.illinois.edu/brittlebooks_open/Books200912/allisa0001prasew/allisa0001prasew.pdf

Sewing Lessons For Beginners – http://www.go-woman.com/wpcontent/uploads/factsheets/FREE_Sewing_Book.pdf

Course Outcomes:

After completing the course, students will be able to:

1. Understand how different elements of garment are stitched and finished.
2. Understand how different collars and plackets are attached and finished.
3. Understand how necklines are finished by different techniques.
4. Know that how a fabric can be changed from 2d to 3d structures by use of tucks, darts, gathers and pleats.
5. Differentiate between seam and their finishing
6. Knowledge of how different part of basic patterns are stitched and finished.

BFD 254: ELEMENT OF DESIGN-II

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD351- Fashion Art and Design, BFD456- Minor Project, BFD651- Graduation Design Collection

Course Objectives:

1. To give complete knowledge of principle of design.
2. To give an overview on different parts of principle of design.
3. To explain the concept of composition making and there elements with the help of principle of design.
4. To give knowledge of different styles involved in the principle of design with its theory.

Detailed Syllabus

Module I: Using the elements of design with principles of design

Meaning, different principles of design & theoretical and practical application of Balance, Proportion, Rhythm, Emphasis, Repetition, Unity and harmony.

Module II: Balance

Module III: Proportion

Module IV: Rhythm

Module V: Emphasis

Module VI: Harmony

Traditional and contemporary, Stylized and Naturalistic, Floral and Geometrical, Abstract and Replicas.

Fibonacci series-introduction and its application

.

Module VII: Different types of Designs

Text and References books:

2. Fashion design, By Sue Jenkyn Jones,
3. Fashion by Design, By Janice G Ellinwood,
4. Elements of design, By Gail Greet Hannah,
5. The fashion design manual, By Pamela Stecker,
6. Principles of Form and Design, By Wucius Wong,
7. Elements of design, By Donald M. Anderson,
8. Elements of design, By Rowena Reed Kostellow,

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| 9. The elements of design: rediscovering colors, textures, forms, and shapes,
ByLoanOei,
10. Cecile De Kegel, |
|---|

Course Outcomes:

After completing the course, students will be able to:

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|--|
| 1. Understand the various techniques or methods of elements of design. |
| 2. Understand about the various principles of design. |
| 3. Understand how we can creatively fill the blank space with the principle of designs. |
| 4. Understand the principles of design and its application in the fashion industry |
| 5. Understand the different elements of design features and their appropriate use according to space and material available. |
| 6. Understand the behavior of design elements and its use in our day to day life whatever we observe in our surrounding. |

BFD 255: Fashion Model Drawing	
Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD456- Minor Project, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of fashion modal making
2. To give an overview of different techniques involved in fashion modal making.
3. To explain the concept of fashion modal making.
4. To give knowledge of different tools and colors used in fashion modal making.

Detailed Syllabus

Module I: Study of human anatomy in relation to fashion proportions (male & female). Introduction to the basic 8 head figures, 10 head figures and 12 head figures, drawing through Observation.
Module II: Photo analysis (female) Collection of photographs and then drawing them
Module III: Sketching of block and flesh figures (female& male) Front view, Back view, 3/4th view and Side view
Module IV: Tilted figures (female) The basic block and flesh figures, sketching of nude figures with pencil- front pose, back pose, one fourth turned, half turned, three- fourth turned etc.
Module V: Movement in fashion figures (female) Concept of movement in figures, arms and legs.
Module VI: Face features, hands, feet and hairstyles (female)
Module VII: Illustration of draped garments (female)
Module VIII: Use of Different Colour Mediums (female) Study in pencil with light and shade of different types of folds and gathers; use of different color mediums- shading pencils, oil and dry pastels, pencil colors and Staedtler, water and poster colors, charcoal pencil.
Text and References books: 1. IL Figurino di Moda, By Fernando Burgo 2. Fashion Rendering, By Ranjana Singhal & Kannaki Bharali

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of Fashion Modal making
2. Understand about the various tools and equipment's used for fashion modal making
3. Understand the measurements and proportion of human body.
4. Understand the different techniques and different forms available in fashion modal making.
5. Understand the different elements of design features and their appropriate use according to its need
6. Understand the rendering process of the human body.

BFD 256 Digital Design-I	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD551&652- Portfolio Development-II, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. Describe the all techniques of transforming images.
2. To give the knowledge of creating layers.
3. To introduce the all editing tools of photoshop.
4. To explain the all file formats.
5. To give the knowledge of layer masking.
6. Explain the all process of layers effects.

Detailed Syllabus

Module I: Introduction of Photoshop software
Module II: Introduction of Tools All details related to tools, how we use different tools for different things.
Module III: Uses of tools Like pen tool, quick selection tool, patch tool, blur tool etc.
Module IV: Creating Prints and Patterns By using different tools how we can create different type of prints and patterns.
Module V: Photo Editing In this process student will learn how to edit a photograph.
Module VI: Mood board Design In this module students will learn how to create different type of boards like mood board, inspiration board etc.
Module VII: All Masking
Text and References books: 1. Embroidery in Asia Sui Dhaga, Kapila Vatayayan 2. Traditional Embroideries of India, By Dr. Shailaija D. Naik

Course Outcomes:

After completing the course, students will be able to:

1. Understand the work with photoshop workspace.
2. Understand about the create new layers and perform other basic layer function.
3. Create print and share and save your image in various formats.
4. Understand the work of layer mask, filters and blending modes.
5. Understand the tool panel, layers panel window panel.
6. Create the all boards with help of photoshop and layer masking.

BFD 301: Fashion Forecast-I	
Teaching Scheme Lectures: 3 hr./ week Labs: Nil Tutorials: 1hr./week Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD 401, BFD 501 Fashion Forecast-II, III, BFD 456 Minor Project, BFD 551 Portfolio Development BFD 651 Graduation Design Collection

Course Objectives:

7. To explain in detail the importance of **concept of fashion forecast**
8. To give knowledge of fashion elements that help in creating fashion forecast
9. To give an **overview of different fashion terminology**
10. To explain what different factors that affects fashion forecast and how fashion forecasting is done
11. To give complete knowledge of importance of creative writing
12. To provide knowledge of **fashion magazines, sources of design**

Detailed Syllabus

Module I: Concept of fashion forecasting

Elements of fashion forecasting: Definition, Factors affecting fashion forecasting, Awareness of fashion trends, fairs and international centers, Sources of fashion forecast

Fashion elements: Types of silhouettes, Type of body shapes, Clothing categories for women, men's and children

Module II: Fashion theories: Fashion cycle, and theories, terms related to fashion,

Study of fashion trends: Source of design, sources of forecasting fashion trends

Fashion forecast magazines: International and Indian fashion magazines,

Knowledge of creative writing

Module III: Interpretation of fashion trends and forecast

Module IV: Steps in fashion forecasting

Text and References books:

McKelvey, K., "Fashion Source Book", 1996, 1st edition, Wiley-Blackwell.

[Brannon](#), E. L., "Fashion Forecasting"., 2002

Phaidon Editors., "The Fashion Book".2016. Phaidon Press

Ireland, P. J. and Ireland, P., "Introduction to fashion design", 2003, Batsford

[Scully](#), K., and [Cobb](#), D. J. Color Forecasting for Fashion., 2012., Thames & Hudson

Tate, S. L., "Inside fashion design" , 1998,4 th Edition, Longman Pub Group

Course Outcomes:

After completing the course, students will be able to:

7. Understand the importance of fashion forecasting for designers, manufacturers, retailers and consumers
8. Understand the source of design creation and data for fashion forecasting
9. Understand about the various International and Indian magazine that support relevant data forecasting
10. Understand the importance of silhouette, body shapes and creativity writing in the field of fashion
11. Analyze the difference between the clothing categories of women, men and kids
12. Understand how fashion forecasting is done by forecasters like designers, blogger, models, fashion leaders, celebrities

BFD 302: Fashion Illustration And Appreciation-I	
Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD503- Industrial Learning and Internship

Course Objectives:

- 1.To give complete knowledge of national and international designer.
- 2.To give an overview of fashion show and how it works on different scale.
- 3.To explain the concept about the designer creativity and level of platform in which they work.

Detailed Syllabus

Module I: Appreciation of International Fashion Designers

A brief history of any four western designers
Collection and illustration work of these designers.
The famous designs of these designers
The signature style of these designers
The shows, studios and expertise of these designers

Module II: Study of fashion shows and collection development

A brief study of how fashion shows take place, complete procedure behind a fashion show, shows of different Indian and International designers.

Text and References books:

1. Fashion Kaleidoscope, by Meher Castelino Rupa and companshion Book
2. The fashion Book, By Phaidon Editors
3. Indian Fashion, by Hindol Sengupta
4. Fashion Rendering, By Ranjana Singhal and Kannaki Bharali
5. Fashion Design and drawing by Elisabetta Drudi Batsford and presentation.
6. How Fashion Works by Gavin Waddell Blackwell

Course Outcomes:

After completing the course, students will be able to:

1.Understand the working of a fashion show on different levels.
2.Understand about the different departments and there working during conducting the show
3.Understand how we can creatively display our work with different channels or organization.
4.Understand the working of famous designers and how they work on a big level.

BFD351 Fashion Art and Design – I

Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks
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Prerequisite: BFD451 Fashion Art & Design-II, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To give an overview knowledge of forecast and trend.
2. To give complete knowledge of market survey.
3. To describe art and designs elements.
4. To give the knowledge of all boards and working on inspirations and theme.
5. To give the knowledge of development of design range.

Detailed Syllabus

Module I: Concept Development based on market survey

Development of original design ideas and concepts, using elements and principles of art and design in creating fashion designs as per market survey and trends

Module II: Design process on the basis of current trend

Development of boards, working on theme, study and application of forecast, development of design range

Text and References books:

1. Fashion Source Book, By Kathryn McKelvey
2. The Fashion Book, By Phaidon Editors

Course Outcomes:

After completing the course, students will be able to:

1.Understand about the design range.
2.Understand about the work on theme.
3.Figure out the all concept of market survey.
4.Understand the use elements and principles of art and design.
5.Understand about the knowledge of hand portfolio.
6.Understand the all knowledge of developments of boards.

BFD 352: Advance Pattern Making –I

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 452 Advance Pattern Making II, BFD 552 Men's Wear, BFD 456 Minor Project, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge about dart manipulation principles.
2. To explain different methods of dart manipulation.
3. To give an overview of how fullness and contouring affects the appearance of dress.
4. To explain the difference between various types of cowl: front, back and armhole.
5. To explain the pattern making procedure for skirt, trousers, dress and their variations.
6. To give knowledge about the incorporation of dart manipulation principle during preparation of final garment.

Detailed Syllabus

Module I: Pattern making techniques: Slash and spread technique and pivotal transfer technique; Single dart and double dart pattern

Dart manipulation principles: Dart manipulation, Added fullness and Contouring and their application

Module II: Cowls neck lines- Single drape, double drape, triple drape

Module III: Skirts variations by using flat pattern technique

One-piece dress variations by using flat pattern technique

Trouser variations by using flat pattern technique

Module IV: Pattern making of two garments applying dart manipulation principles

Text and References books:

Armstrong, H.J., "Pattern making for fashion design", Pearson, 5th edition 2018.

[Knowles](#), L. A., "Practical Guide to Patternmaking for Fashion Designers: Juniors, Misses and women", 2005, Fairchild Books

Holman, G., "Pattern cutting made easy: A Step-by-Step Introduction, 2013

Cooklin, G., "Pattern cutting for women's outerwear", 1994

Rajput, C., A Professional Approach to Garment Construction and Pattern Making (Fashion Designing), 1st edition, 2001

Course Outcomes:

After completing the course, students will be able to:

1.	Understand the techniques of single and double dart manipulation
2.	Understand the manufacturing of various types of cowl necklines
3.	Understand about the variation in pattern of different types of skirts
4.	Understand about the pattern in different variation of trousers and one piece dresses.
5.	Analyze the difference between fullness and contouring in garments
6.	Understand that how dart manipulation principles can be applied during garment construction

BFD 353: Garment Construction-II

Teaching Scheme Lectures: 1 hr./ week Practical: 1hrs/week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 marks End Semester Exam: 35 Marks
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Prerequisite: BFD 452, BFD553 Garment Construction- III, IV, BFD 456 Minor Project, BFD 552 Men's Wear, BFD 651 Graduation Design Collection

Course Objectives:

13. To give knowledge about the stitching of different elements of garment like pockets, necklines.
14. To explain how different parts in garments are finished after stitching.
15. To explain what all specification are required to stitch a properly designed garment.
16. To give actual demonstration how to stitch various styles of skirts, trousers and one-piece garments
17. To give knowledge about stitching of designer's clothes.
18. To explain that stitching is important part of garment construction in terms of designer or manufacturer.

Detailed Syllabus

Module I: <ul style="list-style-type: none">• Fasteners and their usage: Button and button hole, Hook and eye, Velcro• Cowls neck lines: Single drape, double drape, triple drape• Finishing of necklines: Shaped facing, Bias facing, Bias binding
Module II: Construction of various pocket <ul style="list-style-type: none">• Patch pocket and its variations• Flap pocket and its variations• In-set pocket and its variations• Bound pocket and its variations
Module III: Construction of garments <ul style="list-style-type: none">• Any two variations in skirt• Any two variations in one-piece dress• Any two variations in trouser
Module IV: Construction of two garments applying dart manipulation principles
Text and References books: <p>Editor of Reader Digest., "A New complete guide to sewing", 2010</p> <p>Muller, C., "The Timeline of World Costume: From Fig Leaf to Street Fashion", 1993, 01 edition, Thames & Hudson Ltd.</p> <p>Peacock, J., "The Chronicle of Western Costume: From the Ancient World to the Late Twentieth Century", 2019., 01 edition Thames and Hudson Ltd.</p>

Johnston, L ., “19th-Century Fashion in Detail: 1800 - 1900 (Victoria and Albert Museum)” 2016., 01 edition., Thames and Hudson Ltd.

Beukel, D.V., “A Pictorial History of Costume (Pepin Press Design Books)” 1998, 1st Edition, Pepin Press.

Course Outcomes:

After completing the course, students will be able to:

13. Understand to finish the stitch garment.
14. Understand how different elements like pockets and necklines are attached and finished.
15. Understand about specification required to stitch garment.
16. Stitch different variations of skirts, trousers and one-piece dresses.
17. Differentiate between designers and mass production in terms of stitching
18. Knowledge of how designers' clothes are actually stitched

BFD 354 Photography Module	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To provide the basics **knowledge of photography**.
2. To give the basic working knowledge of a DSLR camera.
3. Describe the elements of photographic lenses.
4. Explain the all **accessories of camera**.
5. To give the knowledge of **indoor and outdoor shoot**
6. Describe the types and principles of fashion photography.

Detailed Syllabus

Module I: Basics of Photography, Basic working of a DSLR camera, Handling Still Camera, Lenses, Photo films, Black and White, Compositions of films, Camera Angles, Lenses– controlling the image, Photographic lenses – prime & zoom lens, angle of view (Narrow & Wide Angle Lens), Aperture, Focal No. & Focal Length, Depth of focus, Depth of Field and how they work, Lens care..
Module II: Lighting, Equipment's, Focusing Lenses, Multi Camera Techniques, Special effects, learning about Software's, Shooting an outdoor or any monument, Lens perspective, film speed, flash gun, light meter Exposure Measurement of light – exposure metering system, Exposure control – relationship between shutter speed and aperture, Camera accessories: Tripod, monopod, filters, Lens hood.
Module III: Shooting of a product by creativity, appropriate background and Composition/ see the colors / Black & White. Outdoor Shoot: using Digital SLR and Mobile camera/developing an idea and practice taking a Photo feature on a specific topic by using self- clicked photographs from Digital Camera, Photographs should be of postcard size. Assignments on various lights effects. Shooting 'Textures' or various kinds of styles to get an idea of overall fashion.
Module IV: Fashion photography: Principles, types, history and application.
Module V: Visit to a studio.
Text and References books: 1.Basic Photography — John Hedgecoe. London: Collins & Brown 2.The Color Photo Book — Andreas Feininger. New Jersey: Prentice-Hall

Course Outcomes:

After completing the course, students will be able to:

1.Understand about the knowledge of basic photography.
2.Understand about the working knowledge of DSLR.
3.Understand the knowledge of photography's elements.
4.Understand about the knowledge of advance photography with indoor and outdoor shoot.
5.Understand the knowledge of lenses of photography.
6.Understand about the knowledge types and principles of fashion photography.

BFD355 Surface Ornamentation-I

Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD455 Surface Ornamentation-II , BFD451 Fashion Art & Design-II , BFD501 Fashion Forecast-III, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. Describe the all techniques hand embroidery.
2. To give the knowledge of traditional embroidery.
3. To introduce the all printing methods.
4. To explain the all painting.
5. To give the knowledge of how to use one to three techniques in single fabric.

Detailed Syllabus

Module I: Embroidery: Machine embroidery and Hand embroidery using different stitches
Module II: Painting: Tie & Dye, Batik, Worli painting & Madhubani painting
Module III: Printing: Block printing, Screen printing, Stencil printing and Painting
Module IV: Visit to handicraft market
Text and References books: 1. Embroidery in Asia Sui Dhaga, KapilaVatayayan 2. Traditional Embroideries of India, By Dr. Shailaija D. Naik

Course Outcomes:

After completing the course, students will be able to:

1. Understand the work of techniques of embroidery.
2. Understand about the stitches of embroideries.
3. Understand about the painting.
4. Understand about the techniques of printing.
5. Understand about the advance knowledge of hand embroideries.
6. Create the one article using the all techniques.

BFD 356: DIGITAL DESIGN-II

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD456- Minor Project, BFD652- Portfolio Development, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of basic of digital design through Illustrator.
2. To give complete knowledge about the different tools and use of the software.
3. To explain the concept of digital designing in fashion.
4. To give knowledge about the different formats through which we can display are products digitally.

Detailed Syllabus

Module I: Introduction of software (Adobe Illustrator)
Module II: Introduction of Tools, how to use different tools at correct place.
Module III: Uses of tool like pen tool, curve tool, shape tool, tracing tool etc.
Module IV: Creating Prints and Patterns, how to create different print and patterns by using Different tools.
Module V: Flat Sketching and coloring, by using different tools creating illustration, color Blocks, motifs and flat sketches of garments.
Module VI: Fashion Illustration, packaging Designing, t-shirt print designing
<i>Text and References books:</i> <ol style="list-style-type: none">1. Illustrator for beginners-by Tastytuts (e-book)2. Illustrator workshop-by Jeff (e-book)

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of an illustrator software
2. Understand about the various tools and equipment's used for the illustrator
3. Understand how we can creatively display our work through the digital platform.

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| 4. Understand the importance of digital designing in fashion word in the current scenario. |
| 5. Understand the different elements of design features and their appropriate use through illustrator. |
| 6. Understand the different field in which we can use the illustrator. |

BFD 401 FASHION FORECAST-II

Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD451 Fashion Art & Design-II, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To give the knowledge of marketing concept.
2. Describe the marketing mix.
3. To introduce the new product development.
4. To give the knowledge of product mix, product life cycle.
5. To explain the difference between distribution and marketing channels.
6. Explain the merchandising.

Detailed Syllabus

Module I:

Introduction, meaning, nature, functions, importance of marketing
Definitions of Marketing, Concept of Marketing
Marketing Mix - Segmentation - Targeting - Positioning
Analysis of consumer markets and buyer behavior

Module II:

Product Mix, Product Life Cycle, New Product Development
Promotion Mix.
Pricing Objectives & Pricing Methods
Distribution Channels: Types, Levels, Development.
Marketing channels, wholesaling.

Module III:

Merchandising-definition, role and responsibilities of a merchandiser
6 months merchandising plan-buying calendar
Retail fashion promotion – sales promotion, advertising, branding, public relation, special events
Retailing- types of retail operations
Fashion Retail Management

Text and References books:

1. Fashion Marketing and merchandising, By Mary G. Wolfe
2. Principles of Marketing by Philip Kotler 11th edition
3. Essentials of Marketing by Stanton & Futrell
4. Fashion Innovation & Marketing by Catherine Moore
5. How to sell Fashion by Annalee Gold

Course Outcomes:

After completing the course, students will be able to:

1.	Understand about the marketing and marketing mix.
2.	Understand the all knowledge of product and production mix.
3.	Understand the working process of promotion mix.
4.	Understand the knowledge of merchandising plan.
5.	Understand about the all techniques of merchandising.
6.	Understand about the retail fashion promotion and sales promotion.

BFD402 Fabric Studies	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD453 Garment Construction-III, BFD451 Fashion Art & Design-II, BFD454 Draping Techniques-I , BFD553 Garment Construction-IV , BFD554 Textile Project , BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. Describe the all methods of fabric formation.
2. To give the knowledge of natural fabrics and synthetic fabrics.
3. Describe the properties of fabrics.
4. To introduce the pile fabric and knit fabric.
5. To give the knowledge of all trims and fasteners.
6. Explain the all glossary of the fabrics.

Detailed Syllabus

Module I: Different methods of fabric formation: weaving, knitting and bonding
Module II: Study of the different types of natural fabrics and their properties: Cotton fabric, Wool fabric and Silk fabric.
Module III: Study of the different types of synthetic fabric and their properties: Rayon, polyester and nylon
Module IV: Study of the different types of Pile Fabrics and Knit Fabrics.
Module V: Glossary of other fabric terms and suitability of different fabrics for various types of garments
Module VI: Study of the different types of Trims and Fasteners, Facing, Interfacings and Interlinings.
Module VII: Visit to Textile Industry.
Text and References books: 1. Fabric for fashion the swatch book by Amanda Johnston 2. Fundamentals of textiles & their care, By Shuseela Dhantyagi

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the knowledge of fabric formation of weaving, knitting and bonding.
2. Understand the properties of all natural and synthetic fabrics.

3. Understand about the knowledge of natural and manmade fabrics.
4. Understand the all fabric trims, fasteners, facing and interlining.
5. Understand the glossary of other fabric terms.
6. Understand about the fibers and yarns.

BFD 403 PERSONALITY DEVELOPMENT

Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of body language, personal appearance.
2. To give an overview of SWOT analysis of personality.
3. To explain the skills for a good leader.
4. To describe all elements of stress management.
5. To give the knowledge of time management.
6. To give the knowledge of personal interview.

Detailed Syllabus

Module I: Introduction to Personality Development

Introduction to personality, SWOT Analysis, Increasing Vocabulary, Presentation: Individual power point Presentation.

Body language: Personal Appearance, Gestures-Postures etc. Activities: Word Association test (WAT), PPT Presentation, Role play, Case study (SWOT Analysis)

Module II: STRESS MANAGEMENT

Causes of stress and its impact, how to manage & distress, circle of control, stress busters.

Emotional intelligence, what is emotional intelligence, emotional quotient, why emotional intelligence matters, emotion scales, managing emotions. Activities: Personal Information questionnaire (PIQ), SRT (Situation Reaction Test), Case studies etc.

Module III: TIME MANAGEMENT

Concept, Importance and needs.

Activities: Group Task, Team and management games, Questionnaire etc.

Module IV: LEADERSHIP TRAITS

Skills for a good Leader, Assessment of Leadership Skills

Conflict Management: Levels of conflict, managing Conflict.

Activities: Theater class (Leadership Lessons), Team Building, Employee engagement tools etc.

Module V: PERFORMANCE APPRAISAL

Vertical, horizontal and 360-degree, Self-Introduction, Impromptu

Personal Interview sessions (MOCK Interviews)

Activities: Lecture cum discussions, Industrial Perspective, Role playing, and Questionnaire

Text and References books:

1. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998.
2. Carnegie Dale, how to win Friends and Influence People, New York: Simon & Schuster, 1998.

3. Thomas A Harris, I am ok, you are ok.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Understand the knowledge of body language and personal appearance. |
| 2. Understand about the SWOT analysis of personality. |
| 3. Understand about the skills for a good leader. |
| 4. Understand the all elements of stress manage concepts. |
| 5. Understand about the knowledge of time manage. |
| 6. Understand the knowledge of personal interview. |

BFD 451: FASHION ART AND DESIGN II

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 455 Surface Ornamentation-I-II, BFD 456 Minor project, BFD 454-653 Draping Techniques I-II, BFD 552 Men's Wear, BFD 554 Textile Project, BFD 555 Grading, BFD 551-652 Portfolio Development, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of process of design development and illustrating it creatively.
2. To give an overview on different process of design development.
3. To explain the concept of illustrating creative process.
4. To give knowledge of market survey and branding.

Detailed Syllabus

Module I: Design development and illustrating creative process

Range planning and development, development of designs and detailed technical information, Specifications and description of developed designs, cost sheets.

Module II: Designer sketching, Design illustrations, Rendering for upcoming season trends

Text and References books:

1. Fashion Source Book. By Kathryn McKelvey
2. The fashion book, By Phaidon Editors
3. Fashion designs and illustrations
4. Introduction to fashion design, By Patrick John Ireland,
5. Inside fashion design Simplicity
6. Encyclopedia of fashion detail, By Patrick John Ireland
7. 5. Fermina, Elle, FNL, Apparel views to consult

Course Outcomes:

After completing the course, students will be able to:

19. Understand the various techniques or methods design development
20. Understand about the various paperwork involve in design development.
21. Understand how a brand is developing by doing the market survey.
22. Understand the principles of illustrating the brand research.
23. Understand the different elements of design features and their appropriate use according to the brands available in market.
24. Understand the optical illusion created by the basic styles available in market.

BFD 452: Advance Pattern Making -II

Teaching Scheme Lectures: Nil Labs: 2hrs/week Tutorials: 1 hr./ week Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 552 Men's Wear, BFD 456 Minor Project, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge about construction of design features in women's garments
2. To explain the conversion of torso to bridal wear
3. To give an overview of stitching of female Indian traditional wear
4. To explain the difference between male and female night wears
5. To explain the pattern making and construction of various blouse styles.
6. To give knowledge about construction details of western wear.

Detailed Syllabus

Module I: Adapting torso block to evening gown and bridal wear variations.

Module II: Drafting of saree blouse and its variations.

Module III: Drafting of Kurta, Salwar, Churidar.

Module IV: Drafting of Bath robe.

Module V: Drafting of male and female nightwear.

Module VI: Drafting of western dress.

Text and References books:

Armstrong, H.J., "Pattern making for fashion design", Pearson, 5th edition 2018.

Norma R. H and Carolyn J. K. Pattern Making by the Flat-Pattern Method. 1998. 8th Edition. Prentice Hall

[Mortimer-Dunn](#), G. Pattern designs for children clothes. 1996. B T Batsford Ltd.

Knowles, L. A., "Practical Guide to Patternmaking for Fashion Designers: Juniors, Misses and women", 2005, Fairchild Books

Holman, G., "Pattern cutting made easy: A Step-by-Step Introduction, 2013

Cooklin, G., "Pattern cutting for women's outerwear", 1994

Rajput, C., A Professional Approach to Garment Construction and Pattern Making (Fashion Designing), 1st edition, 2001

Zarapkar, K.R. A system of cutting. 2008. Navneet Publications

Course Outcomes:

After completing the course, students will be able to:

1. Understand the construction and finishing of details in female garments
2. Understand the manufacturing female Indian wear
3. Understand about the variation in pattern of different types of blouse for Indian and western wear
4. Understand about adaptation of torso for construction of bridal wear.
5. Analyze the difference between construction of female and male wear.
6. Understand that how design details are stitched and finished.

BFD 453: GARMENT CONSTRUCTION-II

Teaching Scheme Lectures: 1 hr./ week Practical: 1hrs/week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 marks End Semester Exam: 35 Marks
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Prerequisite: BFD553 Garment Construction- IV, BFD 456 Minor Project, BFD 552 Men's Wear, BFD 651 Graduation Design Collection

Course Objectives:

1. To give knowledge about the stitching of formal wear for women's.
2. To explain how princess line dress and their variation are stitched and finished.
3. To explain difference in construction of cape/ poncho/kaftans/ shrug.
4. To explain construction details of beach or resort wear.
5. To give knowledge about stitching unisex garments.

Detailed Syllabus

Module I: Construction of formal two-piece dress: formal top/vest and skirt
Module II: Construction of princess line dress and variation.
Module III: Construction of cape/ poncho/ kaftans/ shrug.
Module IV: Construction of resort wear/ beach wear.
Module V: Construction of unisex garment.
Text and References books: Editor of Reader Digest., "A New complete guide to sewing", 2010 Muller, C., "The Timeline of World Costume: From Fig Leaf to Street Fashion", 1993, 01 edition, Thames & Hudson Ltd. Peacock, J. , "The Chronicle of Western Costume: From the Ancient World to the Late Twentieth Century", 2019., 01 edition Thames and Hudson Ltd. Johnston, L ., "19th-Century Fashion in Detail: 1800 - 1900 (Victoria and Albert Museum)" 2016., 01 edition., Thames and Hudson Ltd. Beukel, D.V., "A Pictorial History of Costume (Pepin Press Design Books)" 1998, 1st Edition, Pepin Press. Peacock, J. Fashion Source Book, The 1960's, the 1970's the 1980's. 1998. Thames & Hudson

Press, P. Pictorial History of Costumes. 1998. Costume & Fashion Press/Quite Specific Media

Jack Cassin Scott, J.C. Illustrated Encyclopedia of Costume and Fashion. 2000. 2nd Edition. Brockhampton Press.

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the stitching of formal wear.
2. Understand how different princess line dress are attached and finished.
3. Understand about specification required to stitch cape/ poncho/kaftans/ shrug.
4. Stitch different variations of beach or resort wear
5. Differentiate between designers and mass production in terms of stitching
6. Knowledge of how unisex dresses are constructed.

BFD 454: Draping Techniques -I	
Teaching Scheme Lectures: 1 hr./ week Practical: 2 hrs/week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12 Marks Teachers Assessment: 6 Marks Attendance: 12 Marks End Semester Exam: 70 Marks

Prerequisite: BFD 456 Minor Project, BFD 651 Graduation Design Collection, BFD 653 Draping Techniques.

Course Objectives:

- 1.To impart knowledge about the importance of draping in fashion field.
- 2.To give knowledge about principles and techniques of draping.
- 3.To impart knowledge about draping of basic blocks.
- 4.To explain the procedure of draping of sleeve and skirt.
- 5.To give actual demonstration for dart manipulation in draping.
- 6.To give knowledge about draping of cowl, skirt variation and pleated garments.

Detailed Syllabus

Module I: Introduction to Draping Principles of draping, Methods of Draping, Draping Techniques, Tools and equipment's needed, Dummy Preparation.
Module II: Draping of Basic bodice.
Module III: Draping of Basic skirt.
Module IV: Draping of Basic sleeve.
Module V: Bodice variations using dart manipulation.
Module VI: Draping of cowls, pleated garments.
Module VII: Skirt variations
Text and References books: Armstrong , H.J., Draping for Apparel Design. 2013. 3 rd Revised edition. Bloomsbury Publishing India Private Limited. Jaffe, H and Relis, N., Draping for Fashion Design. 1994. 2 nd edition. Pearson Education (US). Crawford, C.A. The art of Fashion Draping. 2012. 4 th Edition. Fairchild Books Christain, N. The Art of Draping. 2011. Esmod Editions. Cloake , D. Cutting and Draping Party and Eveningwear: Dressmaking and pattern cutting for special occasion clothes. 2016. Batsford Ltd.

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the importance techniques and principle of draping
2. Understand importance of draping technique in field of fashion industry.
3. Understand about the draping of basic bodices, sleeve and skirts.
4. Understand procedure of dart manipulation by draping techniques.
5. Explain the draping procedure of cowl and pleated garments.
6. Explain the procedure for draping of skirt variation.

BFD 455 SURFACE ORNAMENTATION-II

Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD554 Textile Project, BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To provide the knowledge of design process.
2. To give the knowledge of initial design concepts, theme and inspiration.
3. Describe the knowledge of traditional painting and Art.
4. To develop the final design of a garment concepts.
5. To give the knowledge of 3D boards.

Detailed Syllabus

Module I: To provide students a sound foundation for any design work based on Creativity and technical knowledge and to create a conscious awareness regarding each step in the design process.

Module II: To develop the ability to understand a theme and demonstrate this understanding in the form of a 3-dimensional theme board, initial concepts and a final design of a garment.

Module III: To use the surface design skills like the dye, embroidery etc. for creating fabric ideas for the final garment and to learn to derive a color palette from the theme or source of inspiration.

Module IV: To develop the ability to verbally present their own work/designs to clients during class hours in mock presentation every week.

Text and References books:

1. Traditional Embroideries of India, By Dr. Shailaija D Naik
2. Embroidery in Asia Siu Dhanga, By Kapila Vatayayan

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the knowledge of design range.
2. Understand the all concepts of collection.
3. Understand about the knowledge 3D boards like inspiration board, mood board, theme board and category board.
4. Understand about the ability to verbally present their own work.
5. Understand about the advance techniques of traditional paintings.
6. Understand about the advance techniques of surface embellishment.

BFD 456: MINOR PROJECT

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD552- Men's Wear, BFD553- Garment Construction, BFD653

Course Objectives:

- 1.To give complete knowledge of how the fashion show is done.
- 2.To give an overview of different methods they have learned in their previous semester.
- 3.To explain the concept about the fashion range development according to the latest trends.
- 4.To give knowledge about how the designer do there market research and how the styling is done accordingly.

Detailed Syllabus

Module I: Working on the inspiration/ theme and developing a product range.
Module II: Presentation & Viva Submission of the Report
<p>Text and References books:</p> <p>Note:</p> <p>1. Please note that since this is a project-based subject the students would not be consulting any books but Instead would have to conduct surveys and search for websites relating to forecasts, latest trends, fabrics, Design as well as silhouettes so that they can prepare their collection accordingly. They will also visit the Market, place for sourcing.</p> <p>References:</p> <p>1. Color Forecasting, By Tracy Diane and Tom Cassidy</p> <p>2. Apparel Online, Apparel Views, Clothesline, Moda, Vogue, and Simplicity etc. to be consulted regularly</p>

Course Outcomes:

After completing the course, students will be able to:

1. Understand how fashion show is done.
2. Understand about the various steps involved in making the fashion range.
3. Understand how we can creatively display our work by showing them on ramp.
4. Understand the importance of doing the fashion show.
5. Understand the different elements of design features and their appropriate use according to space and material available.
6. Understand the previous subjects and its importance in the fashion industry.

BFD501 Fashion Forecast-III	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD456 Minor Project, BFD651 Graduation Design Collection

Course Objectives:

1. To provide the knowledge of visual merchandising.
2. To give the knowledge of techniques of merchandising.
3. Describe the elements and tools of visual merchandising.
4. Explain the all window display.
5. To give the knowledge of brands national and international.

Detailed Syllabus

Module I: Concept of Visual Merchandising.
Module II: Elements, tools and techniques of visual merchandising.
Module III: Study the brand signature in visual merchandising
Module IV: Window display Prepare the window display for a theme.
Module V: Visit to mall
Text and References books: <ol style="list-style-type: none"> 1. Fashion designs and illustrations 2. Introduction to fashion design, By Patrick John Ireland 3. Inside fashion design Simplicity 4. Encyclopedia of fashion detail, By Patrick John Ireland, 5. Femina, Elle, FNL, Apparel views to consult

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the knowledge of windows display.
2. Understand the knowledge of blocking and themes.
3. Understand about the knowledge of good store layouts.
4. Understand about the merchandising techniques.
5. Understand the knowledge of presentation of the product.
6. Understand about the advance knowledge of visual merchandising according to theme and stories.

BFD 502: ORGANIZATIONAL BEHAVIOUR

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD 456 Minor project, BFD 551-652 Portfolio Development, BFD 651 Graduation Design Collection, BFD 503 Industrial Learning and Internship

Course Objectives:

19. To give complete knowledge of organizational behavior.
20. To give an overview of different business ethics in fashion world.
21. To explain the concept of professional behavior in an industry or business.
22. To give knowledge of teamwork.

Detailed Syllabus

Module I: Introduction: Concept, nature, scope and importance of Organizational Behavior. It's interdisciplinary nature. Hawthorne experiments.

Module II: Perception: Definition, factors influencing and importance of perception. Perception process, perceptual errors and distortions due to stereotypes, halo effects, projection, Self-serving bias and attribution error and selective perception.
Attitude: Concept of Attitude, Attitude and behavior, attitude formation, factors determining Attitude formation, Attitude measurement.

Module III: Motivation: Importance of Motivation. Theories of motivation – Maslow's, Herzberg's, McClelland's. McGregor's theory, Merits and demerits.
Learning: Principles of learning. Factors in Human learning. Theories of Learning, Types of Reinforcement

Module IV: Personality: Definition, factors in shaping of personality, Theory of personality development by Freud, Personality traits influencing OB.

Module V: Inter-personal behavior: Importance of inter-personal relationships in organizations, Transactional analysis and its applications in organizations-JOHARI window and its managerial applications
Group Dynamics: Concept of Groups & team. Types of Groups. Theories of Group Formation. Life cycle of group, Group norms and roles.
Leadership: Types of Leader and styles. Stress Management and counseling.

Module VI: Conflict and Change: Meaning and Process of conflict, causes, sources, Consequences of conflict, conflict resolution strategies. Types of change, identification of the Problem and implementation of change, resistance to change, overcoming resistance to change.

Text and References books:

- 1. Organizational Behavior by Fred Luthans**
- 2. Organizational Behavior by Stephen P. Robbins**

Course Outcomes:

After completing the course, students will be able to:

25. Understand the working behavior of a business or industry.
26. Understand about the personality development in an organization.
27. Understand how we can work ethically in an organization.
28. Understand the principles of leadership and team work in an organization.
29. Understand the different work environment in any organization.
30. To increase the motivation and perception power of any worker.

BFD 503: INDUSTRIAL LEARNING AND INTERNSHIP

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD651- Graduation Design Collection, BFD652- Portfolio Development-II

Course Objectives:

1. To give complete knowledge of different sectors of fashion industry.
2. To give an overview of different departments involve in them.
3. To explain the concept of export, buying and domestic house
4. To give knowledge of different methods to export or import of any product.

Detailed Syllabus

Module I: Apparel Industry ? Domestic industry <ul style="list-style-type: none">● Export industry● Buying house
Module II: Various departments of apparel manufacturing unit and workflow, Types of production processes in apparel industry
Module III: Different types of sewing machines, classification of stitches
Module IV: Presentation of Internship report
<i>Text and References books:</i> 1.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the working of different sectors of the export and import industry in fashion.
2. Understand the various departments involved in the production of fashion garments.
3. Understand how an industrial machine works on a large scale.
4. Understand the various parts and elements of the industrial machine with their working.
5. Understand the different work processes of the export house, buying house and domestic

industry.

6. Understand the difference between the working and departments of different industrial houses.

BFD 552: Men's Wear	
Teaching Scheme Lectures: Nil Practical: 2hrs/week Tutorials: 1 hr./ week Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD 652 Portfolio Development-II, BFD 651 Graduation Design Collection

Course Objectives:

23. To give complete knowledge about the men's tailored garments.
24. To explain difference between the measurements of young and mature male body figure type.
25. To give an overview of shirt designs with variation of cuffs and collars.
26. To give knowledge about different lining, interlining and fusing required during the stitching of men's garments.
27. To explain complete knowledge about shirt manufacturing from design idea to actual construction.
28. To explain complete knowledge about construction of waist coat
29. To give knowledge about the stitching of trouser & its parts and their finishing.

Detailed Syllabus

Module I: Introduction

Tools and equipment's needed, grain, seam allowance, preparation of fabrics
Measurement differences among different figure types and age groups.

Module II: Drafting and construction of shirt

Module III: Variations of cuffs and collars

Module IV: Drafting and construction of waistcoat

Module V: Drafting and construction of trouser

Text and References books:

Armstrong, H.J., "Pattern making for fashion design", Pearson, 5th edition 2018.

Aldrich, W., "Metric pattern cutting for Men's wear", Wiley, 5th edition, 2005.

Kim, M., "[Pattern making for Menswear: Classic to Contemporary](#)" Fairchild Books; Spi edition, 2014

Course Outcomes:

After completing the course, students will be able to:

19. Understand the constructional knowledge about the men's tailored garments
20. Understand difference between the body types and measurements of young and mature male
21. Understand about cuffs and collar for different style of shirts.
22. Analyze the types of fabric used for tailored garment like lining, fusing, and interlining.
23. Understand the construction details of shirt, waist coat and trouser.
24. Understand complete knowledge about the constructional details of men's tailored garments

BFD 553 GARMENT CONSTRUCTION-IV	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD651 Graduation Design Collection

Course Objectives:

1. To provide the advance knowledge of garment construction.
2. To give the knowledge of categories wise costume.
3. Describe the all design concepts according to category.
4. Explain the concepts of innovative design

Detailed Syllabus

Module I: Construction of traditional women's wear.
Module II: Construction of western women's wear.
Module III: Construction of traditional men's wear.
Module IV: Construction of innovative dress.
<i>Text and References books:</i> 1. Timeline of World Costumes, By Mules 2. Fashion Source Book, The 1960's, The 1970's the 1980'sBy John Peacock 3. Pattern making for fashion design by Armstrong

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the knowledge of categories wise design.
2. Understand the knowledge of innovative design.
3. Understand about the all concepts of garment categories.
4. Understand about the advance techniques of PM and GC.
5. Understand about the knowledge of garment photoshoot according to category.
6. Understand the knowledge of transformation dresses.

BFD 554: TEXTILE PROJECT

Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks
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Prerequisite: BFD-652 Portfolio Development, BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge of different types of fabrics and traditional embroideries and folk art available throughout the world.
2. To give an overview of different methods fabric manipulation in creative way.
3. To explain the concept of product development through different traditional techniques.

Detailed Syllabus

Module I: Quilting and its Introduction with its use in Fashion Industry

Product Selection
Product Information
Sourcing of Trims & Accessories
Sourcing of Fabrics
Product Development
Presentation & Viva
Submission of the Report

Module II: Smocking and its Introduction with its use in Fashion Industry

Product Selection
Product Information
Sourcing of Trims & Accessories
Sourcing of Fabrics
Product Development
Presentation & Viva
Submission of the Report

Text and References books:

Note: Please note that since this is a project-based subject the students would not be consulting any books but instead would have to conduct surveys and search for websites relating to forecasts, latest trends, fabrics, design as well as silhouettes so that they can prepare them collection accordingly. They will also visit the marketplace for sourcing.

References:

Color Forecasting, By Tracy Diane and Tom Cassidy
Apparel Online, Apparel Views, Clothesline, Moda, Vogue, and Simplicity etc. to be consulted regularly

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various techniques or methods of Fabric Manipulation.
2. Understand the various tools and equipment used for Fabric Manipulation.
3. Understand how we can enhance the look of the fabric with the manipulation.
4. Understand the principles of fabric manipulation and its use in our industry.
5. Understand the working of fabric manipulation.
6. Understand the history of its and its origin.

BFD 555: Grading

Teaching Scheme Lectures: Nil Practical: 2 hrs/week Tutorials: 1 hr./ week Credits: 3	Examination Scheme Class Test: 12 Marks Teachers Assessment: 6 Marks Attendance: 12 Marks End Semester Exam: 70 Marks
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Prerequisite: BFD 651 Graduation Design Collection

Course Objectives:

1. To make students aware about role of grading in garment industry.
2. To give knowledge about **grading terminology**.
3. To explain the different approaches for grading different pattern.
4. To impart knowledge to **develop the grading rules for different basic pattern**.
5. To give knowledge about **working on Cartesian paper**.
6. To explain the grading of different basic patterns.

Detailed Syllabus

Module I: Pattern Grading: Introduction, pattern terminology, grading terminology
Module II: Methods of Grading
Module III: Grading on the Cartesian graph: The Cartesian graph, Cardinal points, pattern orientation, developing grade rules.
Module IV: Grading the Basic pattern set: Grading procedure for bodice front, bodice back, skirt front and back, sleeve.
Module V: Computerized grading
<i>Text and References books:</i> Mullet, K. K., Moore, C.I., Prevatt Young, M.B. Concepts of Pattern Grading: Techniques of Manual and Computer Grading, 2 nd Edition, Fairchild Books. 2008. Cooklin, G., Pattern Grading for Women's Clothes: The Technology of Sizing, Wiley India Pvt Ltd. 2009. Cooklin, G., Pattern Grading for Men's Clothes, Wiley, 1993. Price, B., Jeanne and Zamkoff . Grading Techniques for Modern Design. 4 th edition, Fairchild Publishing, 1985. Goulbourn , M., Introducing Pattern Cutting, Grading And Modeling, Batsford, 1971. Scheier, M., The ABC's of Grading , Scheier, 1974.

Course Outcomes:

After completing the course, students will be able to:

1. Understand complete knowledge about the importance of grading in textile industry.
2. Understand the fundamentals of manual and machine grading.
3. Understand about the terminology related to grading
4. Comprehend difference between the rules for basic patterns.
5. Analyze the different methods of grading
6. Develop and grade the basic and designer pattern.

BFD 651: Graduation Design Collection

Teaching Scheme Lectures: 4 hrs/week Practical: 10 hrs/week Tutorials: 4 hrs/week Credits: 18	Examination Scheme Class Test: 40 Marks Teachers Assessment: 30 Marks Attendance: 30 Marks End Semester Exam: 300 Marks
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Prerequisite: Industrial sector and Designing Sector

Course Objectives:

1. To impart skill to design and present their own collection starting from inspiration and conceptualization.
2. To explain the complete process of design development and the presentation of their collection to invite trade audience.
3. To explain how fashion shows are organized and performed
4. To learn about different process like design process, sourcing, styling, pattern making, proto typing, required accessories involved before presenting the collection.

Detailed Syllabus

Module I: Designing and construction of collection based on selected theme

Module II: Presentation of collection in a fashion show

Text and References books:

[Armstrong](#), H.J., Draping for Apparel Design. 2013. 3rd Revised edition. Bloomsbury Publishing India Private Limited.

Jaffe, H and Relis, N., Draping for Fashion Design. 1994. 2nd edition. Pearson Education (US).

Crawford, C.A. The art of Fashion Draping. 2012. 4th Edition. Fairchild Books

Armstrong, H.J., “Pattern making for fashion design”, Pearson, 5th edition 2018.

Norma R. H and Carolyn J. K. Pattern Making by the Flat-Pattern Method. 1998. 8th Edition. Prentice Hall

Mortimer-Dunn, G. Pattern designs for children clothes. 1996. B T Batsford Ltd.

Knowles., L. A., “Practical Guide to Patternmaking for Fashion Designers: Juniors, Misses and women”, 2005, Fairchild Books

Holman, G., “Pattern cutting made easy: A Step-by-Step Introduction, 2013

Cooklin, G., “Pattern cutting for women’s outerwear”, 1994

Note: Please note that since this is a project-based subject the students would not be consulting books except for pattern making but instead would have to conduct surveys and search for websites relating to fashion forecasts so that they can prepare their collection accordingly.

Course Outcomes:

After completing the course, students will be able to:

1.Understand importance of different patterns making technique in field of fashion industry.
2.Understand the importance of inspiration and theme for collection.
3.Understand the importance of each step-in design collection.
4.Understand how garment collection are prepared and presented.
5.Understand how fashion shows are organized and performed.
6.Understand the importance of fashion shows in design sector to invite trade audience.

BFD 652: PORTFOLIO DEVELOPMENT-II	
Teaching Scheme Lectures: 1 hr./ week Labs: 3hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Prerequisite: BFD 651 Graduation Design Collection

Course Objectives:

1. To give complete knowledge to students about how to display their work on professional level.
2. To give an overview on digital medium to display their work.
3. To explain the concept of Portfolio Development in fashion world.
4. To give knowledge websites and social media to display their work.

Detailed Syllabus

Module I: Introduction to digital Portfolio preparation.
Module II: Digital portfolio
Module III: Development of Portfolio based upon designs made in Graduation Design Collection
Module IV: Portfolio Presentation
<p>Text and References books:</p> <ol style="list-style-type: none"> 1. Visual Merchandising and Display by Martin. M. Pegler, 2. Retail Buying from Basics to Fashion by Richard Clodfelter, <p>References: Note: Please note that since this is a project-based subject the students would not be consulting any books but instead would have to conduct surveys and site visits to judge the nature of the enterprise so that they prepare their portfolio accordingly.</p>

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various platforms to display their work
2. Understand about the various methods to display their work professionally
3. Understand how we can creatively display our work on social media
4. Understand the uniqueness of their work in fashion industry.
5. Understand the importance to display their work professionally.
6. To groom themselves in market or industry.

BFD 653: Draping Techniques -II	
Teaching Scheme Lectures: 1 hr./ week Practical: 3 hrs/week Tutorials: Nil Credits: 4	Examination Scheme Class Test: 12 Marks Teachers Assessment: 6 Marks Attendance: 12 Marks End Semester Exam: 70 Marks

Prerequisite: BFD 651 Graduation Design Collection, Industrial sector and Designing Sectors

Course Objectives:

1. To impart knowledge about the importance of draping in fashion field.
2. To give knowledge about principles and techniques of draping.
3. To impart knowledge about princess line garment.
4. To give actual demonstration of draping corset and sleeve variation.
5. To give knowledge about draping of cowl and pleated garments.
6. To have knowledge of draping a complete garment.

Detailed Syllabus

Module I: Draping of Princess Bodice
Module II: Draping of cowl and pleated design
Module III: Draping of Halter, surplice and midriff yoke
Module IV: Draping of Corset
Module V: Draping of Sleeve variations
Module VI: Final Garment
Text and References books: Armstrong , H.J., Draping for Apparel Design. 2013. 3 rd Revised edition. Bloomsbury Publishing India Private Limited. Jaffe, H and Relis, N., Draping for Fashion Design. 1994. 2 nd edition. Pearson Education (US). Crawford, C.A. The art of Fashion Draping. 2012. 4 th Edition. Fairchild Books Christain, N. The Art of Draping. 2011. Esmo Editions. Cloake , D. Cutting and Draping Party and Eveningwear: Dressmaking and pattern cutting for special occasion clothes. 2016. Batsford Ltd.

Course Outcomes:

After completing the course, students will be able to:

1. Understand about the importance techniques and principle of draping
2. Understand importance of draping technique in field of fashion industry.
3. Understand about the draping of sleeve and skirts variation.
4. Understand procedure to drape garment like corset, halters, surplice and yokes.
5. Explain the draping procedure of cowl and pleated garments.

6. Explain the procedure for draping a complete garment.

SEMESTER I

BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

45 Hours

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system

Course Content:

UNIT I

10 hours

- **Introduction to human body:** Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.
- **Cellular level of organization:** Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine
- **Tissue level of organization:** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

UNIT II

10 hours

- **Integumentary system:** Structure and functions of skin.
- **Skeletal system:** Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction.
- **Joints:** Structural and functional classification, types of joints movements and its articulation

UNIT III

10 hours

- **Body fluids and blood:** □ Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.
- **Lymphatic system:** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

UNIT IV

08 hours

- **Peripheral nervous system:** Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves.
- **Special senses:** Structure and functions of eye, ear, nose and tongue and their disorders.

UNIT V

07 hours

- **Cardiovascular system:** Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.

BP103T. PHARMACEUTICS- I (Theory)

45 Hours

Scope: This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

Objectives: Upon completion of this course the student should be able to:

- ☐ ☐ Know the history of profession of pharmacy
- ☐ ☐ Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- ☐ ☐ Understand the professional way of handling the prescription
- ☐ ☐ Preparation of various conventional dosage forms

Course Content:

UNIT I

10 Hours

- **Historical background and development of profession of pharmacy:** History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.
- **Dosage forms:** Introduction to dosage forms, classification and definitions.
- **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription.
- **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

UNIT II

10 Hours

- **Pharmaceutical calculations:** Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.
- **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.
- **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques

UNIT III **08 Hours**

- **Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.
- **Biphasic liquids**
- **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.
- **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

UNIT IV **08 Hours**

- **Suppositories:** Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories.
- **Pharmaceutical incompatibilities:** Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

UNIT V **07 Hours**

- **Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms.

BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)**45 Hours**

Scope: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

Objectives: Upon completion of course student shall be able to

- ☐ ☐ Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- ☐ ☐ Understand the medicinal and pharmaceutical importance of inorganic compounds

Course Content:**UNIT I** **10 Hours**

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the **limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate.**
- **General methods of preparation,** assay for the compounds superscripted with **asterisk (*)**, properties and medicinal uses of inorganic compounds belonging to the following classes

UNIT II **10 Hours**

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes:** Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium

gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.

- **Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

UNIT III

10 Hours

- **Gastrointestinal agents**
 - a) **Acidifiers:** Ammonium chloride* and Dil. HCl.
 - b) **Antacid:** Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture.
 - c) **Cathartics:** Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite.
 - d) **Anti-microbials:** Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations.

UNIT IV

08 Hours

- **Miscellaneous compounds**
 - a) **Expectorants:** Potassium iodide, Ammonium chloride*.
 - b) **Emetics:** Copper sulphate*, Sodium potassium tartarate
 - c) **Haematinics:** Ferrous sulphate*, Ferrous gluconate
 - d) **Poison and Antidote:** Sodium thiosulphate*, Activated charcoal, Sodium nitrite
 - e) **Astringents:** Zinc Sulphate, Potash Alum

UNIT V

07 Hours

- **Radiopharmaceuticals:** Radio activity, Measurement of radioactivity, Properties of α , β , γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substances.

BP105T.COMMUNICATION SKILLS (Theory)

30 Hours

Scope: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

Objectives:

Upon completion of the course the student shall be able to

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectively manage the team as a team player
4. Develop interview skills
5. Develop Leadership qualities and essentials

Course content:

UNIT I

07 Hours

- **Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context.
- **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers.
- **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

UNIT II

07 Hours

- **Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication.
- **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style

UNIT III

07 Hours

- **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations.

Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication.

- **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

UNIT IV

05 Hours

- **Interview Skills:** Purpose of an interview, Do's and Don'ts of an interview.
- **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

UNIT V

04 Hours

- **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Don'ts of group discussion

UNIT IV

06 Hours

- **Analytical Geometry**
 - a) **Introduction:** Signs of the Coordinates, Distance formula,
 - b) **Straight Line:** Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line

- c) **Integration:** Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

UNIT V

06 Hours

- **Differential Equations:** Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations, Application in solving.
- **Pharmacokinetic equations.**
- **Laplace Transform :** Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, Application in solving Chemical kinetics and Pharmacokinetics equations.

BP203 T. BIOCHEMISTRY (Theory)

45 Hours

Scope: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

Objectives: Upon completion of course student shall be able to

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Course Content:

UNIT I

08 Hours

- **Biomolecules:** Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.
- **Bioenergetics:** Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP.

UNIT II

10 Hours

- **Carbohydrate metabolism:** Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance, HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency. Glycogen metabolism Pathways and glycogen storage diseases (GSD), Gluconeogenesis- Pathway and its significance. Hormonal regulation of blood glucose level and Diabetes mellitus.
- **Biological oxidation:** Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate level phosphorylation. Inhibitors ETC and oxidative phosphorylation/Uncouplers.

UNIT III

10 Hours

- **Lipid metabolism:** β -Oxidation of saturated fatty acid (Palmitic acid), Formation and utilization of ketone bodies; ketoacidosis. De novo synthesis of fatty acids (Palmitic acid). Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D. Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.
- **Amino acid metabolism:**
 - a) General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders.
 - b) Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia).
 - c) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline.
 - d) Catabolism of heme; hyperbilirubinemia and jaundice.

UNIT IV

10 Hours

- **Nucleic acid metabolism and genetic information transfer:**
 - a) Biosynthesis of purine and pyrimidine nucleotides. Catabolism of purine nucleotides and Hyperuricemia and Gout disease.
 - b) Organization of mammalian genome. Structure of DNA and RNA and their functions.
 - c) DNA replication (semi conservative model), Transcription or RNA synthesis.
 - d) Genetic code, Translation or Protein synthesis and inhibitors

UNIT V

07 Hours

- **Enzymes**
 - a) Introduction, properties, nomenclature and IUB classification of enzymes.
 - b) Enzyme kinetics (Michaelis plot, Line Weaver Burke plot).
 - c) Enzyme inhibitors with examples.
 - d) Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation.
 - e) Therapeutic and diagnostic applications of enzymes and isoenzymes.
 - f) Coenzymes –Structure and biochemical function

BP 204T.PATHOPHYSIOLOGY (THEORY)

45 Hours

Scope: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

Objectives: Upon completion of the subject student shall be able to –

1. Describe the etiology and pathogenesis of the selected disease states;
2. Name the signs and symptoms of the diseases; and
3. Mention the complications of the diseases.

Course content:

UNIT I

10 Hours

- **Basic principles of Cell injury and Adaptation:** Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance.
- **Basic mechanism involved in the process of inflammation and repair:** Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation– Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis

UNIT II

10 Hours

- **Cardiovascular System:** Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis).
- **Respiratory system:** Asthma, Chronic obstructive airways diseases.
- **Renal system:** Acute and chronic renal failure.

UNIT II

10 Hours

- **Haematological Diseases:** Iron deficiency, megaloblastic anemia (Vit. B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia.
- **Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones.

- **Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
- **Gastrointestinal system:** Peptic Ulcer

UNIT IV

8 Hours

- **Disease of liver:** Inflammatory bowel diseases, jaundice, hepatitis (A, B, C, D, E, F) alcoholic liver disease.
- **Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout.
- **Principles of cancer:** Classification, etiology and pathogenesis of cancer.

UNIT V

7 Hours

- **Infectious diseases:** Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections
- **Sexually transmitted diseases:** AIDS, Syphilis, Gonorrhea

BP205 T. COMPUTER APPLICATIONS IN PHARMACY (Theory)

30 Hrs (2 Hrs/Week)

Scope: This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.

Objectives: Upon completion of the course the student shall be able to

1. Know the various types of application of computers in pharmacy
2. Know the various types of databases
3. Know the various applications of databases in pharmacy

Course content:

UNIT I

06 hours

- **Number system:** Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division.
- **Concept of Information Systems and Software:** Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project

UNIT II

06 hours

- **Web technologies:** Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products, Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database.

UNIT III

06 hours

- **Application of computers in Pharmacy:** Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring, Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System

UNIT IV

06 hours

- **Bioinformatics:** Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery.

UNIT V

06 hours

- **Computers as data analysis in Preclinical development:**Chromatographic data analysis (CDS), Laboratory Information management System (LIMS) and Text Information Management System (TIMS).

B.PHARM 2nd YEAR

BP302T. PHYSICAL PHARMACEUTICS-I (Theory)

45 Hours

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:

UNIT I

10 Hours

- **Solubility of drugs:** Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

UNIT II

10 Hours

- **States of Matter and properties of matter:** State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols-inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid crystalline, amorphous & polymorphism.
- **Physicochemical properties of drug molecules:** Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

UNIT III

10 Hours

- **Surface and interfacial phenomenon:** Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.

UNIT IV

08 Hours

- **Complexation and protein binding:** Introduction, Classification of Complexation,

Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

UNIT V

07 Hours

- **pH, buffers and Isotonic solutions:** Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.

BP 303 T. PHARMACEUTICAL MICROBIOLOGY (Theory)

45 Hours

Scope: Study of all categories of microorganisms especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc.

Objectives: Upon completion of this course the student should be able to:

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

Course Content:

UNIT I

10 Hours

- Introduction, history of microbiology, its branches, scope and its importance.
- Introduction to Prokaryotes and Eukaryotes
- Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).
- Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

UNIT II

10 Hours

- Identification of bacteria using staining techniques (simple, Gram's & acid fast staining) and biochemical tests (IMViC).
- Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization.
- Evaluation of the efficiency of sterilization methods.
- Equipments employed in large scale sterilization.
- Sterility indicators.

UNIT III

10 Hours

- Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.
- Classification and mode of action of disinfectants
- Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions
- Evaluation of bactericidal & bacteriostatic.

- Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

UNIT IV

08 Hours

- Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.
- Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.

UNIT V

07 Hours

- Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.
- Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.
- Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.
- Application of cell cultures in pharmaceutical industry and research.

BP 304 T. PHARMACEUTICAL ENGINEERING (Theory)

45 Hours

Scope: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

Objectives: Upon completion of the course student shall be able:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Course Content:

UNIT I

10 Hours

- **Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.
- **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.
- **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and

demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

UNIT II

10 Hours

- **Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.
- **Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator.
- **Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

UNIT III

10 Hours

- **Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction,

working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.

- **Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier.

UNIT IV

08 Hours

- **Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter media. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seitz filter.
- **Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

UNIT V

07 Hours

- **Materials of pharmaceutical plant construction, Corrosion and its prevention:** Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and non-ferrous metals, inorganic and organic non metals, basics of material handling system.

BP 403 T. PHYSICAL PHARMACEUTICS-II (Theory)

45 Hours

Scope: The course deals with the various physica and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course Content:

UNIT I

07 Hours

- **Colloidal dispersions:** Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization & protective action.

UNIT II

08 Hours

- **Rheology:** Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation,

determination of viscosity, capillary, falling Sphere, rotational viscometers.

- **Deformation of solids:** Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus

UNIT III

10 Hours

- **Coarse dispersion:** Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method. Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline. Catabolism of heme; hyperbilirubinemia and jaundice

UNIT IV

10 Hours

- **Micromeritics:** Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.

UNIT V

10 Hours

- **Drug stability:** Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention

BP404 T. PHARMACOLOGY-I (Theory)

45 Hours

Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

Objectives: Upon completion of this course the student should be able to

1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Observe the effect of drugs on animals by simulated experiments
5. Appreciate correlation of pharmacology with other bio medical sciences

Course Content:

UNIT I

08 hours

- **General Pharmacology**
 - a) **Introduction to Pharmacology-** Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.
 - b) **Pharmacokinetics-** Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination

UNIT II

12 Hours

- **General Pharmacology**
 - a) **Pharmacodynamics-** Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor

and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.

- b) Adverse drug reactions.
- c) Drug interactions (pharmacokinetic and pharmacodynamic)
- d) Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.

UNIT III

10 Hours

- **Pharmacology of drugs acting on peripheral nervous system**
 - a) Organization and function of ANS.
 - b) Neurohumoral transmission, co-transmission and classification of neurotransmitters.
 - c) Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.
 - d) Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).
 - e) Local anesthetic agents.
 - f) Drugs used in myasthenia gravis and glaucoma

UNIT IV

08 Hours

- **Pharmacology of drugs acting on central nervous system**
 - a) Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.
 - b) General anesthetics and pre-anesthetics.
 - c) Sedatives, hypnotics and centrally acting muscle relaxants.
 - d) Anti-epileptics
 - e) Alcohols and disulfiram

UNIT V

07 Hours

- **Pharmacology of drugs acting on central nervous system**
 - a) Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
 - b) Drugs used in Parkinson's disease and Alzheimer's disease.
 - c) CNS stimulants and nootropics.
 - d) Opioid analgesics and antagonists
 - e) Drug addiction, drug abuse, tolerance and dependence.

BP405 T.PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

45 Hours

Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.

Objectives: Upon completion of the course, the student shall be able

1. To know the techniques in the cultivation and production of crude drugs
2. To know the crude drugs, their uses and chemical nature
3. Know the evaluation techniques for the herbal drugs

4. To carry out the microscopic and morphological evaluation of crude drugs

Course Content:

UNIT I

10 Hours

- **Introduction to Pharmacognosy:**
 - a) Definition, history, scope and development of Pharmacognosy
 - b) Sources of Drugs – Plants, Animals, Marine & Tissue culture
 - c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).
- **Classification of drugs:**
 - a) Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs
- **Quality control of Drugs of Natural Origin:**
 - a) Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.
 - b) Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

UNIT II

10 Hours

- **Cultivation, Collection, Processing and storage of drugs of natural origin:**
 - a) Cultivation and Collection of drugs of natural origin
 - b) Factors influencing cultivation of medicinal plants.
 - c) Plant hormones and their applications.
 - d) Polyploidy, mutation and hybridization with reference to medicinal plants
- **Conservation of medicinal plants**

UNIT III

07 Hours

- **Plant tissue culture:**
 - a) Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.

b) Applications of plant tissue culture in pharmacognosy.

c) Edible vaccines

UNIT IV

10 Hours

- **Pharmacognosy in various systems of medicine:**
 - a) Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.
- **Introduction to secondary metabolites:**
 - a) Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

UNIT V

08 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

- **Plant Products:**
 - a) Fibers - Cotton, Jute, Hemp
 - b) Hallucinogens, Teratogens, Natural allergens
- **Primary metabolites:**
 - a) General introduction, detailed study with respect to chemistry, sources, preparation,
 - b) evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical
 - c) Aids and/or Medicines for the following Primary metabolites:
- **Carbohydrates:** Acacia, Agar, Tragacanth, Honey
- **Proteins and Enzymes :** Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).
- **Lipids(Waxes, fats, fixed oils) :** Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax
- **Marine Drugs:** Novel medicinal agents from marine sources

B.PHARM 3rd YEAR

BP502T. INDUSTRIAL PHARMACY-I (Theory)

45 Hours

Scope: Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

Objectives: Upon completion of the course student shall be able to

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

Course Content:

UNIT I

07 Hours

- **Preformulation Studies:** Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances.

- a) **Physical properties:** Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism
- b) **Chemical Properties:** Hydrolysis, oxidation, reduction, racemisation, polymerization
BCS classification of drugs & its significant
- Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

UNIT II

10 Hours

- **Tablets:**
 - a) Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.
 - b) Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.
 - c) Quality control tests: In process and finished product tests
- **Liquid orals:** Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia.

UNIT III

08 Hours

- **Capsules:**
 - a) **Hard gelatin capsules:** Introduction, Production of hard gelatin capsule shells. Size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.

b) **Soft gelatin capsules:** Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

- **Pellets:** Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets.

UNIT IV

10 Hours

- **Parenteral Products:**
 - a) Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity.
 - b) Production procedure, production facilities and controls, aseptic processing
 - c) Formulation of injections, sterile powders, large volume parenterals and lyophilized products.
 - d) Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.
- **Ophthalmic Preparations:** Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations

UNIT V

10 Hours

- **Cosmetics:** Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.
- **Pharmaceutical Aerosols:** Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies.
- **Packaging Materials Science:** Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.

BP503 T. PHARMACOLOGY-II (Theory)

45 Hours

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

Objectives: Upon completion of this course the student should be able to:

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

Course Content:

UNIT I

10 Hours

- **Pharmacology of drugs acting on cardio vascular system**
 - a) Introduction to hemodynamic and electrophysiology of heart.
 - b) Drugs used in congestive heart failure
 - c) Anti-hypertensive drugs.
 - d) Anti-anginal drugs.
 - e) Anti-arrhythmic drugs.
 - f) Anti-hyperlipidemic drugs.

UNIT II

10 Hours

- **Pharmacology of drugs acting on cardio vascular system**
 - a) Drug used in the therapy of shock.
 - b) Hematinics, coagulants and anticoagulants.
 - c) Fibrinolytics and anti-platelet drugs
 - d) Plasma volume expanders
- **Pharmacology of drugs acting on urinary system**
 - a) Diuretics
 - b) Anti-diuretics.

UNIT III

10 Hours

- **Autocoids and related drugs**
 - a) Introduction to autocoids and classification
 - b) Histamine, 5-HT and their antagonists.
 - c) Prostaglandins, Thromboxanes and Leukotrienes.
 - d) Angiotensin, Bradykinin and Substance P.

- e) Non-steroidal anti-inflammatory agents
- f) Anti-gout drugs
- g) Antirheumatic drugs

UNIT IV

08 Hours

- Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.
- Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.

UNIT V

07 Hours

- Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.
- Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.
- Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.
- Application of cell cultures in pharmaceutical industry and research.

BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

45 Hours

Scope: The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine

Objectives: Upon completion of the course, the student shall be able

1. To know the modern extraction techniques, characterization and identification of the herbal drugs and Phytoconstituents.
2. To understand the preparation and development of herbal formulation.
3. To understand the herbal drug interactions
4. To carryout isolation and identification of Phytoconstituents

Course Content:

UNIT I

07 Hours

- **Metabolic pathways in higher plants and their determination**
 - a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.
 - b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.

UNIT II

14 Hours

- General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses

and commercial applications of following secondary metabolites:

- **Alkaloids:** Vinca, Rauwolfia, Belladonna, Opium,
- **Phenylpropanoids and Flavonoids:** Lignans, Tea, Ruta
- **Steroids, Cardiac Glycosides & Triterpenoids:** Liquorice, Dioscorea, Digitalis
- **Volatile oils:** Mentha, Clove, Cinnamon, Fennel, Coriander,
- **Tannins:** Catechu, Pterocarpus
- **Resins:** Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony
- **Glycosides:** Senna, Aloes, Bitter Almond
- **Iridoids, Other terpenoids & Naphthaquinones:** Gentian, Artemisia, taxus, carotenoids

UNIT III

06 Hours

- **Isolation, Identification and Analysis of Phytoconstituents**
 - a) Terpenoids: Menthol, Citral, Artemisin
 - b) Glycosides: Glycyrrhetic acid & Rutin
 - c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine
 - d) Resins: Podophyllotoxin, Curcumin

UNIT IV

10 Hours

- Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT V

08 Hours

- **Basics of Phytochemistry:** Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

BP602 T. PHARMACOLOGY-III (Theory)

45 Hours

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology.

Objectives: Upon completion of this course the student should be able to:

1. Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
2. Comprehend the principles of toxicology and treatment of various poisonings.
3. Appreciate correlation of pharmacology with related medical sciences.

Course Content:

UNIT I

10 Hours

- **Pharmacology of drugs acting on Respiratory system**
 - a) Anti -asthmatic drugs
 - b) Drugs used in the management of COPD
 - c) Expectorants and antitussives
 - d) Nasal decongestants
 - e) Respiratory stimulants
- **Pharmacology of drugs acting on the Gastrointestinal Tract**
 - a) Antiulcer agents.
 - b) Drugs for constipation and diarrhoea.
 - c) Appetite stimulants and suppressants.
 - d) Digestants and carminatives.
 - e) Emetics and anti-emetics.

UNIT II

10 Hours

- **Chemotherapy**
 - a) General principles of chemotherapy.

- b) Sulfonamides and cotrimoxazole.
- c) Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolones, tetracycline and aminoglycosides.

UNIT III

10 Hours

- **Chemotherapy**
 - a) Antitubercular agents
 - b) Antileprotic agents
 - c) Antifungal agents

- d) Antiviral drugs
- e) Anthelmintics
- f) Antimalarial drugs
- g) Antiamoebic agents

UNIT IV

08 Hours

- **Chemotherapy**
 - a) Urinary tract infections and sexually transmitted diseases.
 - b) **Chemotherapy of malignancy.**
- **Immunopharmacology**
 - a) Immunostimulants
 - b) Immunosuppressant
- Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

UNIT V

07 Hours

- **Principles of toxicology**
 - a) Definition and basic knowledge of acute, subacute and chronic toxicity.
 - b) Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity.
 - c) **General principles of treatment of poisoning**
 - d) Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.
- **Chronopharmacology**
 - a) Definition of rhythm and cycles.
 - b) Biological clock and their significance leading to chronotherapy.

BP603 T. HERBAL DRUG TECHNOLOGY (Theory)

45 Hours

Scope: This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs

Objectives: Upon completion of this course the student should be able to:

1. Understand raw material as source of herbal drugs from cultivation to herbal drug product.
2. Know the WHO and ICH guidelines for evaluation of herbal drugs.
3. Know the herbal cosmetics, natural sweeteners, Nutraceuticals.
4. Appreciate patenting of herbal drugs, GMP.

Course content:

UNIT I

11 Hours

- **Herbs as raw materials:**
 - a) Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation, Source of Herbs Selection, identification and authentication of herbal materials, Processing of herbal raw material
- **Biodynamic Agriculture:** **Good agricultural practices in cultivation of medicinal plants including Organic farming.** Pest and Pest management in medicinal plants:

Biopesticides/Bioinsecticides.

- **Indian Systems of Medicine:**

- a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy.
- b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.

UNIT II

07 Hours

- **Nutraceuticals:** General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of **Nutraceuticals** in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases. Study of following herbs as health food: Alfa alfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina.
- **Herbal-Drug and Herb-Food Interactions:** General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginko biloba, Ginseng, Garlic, Pepper & Ephedra.

UNIT III

10 Hours

- **Herbal Cosmetics:** Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

- **Herbal excipients:** Herbal Excipients – Significance of substances of natural origin as excipients - colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.
- **Herbal formulations:** Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes.

UNIT IV

10 Hours

- **Evaluation of Drugs:** WHO & ICH guidelines for the assessment of herbal drugs, Stability testing of herbal drugs.
- **Patenting and Regulatory requirements of natural products:**
 - a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy
 - b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.
- **Regulatory Issues:** Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

UNIT V

07 Hours

- **General Introduction to Herbal Industry:** Herbal drugs industry: Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.
- **Schedule T – Good Manufacturing Practice of Indian systems of medicine:** Components of GMP (Schedule – T) and its objectives, Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.

BP604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS

45 Hours

Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arisen therein.

Objectives: Upon completion of the course student shall be able to:

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
4. Understand various pharmacokinetic parameters, their significance & applications.

Course Content:

UNIT I

10 Hours

- **Introduction to Biopharmaceutics:**
 - a) **Absorption;** Mechanisms of drug absorption through GIT, factors influencing drug absorption through GIT, absorption of drug from Non per oral extra-vascular routes.
 - b) **Distribution;** Tissue permeability of drugs, binding of drugs, apparent, volume of drug

distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs.

UNIT II

10 Hours

- **Elimination:** Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs.
- **Bioavailability and Bioequivalence:** Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in-vitro* drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

UNIT III

10 Hours

- **Pharmacokinetics:** Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolus) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - KE , $t_{1/2}$, V_d , AUC , K_a , Cl_t and CLR - definitions methods of eliminations, understanding of their significance and application.

UNIT IV

08 Hours

- **Multi-compartment models:** Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.

UNIT V

07 Hours

Nonlinear Pharmacokinetics: Introduction, Factors causing Non-linearity. Michaelis- menton method of estimating parameters, Explanation with example of drugs

BP605 T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

45 Hours

Scope: Biotechnology has a long promise to revolutionize the biological sciences and technology. Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting. Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs. Biotechnology has already produced transgenic crops and animals and the future promises lot more. It is basically a research-based subject.

Objectives: Upon completion of the subject student shall be able to;

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries.
2. Genetic engineering applications in relation to production of pharmaceuticals.
3. Importance of Monoclonal antibodies in Industries.
4. Appreciate the use of microorganisms in fermentation technology.

Course Content:

UNIT I

10 Hours

- Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.
- Enzyme Biotechnology- Methods of enzyme immobilization and applications.
- Biosensors- Working and applications of biosensors in Pharmaceutical Industries.
- Brief introduction to Protein Engineering.
- Use of microbes in industry. Production of Enzymes- General consideration -
- Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.
- Basic principles of genetic engineering.

UNIT II

10 Hours

- Study of cloning vectors, restriction endonucleases and DNA ligase.
- **Recombinant DNA technology. Application of genetic engineering in medicine.**
- Application of r DNA technology and genetic engineering in the production of:
 - a) Interferon
 - b) Vaccines- hepatitis- B
 - c) Hormones-Insulin.
- Brief introduction to PCR.

UNIT III

10 Hours

- Types of immunity- humoral immunity, cellular immunity:

- a) Structure of Immunoglobulins.
- b) Structure and Function of MHC.
- c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.
- d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.
- e) Storage conditions and stability of official vaccines.

- f) Hybridoma technology- Production, Purification and Applications.
- g) Blood products and Plasma Substitutes.

UNIT IV

08 Hours

- Immuno blotting techniques- ELISA, Western blotting, Southern blotting.
- Genetic organization of Eukaryotes and Prokaryotes.
- Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.
- Introduction to Microbial biotransformation and applications.
- Mutation: Types of mutation/mutants.

UNIT V

07 Hours

- Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.
- Large scale production fermenter design and its various controls.
- Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin.
- Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

BP606T PHARMACEUTICAL QUALITY ASSURANCE (Theory)

45 Hours

Scope: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.

Objectives: Upon completion of the course student shall be able to:

1. Understand the cGMP aspects in a pharmaceutical industry.
2. Appreciate the importance of documentation.
3. Understand the scope of quality certifications applicable to pharmaceutical industries.
4. Understand the responsibilities of QA & QC departments

Course content:

UNIT I

10 Hours

- **Quality Assurance and Quality Management concepts:** Definition and concept of Quality control, Quality assurance and GMP.
- **Total Quality Management (TQM):** Definition, elements, philosophies.
- **ICH Guidelines:** purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines.
- **Quality by design (QbD):** Definition, overview, elements of QbD program, tools.
- **ISO 9000 & ISO14000:** Overview, Benefits, Elements, steps for registration.
- **NABL accreditation:** Principles and procedures.

UNIT II

10 Hours

- **Organization and personnel:** Personnel responsibilities, training, hygiene and personal records.

- **Premises:** Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.
- **Equipments and raw materials:** Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

UNIT III

10 Hours

- **Quality Control:** Quality control test for containers, rubber closures and secondary packing materials.
- **Good Laboratory Practices:** General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities.

UNIT IV

08 Hours

- **Complaints:** Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

- **Document maintenance in pharmaceutical industry:** Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

UNIT V

07 Hours

- **Calibration and Validation:** Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.
- **Warehousing:** Good warehousing practice, materials management.

B.PHARM 4th YEAR

BP702T. INDUSTRIAL PHARMACY II (Theory)

45 Hours

Scope: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market

Objectives: Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms.
2. Understand the process of technology transfer from lab scale to commercial batch.
3. Know different Laws and Acts that regulate pharmaceutical industry.
4. Understand the approval process and regulatory requirements for drug products.

Course Content:

UNIT I

10 Hours

- **Pilot plant scale up techniques:** General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology.

UNIT II

10 Hours

- **Technology development and transfer:** WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE /SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues

UNIT III

10 Hours

- **Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals.

- **Regulatory requirements for drug approval:** Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.

UNIT IV

08 Hours

- **Quality management systems:** Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of

Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP.

UNIT V

07 Hours

Indian Regulatory Requirements: Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.

BP703T. PHARMACY PRACTICE (Theory)

45 Hours

Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counseling for improved patient care in the community set up.

Objectives: Upon completion of the course, the student shall be able to

1. Know various drug distribution methods in a hospital.
2. Appreciate the pharmacy stores management and inventory control.
3. Monitor drug therapy of patient through medication chart review and clinical review.
4. Obtain medication history interview and counsel the patients.
5. Identify drug related problems.
6. Detect and assess adverse drug reactions.
7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
8. Know pharmaceutical care services.
9. Do patient counseling in community pharmacy.
10. Appreciate the concept of rational drug therapy.

Course Content:

UNIT I

10 Hours

- **Hospital and it's organization:** Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.
- **Hospital pharmacy and its organization:** Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.
- **Adverse drug reaction:** Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting. drug interactions, spontaneous case reports and record linkage studies, and

Adverse drug reaction reporting and management.

- **Community Pharmacy:** Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

UNIT II

10 Hours

- **Drug distribution system in a hospital:** Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.
- **Hospital formulary:** Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.
- **Therapeutic drug monitoring:** Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.
- **Medication adherence:** Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.
- **Patient medication history interview:** Need for the patient medication history interview, medication interview forms.
- **Community pharmacy management:** Financial, materials, staff, and infrastructure requirements.

UNIT III

10 Hours

- **Pharmacy and therapeutic committee:** Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.
- **Drug information services:** Drug and Poison information centre, Sources of drug information, computerized services, and storage and retrieval of information.
- **Patient counseling:** Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist.
- **Education and training program in the hospital:** Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.
- **Prescribed medication order and communication skills:** Prescribed medication order-interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

UNIT IV

8 Hours

- **Budget preparation and implementation:** Budget preparation and implementation.
- **Clinical Pharmacy:** Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication

history and Pharmaceutical care. Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

- **Over the counter (OTC) sales:** Introduction and sale of over the counter, and Rational use of common over the counter medications.

UNIT V

7 Hours

- **Drug store management and inventory control:** Organization of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure.
- **Investigational use of drugs:** Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.
- **Interpretation of Clinical Laboratory Tests:** Blood chemistry, hematology, and urinalysis

BP704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

45 Hours

Scope: This subject is designed to impart basic knowledge on the area of novel drug delivery systems.

Objectives: Upon completion of the course student shall be able:

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Course content:

UNIT I

10 Hours

- **Controlled drug delivery systems:** Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations.
- **Polymers:** Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

UNIT II

10 Hours

- **Microencapsulation:** Definition, advantages & disadvantages, microspheres/microcapsules, microparticles, methods of microencapsulation, applications.
- **Mucosal Drug Delivery system:** Introduction, Principles of bio-adhesion /muco-adhesion, concepts, advantages and disadvantages, trans-mucosal permeability and formulation considerations of buccal delivery systems.
- **Implantable Drug Delivery Systems:** Introduction, advantages and disadvantages, concept of implants and osmotic pump.

UNIT III

10 Hours

- **Transdermal Drug Delivery Systems:** Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches.
- **Gastroretentive drug delivery systems:** Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastro-adhesive systems and their applications.
- **Nasopulmonary drug delivery system:** Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers.

UNIT IV**08 Hours**

- **Targeted drug Delivery:** Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

UNIT V**07 Hours**

- **Ocular Drug Delivery Systems:** Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts.
- **Intrauterine Drug Delivery Systems:** Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

BP803ET. PHARMA MARKETING MANAGEMENT (Theory)**45 Hours**

Scope: The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.

Course Objective: The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

Course Content:**UNIT I****10****Hours**

- **Marketing:** Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.
- **Pharmaceutical market:** Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation& targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research.

UNIT II**10 Hours**

- **Product decision:** Classification, product line and product mix decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.

UNIT III**10 Hours**

- **Promotion:** Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition,

public relations, online promotional techniques for OTC Products.

UNIT IV

10 Hours

- **Pharmaceutical marketing channels:** Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.
- **Professional sales representative (PSR):** Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.

UNIT V

10 Hours

- **Pricing:** Meaning, importance, objectives, and determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority).
- **Emerging concepts in marketing:** Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.

BP806ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)

45 Hours

Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

Objectives: Upon completion of the subject student shall be able to;

1. Know WHO guidelines for quality control of herbal drugs.
2. Know Quality assurance in herbal drug industry.
3. Know the regulatory approval process and their registration in Indian and International markets.
4. Appreciate EU and ICH guidelines for quality control of herbal drugs.

Course Content:

UNIT I

10 hours

- Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms. WHO guidelines for quality control of herbal drugs. Evaluation of commercial crude drugs intended for use

UNIT II

10 hours

- **Quality assurance in herbal drug industry** of cGMP, GAP, GMP and GLP in traditional system of medicine.
- WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines.
- WHO Guidelines on GACP for Medicinal Plants.

UNIT III

10 hours

- EU and ICH guidelines for quality control of herbal drugs.
- Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines.

UNIT IV

08 hours

- Stability testing of herbal medicines. Application of various chromatographic techniques in standardization of herbal products.
- Preparation of documents for new drug application and export registration.
- GMP requirements and Drugs & Cosmetics Act provisions.

UNIT V

07 hours

- Regulatory requirements for herbal medicines.
- WHO guidelines on safety monitoring of herbal medicines in Pharmacovigilance systems.
- Comparison of various Herbal Pharmacopoeias.

Role of chemical and biological markers in standardization of

BP812ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS (Theory)

45 Hours

Scope:

This subject covers foundational topic that are important for understanding the need and requirements of dietary supplements among different groups in the population.

Objective:

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to:

1. Understand the need of supplements by the different group of people to maintain healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and the application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

Course Content

UNIT I

07 hours

- Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.
- Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community.
- Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

UNIT II

15 hours

- Phytochemicals as nutraceuticals: Occurrence and characteristic features (chemical nature medicinal benefits) of following;
 - a) Carotenoids: α and β -Carotene, Lycopene, Xanthophylls, leutin.
 - b) Sulfides: Diallyl sulfides, Allyl trisulfide.
 - c) Polyphenolics: Resveratrol.
 - d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones.
 - e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum.
 - f) Phyto estrogens: Isoflavones, daidzein, Geobustan, lignans.

- g) Tocopherols.
- h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat, bran, rice bran, sea foods, coffee, tea and the like.

UNIT III**07 hours**

- Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.
- **Dietary fibres** and complex carbohydrates as functional food ingredients.

UNIT IV**10 hours**

- Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing.
- Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione, Vitamin C, Vitamin E, α - Lipoic acid, melatonin. Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole.
- Functional foods for chronic disease prevention

UNIT V**06 hours**

- Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals.
- Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods.
- Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

BAG 101: FUNDAMENTAL OF HORTICULTURE

Syllabus

Theory

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; **Plant propagation-methods and propagating structures**; Seed dormancy, Seed germination, **principles of orchard establishment**; Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; **medicinal and aromatic plants**; importance of plant bio-regulators in horticulture. Irrigation – methods, Fertilizer application in horticultural crops.

Practical

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation including micro-propagation. Layout and planting of orchard. Training and pruning of fruit trees. Preparation of potting mixture. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

Course Outcomes:

After completing the course, students will be able to:
1. To get familiar with important horticulture trees
2. Preparation of quality planting material
3. Designing and shaping of trees
4. Learning about practices for cultivation of MAPs
5. Understand medicinal value of different plants

BAG 103: FUNDAMENTAL OF SOIL SCIENCE

Syllabus

Theory

Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil; Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability; Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature; source, amount and flow of heat in soil; effect on plant growth, Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation; soil organic matter: composition, properties and its influence on soil properties; humic substances - nature and properties; soil organisms: macro and micro organisms, their beneficial and harmful effects; Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

Practical

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Studies of capillary rise phenomenon of water in soil column and water movement in soil. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Study of soil map. Determination of soil colour. Demonstration of heat transfer in soil. Estimation of organic matter content of soil

Course Outcomes:

After completing the course, students will be able to:
1. Understand about soil its properties and linkage with crop production
2. Management of soils
2. Determination of different soil properties

BAG105: COMPREHENSION & COMMUNICATION SKILLS IN ENGLISH

Syllabus

Theory

War Minus Shooting- The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick. You and Your English – Spoken English and broken English G.B. Shaw. Reading Comprehension, Vocabulary- Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing. Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and process.

Practical

Listening Comprehension: Listening to short talks lectures, speeches (scientific, commercial and general in nature). Oral Communication: Phonetics, stress and intonation, Conversation practice. Conversation: rate of speech, clarity of voice, speaking and Listening, politeness & Reading skills: reading dialogues, rapid reading, intensive reading, improving reading skills. Mock Interviews: testing initiative, team spirit, leadership, intellectual ability. Group Discussions.

Course Outcomes:

After completing the course, students will be able to:
1. To draft effective business correspondence with brevity and clarity.
2. Students will be able to find, use, and evaluate primary academic writing associated with the communication discipline.
3. Students will be able to communicate effectively orally and in writing.
4. To demonstrate his Verbal and non-verbal communication ability through presentations.

BAG106: FUNDAMENTALS OF AGRONOMY

Syllabus

Theory

Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil-plant-water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, logging.

Weeds- importance, classification, crop weed competition, concepts of weed management principles and methods, herbicides- classification, selectivity and resistance, allelopathy. Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Practical

Identification of crops, seeds, fertilizers, pesticides and tillage implements, study of agroclimatic zones of India, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

Course Outcomes:

After completing the course, students will be able to:
1. Broad knowledge on different components of agriculture
2. Get acquainted with modern machines and agricultural tools
3. Managing inputs both monetary and non-monetary in a scientific manner
4. Learning about irrigation methods and its precise application
5. Preventing unproductive losses on and off the fields

BAG 206: FUNDAMENTALS OF PLANT PATHOLOGY

Syllabus

Theory

Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Pathogenesis. Causes / factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes.

Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, subdivisions, orders and classes.

Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction.

Viruses: nature, structure, replication and transmission. Study of phanerogamic plant parasites.

Nematodes: General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (*Heterodera*, *Meloidogyne*, *Anguina*, *Radopholus* etc.)

Growth and reproduction of plant pathogens. Liberation / dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. Pathogenesis. Role of enzymes, toxins and growth regulators in disease development. Defense mechanism in plants. Epidemiology: Factors affecting disease development. Principles and methods of plant disease management. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

Practical

Acquaintance with various laboratory equipment's and microscopy. Collection and preservation of disease specimen. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi.

Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites. Study of morphological features and identification of plant parasitic nematodes. Sampling and extraction of nematodes from soil and plant material, preparation of nematode mounting. **Study of fungicides and their formulations.**

Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.

Course Outcomes:

After completing the course, students will be able to:
1. Understand various causes/ factors affecting plant disease.
2. Understand interaction between plant and pathogen in relation to environment and time.
3. Understand about the morphology and life cycle of different plant pathogenic organisms e.g. Fungi, Bacteria etc.
4. Understand various sign and symptoms of Plant diseases.
5. Understand defense mechanism in plants (how they protect themselves from the disease).
6. Understand about the various principles and methods of plant disease management.

BAG 207: FUNDAMENTALS OF ENTOMOLOGY

Syllabus

Theory

Part – I

History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

Part-II

Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors—temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – food competition, natural and environmental resistance.

Part III

Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control importance, hazards and limitations. Recent methods of pest control, repellents, anti feed ants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.

Part – IV

Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigoniidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae,

Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturniidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

Practical

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper) Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. **Insecticides and their formulations.** **Pesticide appliances and their maintenance.** Sampling techniques for estimation of insect population and damage.

Course Outcomes:

After completing the course, students will be able to:

1. Understand that due to the great diversity, remarkable adaptability and genetic flexibility of insects, made them dominant species on the Earth.
2. Understand the characteristics of the phylum Arthropoda and class insecta.
3. Able to understand economic importance of insects.
4. Recognize the major taxonomic Orders of Insect and their key characteristics.
5. Identify harmful insect pest and understand their morphology and physiology.
6. Understand the concept, scope and limitation of IPM.
7. Understand about various environmental factors affecting insects and their biology.

BAG 208: FUNDAMENTALS OF AGRICULTURAL EXTENSION EDUCATION

Syllabus

Theory

Education: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.); various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.). New trends in agriculture extension: privatization extension, cyber extension/ e-extension, market-led extension, farmer-led extension, expert systems, etc.

Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Philosophy of C.D. Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building of extension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods, ICT Applications in TOT (New and Social Media), media mix strategies; communication: meaning and definition; Principles and Functions of Communication, models and barriers to communication. Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories.

Practical

To get acquainted with university extension system. Group discussion- exercise; handling and use of audio visual equipment's and digital camera and LCD projector; preparation and use of AV aids, preparation of extension literature – leaflet, booklet, folder, pamphlet news stories and success stories. Presentation skills exercise; micro teaching exercise; A visit to village to understand the problems being encountered by the villagers/ farmers; to study organization and functioning of DRDA and other development departments at district level. Visit to NGO and learning from their experience in rural development; understanding PRA techniques and their application in village development planning; exposure to mass media: visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

Course Outcomes:

After completing the course, students will be able to:
1.Learn different methods of agriculture technology transfer
2. Methods to be conducted on farm research
3. Bridging the gaps between farmers and researchers
4. Getting feedback to improvise the research activities.

BAG 209: COMMUNICATION SKILLS AND PERSONALITY DEVELOPMENT

Syllabus

Theory

Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication; listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences.

Practical

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations.

Course Outcomes:

After completing the course, students will be able to:
1. .Students will be able to understand and apply knowledge of communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication etc. from multiple perspectives.
2.Students will be able to understand and evaluate key theoretical approaches used in the interdisciplinary field of communication. I.e., students will be able to explain major theoretical frameworks, constructs, and concepts for the study of communication and language, summarize the work of central thinkers associated with particular approaches, and begin to evaluate the strengths and weaknesses of their approaches.
3.Students will be able to find, use, and evaluate primary academic writing associated with the communication discipline.
4. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, etc.
5.. Students will be able to communicate effectively orally and in writing.

BAG301: CROP PRODUCTION TECHNOLOGY – I (*KHARIF* CROPS)

Syllabus

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops. Cereals-rice, maize, sorghum, pearl millet and finger millet, pulses-pigeonpea, mungbean and urdbean; oilseeds- groundnut, and soybean; fibre crops-cotton & jute; forage crops-sorghum, cowpea, cluster bean and napier.

Practical

Rice nursery preparation, transplanting of rice, sowing of soybean, pigeonpea and mungbean, Maize, groundnut and cotton, effect of seed size on germination and seedling vigour of kharif season crops, Effect of sowing depth on germination of *kharif* crops, identification of weeds in kharif season crops, top dressing and foliar feeding of nutrients, Study of yield contributing characters and yield calculation of kharif season crops, study of crop varieties and important agronomic experiments at experimental farm, Study of forage experiments, morphological description of *kharif* season crops, visit to research centers of related crops.

Course Outcomes:

After completing the course, students will be able to:
1.Student will able to plan and manage cultivation of <i>Kharif</i> crops
2.Identify seasonal weeds and their management.
3.Detailed knowledge on geographical adaption of crops and their cultivation practices
4.Qualtiy and other important constituents, storage management and important varieties of different crops

BAG302- FUNDAMENTALS OF PLANT BREEDING

Syllabus

Theory

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixes, self-incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization and Introduction; Centres of origin/ diversity, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Population improvement Schemes- Ear to row method, Modified Ear to Row, recurrent selection schemes; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Maintenance of breeding records and data collection; Wide hybridization and prebreeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and & Farmer's Rights

Practical

Plant Breeder's kit, Study of germplasm of various crops, Study of floral structure of self-pollinated and cross pollinated crops, Emasculation and hybridization techniques in self & cross pollinated crops, Consequences of inbreeding on genetic structure of resulting populations, Study of male sterility system, Handling of segregation populations, Methods of calculating mean, range, variance, standard deviation, heritability, Designs used in plant breeding experiments, analysis of Randomized Block Design, To work out the mode of pollination in a given crop and extent of natural out-crossing, Prediction of performance of double cross hybrids.

Course Outcomes:

After completing the course, students will be able to:

1. Acquaintance with concept, nature and role of plant breeding, major achievements and future prospects
2. Genetics in relation to plant breeding, modes of reproduction and apomixes, self – incompatibility and male sterility- genetic consequences, cultivar options.

3.	Plant Breeder's kit, Study of germplasm of various crops. Study of floral structure of self-pollinated and cross-pollinated crops.
4.	Emasculation and hybridization techniques in self- & cross-pollinated crops.
5.	Student will able to understand different scientific methods to provide improved crop varieties to the farmers /mass.
6.	Student will able to understand advanced technology of plant breeding

BAG303-AGRICULTURAL FINANCE AND COOPERATION

Syllabus

Theory

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits. Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. Lead bank scheme, RRBs, Scale of finance and unit cost. An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India. Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.

Agriculture Cooperation-Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

Practical

Determination of most profitable level of capital use, Optimum allocation of limited amount of capital among different enterprise, Analysis of progress and performance of cooperatives using published data, Analysis of progress and performance of commercial banks and RRBs using published data, Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures, Estimation of credit requirement of farm business – A case study, Preparation and analysis of balance sheet – A case study, Preparation and analysis of income statement – A case study, Appraisal of a loan proposal– A case study, Techno-economic parameters for preparation of projects, Preparation of Bankable projects for various agricultural products and its value added products, Seminar on selected topics.

Course Outcomes:

After completing the course, students will be able to:

- 1.Detailed knowledge on Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture.
- 2.Agriculture credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits.

3. Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture.
4. Student will be able to understand scope and significance of Agriculture Finance.
5. Student will be able to understand significance of cooperatives in Indian agriculture.

BAG304-AGRI- INFORMATICS

Syllabus

Theory

Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.

e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information. Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

Practical

Study of Computer Components, accessories, practice of important DOS Commands, Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management, Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document, MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data, MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system, Introduction to World Wide Web (WWW), Introduction of programming languages, Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools, Introduction of Geospatial Technology for generating valuable information for Agriculture, Hands on Decision Support System, Preparation of contingent crop planning.

After completing the course, students will be able to:

1. Basic knowledge on Computers
2. Anatomy of Computers, Memory Concepts, Units of Memory, Operating System, definition and types.
3. Applications of MS-Office for creating.

4.	Editing and formatting a document. Student will able to learn computer application for the development of agriculture.
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5.	Student will able to learn IT tools for the development of agriculture.
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BAG305: FARM MACHINERY AND POWER

Syllabus

Theory

Status of Farm Power in India, Sources of Farm Power , I.C. engines, working principles of I C engines, comparison of two stroke and four stroke cycle engines , Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication ,fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor , Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practical

Study of different components of I.C.engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow, Familiarization with seedcum- fertilizer drills their seed metering mechanism and calibration, planters and transplanter, Familiarization with different types of sprayers and dusters, Familiarization with different intercultivation equipment, Familiarization with harvesting and threshing machinery.

Course Outcomes:

After completing the course, students will be able to:

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| 1.Student will able to understand use of different farm machinery in Agriculture. |
| 2. Student will able to understand significance of power to operate farm machinery. |
| 3. Detailed knowledge on Status of Farm Power in India, Sources of Farm Power. |
| 4.I.C. engines, working principles of IC engines, comparison of two stroke and four stroke cycle engines, fuel supply and hydraulic control system of a tractor. |
| 5.Tractor types, Cost analysis of tractor power and attached implement. |

BAG306-PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

Syllabus

Theory

Importance of vegetables & spices in human nutrition and national economy, kitchen gardening, brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important vegetable and spices (Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, French bean, Peas; Cole crops such as Cabbage, Cauliflower, Knol-khol; Bulb crops such as Onion, Garlic; Root crops such as Carrot, Raddish, Beetroot; Tuber crops such as Potato; Leafy vegetables such as Amaranth, Palak. Perennial vegetables)

Practical

Identification of vegetables & spice crops and their seeds, **Nursery raising**, Direct seed sowing and transplanting, Study of morphological characters of different vegetables & spices, Fertilizers applications, Harvesting & preparation for market, **Economics of vegetables and spices cultivation.**

Course Outcomes:

After completing the course, students will be able to:
1.To study about origin, area, production, improved varieties and cultivation practices.
2.Student will able to understand importance of vegetable and spices in nutrition and economy
3.Student will able to learn cultivation of vegetable and spices

BAG309-LIVESTOCK AND POULTRY MANAGEMENT

Syllabus

Theory

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

Practical

External body parts of cattle, buffalo, sheep, goat, swine and poultry, Handling and restraining of livestock, Identification methods of farm animals and poultry, Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records, Judging of cattle, buffalo and poultry, Culling of livestock and poultry, Planning and layout of housing for different types of livestock, Computation of rations for livestock, Formulation of concentrate mixtures, Clean milk production, milking methods, Hatchery operations, incubation and hatching equipments, Management of chicks, growers and layers, Debeaking, dusting and vaccination, Economics of cattle, buffalo, sheep, goat, swine and poultry production.

Course Outcomes:

After completing the course, students will be able to:
1. Understood the importance of farm animals and its influence in rural economy
2. Gained knowledge on characteristics of indigenous and exotic breeds of cattle, goat, buffalo, swine and poultry
3. knowledge on management of farm animals, its nutrient requirement and its housing Reproduction in farm animals and poultry.
4. Housing principles.
5. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers.

BAG401: CROP PRODUCTION TECHNOLOGY –II (*RABI* CROPS)

Syllabus

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; cereals –wheat and barley, pulses-chickpea, lentil, peas, oilseeds-rape seed, mustard and sunflower; sugar crops-sugarcane; medicinal and aromatic crops- mentha, lemon grass and citronella, Forage crops-berseem, lucerne and oat.

Practical

Sowing methods of wheat and sugarcane., Identification of weeds in *rabi* season crops., Study of morphological characteristics of *rabi* crops., Study of yield contributing characters of *rabi* season crops., Yield and juice quality analysis of sugarcane., Study of important agronomic experiments of *rabi* crops at experimental farms., Study of *rabi* forage experiments, oil extraction of medicinal crops, visit to research stations of related crops.

Course Outcomes:

After completing the course, students will be able to:
1. Students will be able to know about the economic importance of medicinal and Aromatic crops in present sphere.
2. Will be able to identify weeds, pest and diseases along with their management.
3. It will be helpful to know about basic morphological characteristics of <i>Rabi</i> crops.

BAG402: PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAP AND LANDSCAPING

Syllabus

Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping, Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, liliun and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

Practical

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

Course Outcomes:

After completing the course, students will be able to:
1. To evaluate natural herbal products from an economic perspective.
2. To use medicinal and aromatic herbs sustainably.
3. To set up business related to medicinal, aromatic and landscaping.
4. To develop effective ideas related to collecting, processing and marketing herbal naturalsources.
5. Understand medicinal value of different plants

BAG 403: RENEWABLE ENERGY AND GREEN TECHNOLOGY

Syllabus

Theory

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bio alcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier. To study the production process of biodiesel, To study briquetting machine. To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker. To study solar drying system. To study solar distillation and solar pond.

Course Outcomes:

After completing the course, students will be able to:
1. Understand the role of renewable sources in agriculture sector
2. Understand the bio fuel production and their applications in today's world.

BAG 404: PROBLEMATIC SOILS AND THEIR MANAGEMENT

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils.

Irrigation water–quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystem.

Course Outcomes:

After completing the course, students will be able to:
1. Knowledge of different reclamation and management practices for the development of the soils.
2. Understand the different factors responsible for saline ,sodic and acidic soils and their properties
3. Capable of identifying problematic soils in India and their management

BAG 405: PRODUCTION TECHNOLOGY FOR FRUIT AND PLANTATION CROPS

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, sapota, apple, pear, peach, walnut, almond and; minor fruits- date, ber, pineapple, pomegranate, jackfruit, strawberry, plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Practical

Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops. Description and identification of fruit. Preparation of plant bio regulators and uses, Important pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchards.

Course Outcomes:

After completing the course, students will be able to:
1. Students will understand package of practices for the major crops like mango, banana, guava, lemon, pineapple, coffee, coconut and rub

BAG 406: PRINCIPLES OF SEED TECHNOLOGY

Syllabus

Theory

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.

Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

Practical

Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard. Seed production in important vegetable crops. Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Grow out test and electrophoresis. Seed certification: Procedure, Field inspection, Preparation of field inspection report. Visit to seed production farms, seed testing laboratories and seed processing plant.

Course Outcomes:

After completing the course, students will be able to:
1. To supply the disease free seed in the market to get the environment friendly cultivation of crops.
2. To increase the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also.
3. Production of hybrid seed of different crops to increase the farm income.

4. Store the pure variety seed to avoid the availability crises of pure variety seed due to adverse environmental conditions.

BAG 407: FARMING SYSTEM & SUSTAINABLE AGRICULTURE

Theory

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

Course Outcomes:

After completing the course, students will be able to:
1. The student will be able to design and develop farming system models.
2. The will learn efficient management of different farming system components

BAG 408: AGRICULTURAL MARKETING TRADE & PRICES

Theory

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities; product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

Practical

Plotting and study of demand and supply curves and calculation of elasticities. Study of relationship between market arrivals and prices of some selected commodities. Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies, Identification of marketing

channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. To study their organization and functioning; Application of principles of comparative advantage of international trade.

Course Outcomes:

After completing the course, students will be able to:
1. Increase in Farm Income: An efficient marketing system ensures higher levels of income for the farmers by reducing the number of middlemen or by restricting the commission on marketing services and the malpractices adopted by them in the marketing of farm products.
2. Growth of Agro-based Industries: An improved and efficient system of agricultural marketing helps in the growth of agro-based industries and stimulates the overall development process of the economy. Many industries depend on agriculture for the supply of raw materials.
3. Adoption and Spread of New Technology: The marketing system helps the farmers in the adoption of new scientific and technical knowledge. New technology requires higher investment and farmers would invest only if they are assured of market clearance.
4. Addition to National Income: Marketing activities add value to the product thereby increasing the nation's gross national product and net national product.
5. Will learn different production factors and their rationalization

BAG 501: PRINCIPLES OF INTEGRATED PEST AND DISEASE MANAGEMENT

Theory

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis. Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level. Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes.

Practical

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement. Assessment of crop yield losses, calculations based on economics of IPM, Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. Crop monitoring attacked by insect, pest and diseases. Awareness campaign at farmers fields.

Course Outcomes:

After completing the course, students will be able to:
1. Understand Economic importance of insect pest,disease and pest risk analysis.
2. Understand different tools of IPM like cultural and mechanical practices etc. to manage insect pest and diseases.
3. Understand Political , Social and Legal implication of about Integrated Pest Management.
4. Understand maximum ideas regarding the control measures and management of diseases and pest.
5. Understand detail account of pesticide and their uses in the crops.
6. Understand why judicious use of chemical control is necessary.

7. Understand the importance of Survey, Surveillance and Forecasting of Insect Pest and Disease.

BAG505: ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS

Syllabus

Theory

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development, Impact of economic reforms on Agribusiness/ Agri enterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for Agri entrepreneurship and rural enterprise.

Practical

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision. Identification and selection of business idea. Preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs.

Course Outcomes:

After completing the course, students will be able to:
1. Identify the elements of success of entrepreneurial ventures
2. Understand the effectiveness of different entrepreneurial strategies
3. Can Interpret their own business plan
4. Will be able to analyze the business environment in order to identify business opportunities.

BAG507: GEOINFORMATICS AND NANO-TECHNOLOGY AND PRECISION FARMING

Syllabus

Theory

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; **Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions;** Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; **STCR approach for precision agriculture; Nanotechnology,** definition, concepts and techniques, brief introduction about nanoscale effects, **nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.**

Practical

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming.

Course Outcomes:

After completing the course, students will be able to:
1. More effective use of inputs results in greater crop yield and/or quality, without polluting the environment.
2. Creating awareness amongst farmers about consequences of applying imbalanced doses of farm inputs like irrigation, fertilizers, insecticides and pesticides.
3. Precision agriculture can address both economic and environmental issues that surrounded production agriculture today.

BAG 602: PROTECTED CULTIVATION AND SECONDARY AGRICULTURE

Syllabus

Theory

Green house technology: Introduction, Types of Green Houses; **Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.** Green house equipment's, materials of construction for traditional and low cost green houses. **Irrigation systems used in greenhouses,** typical applications, passive solar green house, hot air greenhouse heating systems, green house drying. **Cost estimation and economic analysis.**

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Practical:

Study of different type of greenhouses based on shape. **Determine the rate of air exchange in an active summer winter cooling system.** Determination of drying rate of agricultural products inside green house. Study of greenhouse equipment's. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

Course Outcomes:

After completing the course, students will be able to:
1. Conservation of soil by adopting latest soil conservation techniques will help in obtaining higher production of Rain-fed crops
2. Student can able to understand about rainfed agriculture and its introduction, problem and prospects in India
3. Student can able to understand objective, principles and componentof watershed management.

BAG 604: POST-HARVEST MANAGEMENT AND VALUE ADDITION OF FRUITS AND VEGETABLES

Syllabus

Theory

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning – Concepts and Standards, packaging of products.

Practical

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

Course Outcomes:

After completing the course, students will be able to:
1. Understand the different causes of post harvest losses.
2. Gives knowledge about storage chain of fruits and vegetables and their field handling.
3. Imparts knowledge of food preservation methods to prevent post harvest losses.
4. Understand the various food standards and quality control for food preservation.

BAG 605: MANAGEMENT OF BENEFICIAL INSECTS

Syllabus

Theory

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants.

Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control.

Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

Practical

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies

Course Outcomes:

After completing the course, students will be able to:

1. Understand the importance of beneficial insects.
2. Understand about the commercial methods of rearing of Honey bee, Silk worm and Lac insect.
3. Understand about the pest and disease in beekeeping, Sericulture and Lac culture.
4. Recognize major pest and predators used in biological control.

5. Familiar about the important species of pollinators, weeds killers and scavengers.

BAG 607: PRINCIPLES OF ORGANIC FARMING

Syllabus

Theory

Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

Practical

Visit of organic farms to study the various components and their utilization. Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis. Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management. Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.

Course Outcomes:

After completing the course, students will be able to:
1. Understanding the concept of Organic farming.
2. Learning the production techniques for organic crop production
3. Preparation of manures and natural pesticides.
4. Understand the process of organic certification.

BAG 852: Seed Production and Technology

Theory

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification - phases of certification, procedure for seed certification, field inspection. Post harvest inspection - processing, bagging and tagging. Seed Act and Rules - Seed law enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983 - Salient features of PPV&FRA 2001 - National Seed Policy 2002 - Seed Bill 2004. Seed testing for quality assessment - importance - Varietal identification through grow out test, molecular and biochemical test.

Practical

Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea. Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard. Seed production in important vegetable crops. Seed sampling and testing: Physical purity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Grow out test and electrophoresis. Seed certification: Procedure, Field inspection, Preparation of field inspection report. Visit to seed production farms, seed testing laboratories and seed processing plant.

Course Outcomes

At the end of the course the student should be able to:

1. To supply the disease free seed in the market to get the environment friendly cultivation of crops.
2. To increase the farm income by producing high yielding disease free quality seed and decrease the cost of cultivation also.
3. Production of hybrid seed of different crops to increase the farm income.

4. Store the pure variety seed to avoid the availability crises of pure variety seed due to adverse environmental conditions.

BAG 853 MUSHROOM CULTIVATION TECHNOLOGY

Theory

Introduction to mushroom fungi, nutritional value, edible and poisonous type, edible mushrooms, Designing and construction of Mushroom farm, Acquittance with infrastructure, equipment's and machineries required in mushroom cultivation practices, Role of composting in Mushroom Cultivation and methods of composting, Cultivation of different types of Mushroom growing , Disease control and pest management of mushroom, Methods of harvesting of Mushroom. Harvesting, packing and storage; Medical mushroom, Problems in cultivating in mushroom.

Practical

Identification of different types of mushrooms, Identification of equipment and sterilization techniques for culture media, Preparation of culture media for mother spawn production and multiplication of spawn, Preparation of compost for mushroom cultivation, Cultivation of different types of mushrooms (Button, oyster and milky mushroom), Harvesting packaging & grading and storage of Mushroom.

Course outcome:

At the end of the course the student should be able to:

1. Identify edible, poisonous and medicinal mushrooms.
2. Prepare media for pure culture of edible mushrooms species and their long-term preservation.
3. Suggest mushroom farm layouts and substrates for cultivation.
4. Manage pests and pathogens affecting mushrooms.
5. Market mushrooms profitably.

BAG 854 SOIL, PLANT, WATER AND SEED TESTING

Theory

Soil sampling, soil testing methods processing for analysis, types of soil, soil properties, soil pollutants, role of soil testing for environment, uses of soil testing. Introduction to plant sample, plant nutrient, methods and processing of plant testing, application of plant testing, leaf area index. Seeds, types of seed, characteristics of seed, seed testing. Seed sampling intensity, Physical Purity of seeds, seed germination, seed dormancy, viability and vigor. Introduction to water testing, types of water, water pollutants, role of water testing for environment, Uses of water testing.

Practical

Collection of Soil and plant sample for testing, soil moisture estimation gravimetric, tensiometer, estimation of Carbon, Nitrogen, Phosphorus, Potassium and organic matter in soil and plant, determination of soil pH, texture, bulk density and water holding capacity, Structure of monocot and dicot seeds of important plant species; identification and handling of instruments used in seed testing laboratory; identification of seeds of weeds and crops; purity analysis of samples of different crops; determination of test weight and seed moisture content (oven method); seed dormancy breaking methods requirements for conducting germination test, specifications viability testing by tetrazolium test in different crops; seed and seedling vigor tests applicable in various crops; determination of pH and turbidity, Determination of chloride, iron, fluoride.

Course Outcomes

At the end of the course the student should be able to:

1. Student will gain knowledge on concepts of soil, plant water and seed.
2. Knowledge on soil quality and health
3. Understand the problem and protentional of soil for most appropriate land use.
4. Understand the reclamation and management of soil
5. Useful in making decision on nutrient dose, choice of fertilizer and methods of applications for better crop production.
6. Will be able to understand seed quality attributes and factors affecting seed quality
7. Will learn the steps of seed production and their certification

BAG 855 COMMERCIAL BEEKEEPING

Theory

Introduction- Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Identification of Flora and location of sites. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in crosspollinated plants. Use of Bee Boxes and other Tools, Description and demonstration of use of different boxes, Cleaning of boxes. Other tools in Bee Keeping. Building of Comb, Building of comb and colony, Division of colony, Raw produce generated by different life stages of bees. Harvesting, Processing and Preservation of Honey, Methods of harvesting honey, Processing and Preservation of honey. Costing, Pricing, Packaging & Marketing of Honey. Methodologies adopted for costing, pricing. Packaging and labelling and branding. Marketing Management.

Practical

Identification of different Honey bee species, castes of bees.

Identification of Beekeeping appliances and seasonal management practices.

Identification of bee enemies and disease.

Bee pasturage, bee foraging and communication.

Visit to research and training institutions devoted to beekeeping

Field Visit & Interaction with Bee Keepers and other Support Agencies.

Course Outcomes

At the end of the course the student should be able to:

- Understand the importance of embarking on self-employment and has developed the confidence and personal skills for the same.
- Establish Bee Keeping unit and run it profitably
- Select suitable species and races of bees for Bee keeping.
- Maintain the Bee hives in a scientific way 8. Work out the economics of Bee Keeping
- Understand the methodologies of in extracting, preservation and marketing of honey and other products of honey bee

BAG 856 POULTRY PRODUCTION TECHNOLOGY

Theory

Significance of poultry production. Poultry rearing–backyard system, semi-intensive system, intensive system: deep litter, slat system, wire floor, cage houses and raised platform cage houses. Cages and its types. Environmentally controlled houses, floor space, watering and feeding. Space requirements and rearing conditions. Selection of site and location of poultry farm – importance of poultry housing and equipments. Feeder and drinker-pipeline, automatic drinker and nipple drinker arrangements. Principles of housing-location and basic principles of construction. Shed dimension measurement and area calculation, different shed designs and layout and poultry shed housing materials. Hatchery: layout, design and location. Single and multistage incubators. Methods of incubation. Incubation periods. Physical factors and requirements for incubating eggs–temperature, humidity, gaseous environment, position and turning of eggs. Collection, selection, cleaning, sanitation and storage of hatching eggs. Setting, candling, transfer, hatching, pedigree hatching, chicks pull out, grading, vaccinations and medications. Layer farm, system, economic traits, pre-laying and laying management. Feeding types, male and female management. Pre-peak, Peak and Post-peak laying period management, watering and lighting. Culling of unproductive birds, moulting, forced moulting, monitoring, egg production curve and record keeping. Flock uniformity. Seasonal management of layer birds. Broiler farm: calculating FCR, EEF, CFR, day gain, mean age and cost of production. Breeder farm: brooding and growing, cost of production/ bird, cost of production Vs. egg returns, mortality %, livability %, FCR for eggs, HD %, HE %, HHHE %, HHE %, Egg mass, CPP, and visual control system (VCS). Maintaining poultry farms with healthy flocks and usage of bio-security system. System of feeding: restricted and controlled, use of additives and non-additives, enzymes, probiotics, prebiotics and antibiotics, herbs and performance enhancers and utilization of non-conventional feedstuff. Organic chicken and lean meat production technology. Broiler duck production, management of broiler quail and goose. Disease management, processing and products. By-products. Egg formation, structure, quality, size, preservation, processing, grading and packaging. Poultry meat: chemical and nutritive value, composition, flavor, tenderness, meat processing, carcass yield and characteristics. Ready-to-Cook and Ready-to-Eat chicken. Waste utility: Design and layout of rendering plant. Manure and biogas generation from hatchery and slaughter house waste. Dead bird disposal and disposal of diseased birds. Bio-hazards of poultry waste. Broiler performance indices. Role of cooperative, public and private sectors in marketing. Heat resistant breeds to suit different

climatic regions. Climatic factors affecting poultry production in housed conditions and their management. Weather forecasting. Visit to commercial poultry farms. Lecture by industrial experts on recent developments in poultry farming.

Practical

Study the Rural Chicken and its types, Other poultry species (Duck, Japanese quails, Turkey, Geese, Guinea Fowl and Pigeon), Per capita meat and egg availability in India and other regions, Poultry integration and farming process – Commercial Broiler and Commercial Layer, Poultry integration and farming process – Breeder, Broiler and Layer, Shed dimension measurement and area calculation, Different shed designs and layout, Poultry shed roofing materials, Feeder and drinker alignment – layout, Feeder and drinker – dismantling and assembling, Brooding equipment's – dismantling and assembling, Pipeline, automatic drinker and nipple drinker, line arrangement – connectivity and operations, Curtain arrangements – types and setup cost, Water sample collection-pH and hardness measurement, Different kinds of automation system in poultry – visit to feed mill, Hatchery, Processing Plant, Breeder, Broiler and Layer farms. Hatchery design, layout and equipments, Grading of hatching eggs – egg setting, Candling of incubated eggs and transfer to hatcher, chick grading, vaccination, sexing methods, Break open study of unhatched eggs – infertile, dead germ, dead in shell, malformation, malposition, Chick transportation methods, Hatchery waste disposal methods and sanitation methods.

Course Outcomes

At the end of the course the student should be able to:

1. To understand the concepts of poultry rearing and poultry farming
2. To supervise a hatchery
3. To organize healthy and uniform flock of poultry in farm
4. To sell the by-products,
5. To utilize and dispose waste from a poultry farm
6. Recommend poultry business and marketing strategies
7. Understand the emerging trends and challenges in poultry industry

BAG 857: COMMERCIAL HORTICULTURE

Theory

Scope and importance, classification of horticultural crops and nutritive value, area and production, exports and imports, fruit and vegetable. Kitchen garden and other types of gardens – principles, planning and layout, management of orchards, planting systems and planting densities. Production and practices for fruit, vegetable and floriculture crops. Principles objectives, types and methods of pruning and training of fruit crops, types and use of growth regulators in horticulture. Irrigation – methods, Fertilizer application in horticultural crops.

Practical

Identification of garden tools. Identification of horticultural crops. Preparation of seed bed/nursery bed. Practice of sexual and asexual methods of propagation including micro-propagation. Layout and planting of orchard. Training and pruning of fruit trees. Preparation of potting mixture. Fertilizer application in different crops. Visits to commercial nurseries/orchard.

Course Outcomes

At the end of the course the student should be able to:

1. To get familiar with important horticultural crops
2. Preparation of quality planting material
3. Designing and shaping of trees

4. Learning about orchard management
5. Understand training and pruning of fruits crops

BAG 858: FLORICULTURE AND LANDSCAPING

Theory

Scope and importance of floriculture in India. Present status, Future prospects and strategies needed for improvement. Area, production and exports. Production technology of **Rose, Chrysanthemum, Jasmine, Marigold, Gebera, Tuberose and Dahlia.**

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application

Practical

1. Preparation of nursery bed for flower seeds sowing.
2. Identification of important flower crops and their varieties
3. Training and Pruning of Roses in open and polyhouses
4. Propagation of rose by cutting and budding
5. Propagation methods in chrysanthemum
6. Layering methods for Jasmine propagation
7. layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden)
8. Field visit to commercial flower growing area

Course Outcomes

At the end of the course the student should be able to:

1. Familiarized with the production technology of commercially utilized flower crops.
2. Learnt about the various styles of gardening.
3. Landscape use of trees, shrubs and climbers were studied
4. Got familiarized with the harvesting and post-harvest handling of flower crops

BAG 859 FOOD PROCESSING

Theory

Fruits and vegetables as living products: Chemical composition; pre and post harvest changes, maturity standards for storage, desirable characteristics of fruits and vegetables of processing. Post harvest handling of fresh fruits and vegetables. Fruit and vegetable juices: Preparation of juice, syrups, squashes, cordials, and nectars; concentrations and drying of juice, packaging and storage and concentrations and powders; fortified and soft drinks. Preparation of preserve and candied fruits. Pickles and chutneys: Preparation of various types of pickles-theory and practice; preparation of sauces and chutneys; problems relating to the shelf life of pickles and chutneys; quality control.

Practical

1. Dehydration of fruits and vegetables
2. Preparation of tomato products like ketchup, puree & past
3. Preparation of Jam, Jelly, marmalade, preserve and fruit candy.
4. Preparation and analysis of fruits beverages i.e. Squash and cordial.

Course Outcomes

At the end of the course the student should be able to:

1. Understand, use and apply the knowledge, skills of quality management in food processing.
2. Understand the chemical, technological and toxicological aspects of food additives in food preservation.

BAG 860 AGRICULTURAL WASTE MANAGEMENT

Theory

Introduction to agricultural waste management, Nature and characteristics of agricultural waste and their impact on the environment, Kinds of wastes, Classification, role of soil and plants in waste management, sources of waste, impact of waste on soil and plant quality, Biological processes of waste management, Utilization and Recycling of Agricultural waste, Potential of Recyclable Crop Residues and its management, Composting and Vermicomposting for bio conservation of biodegradable waste, Biogas Technology. Impacts of waste on human, animal health and environment., environmental benefit of waste management.

Practical

Collection and preparation agricultural waste sample. Determination of pH, EC, CECe, heavy metals, BOD, COD, TSS, TDS, NH₄, Total P, and dissolved reactive P. Nutrient status (N, P, K, secondary and micronutrients) analysis of agricultural waste. Survey of different agri waste from live stock, dairy, poultry, food processing, fruit & vegetable and agri-chemicals, Preparation of compost, Vermicomposting, biogas and analysis of compost.

Course outcome

1. To impart knowledge to students on various methods of agricultural waste management for eco-friendly energy and manure production
2. Various eco-friendly methods for agricultural waste management
3. Nutritive value and energy production potential of agro wastes.

BAG 862 COMMERCIAL SERICULTURE

Theory

Introduction of Sericulture, Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, Varieties of Mulberry, its cultivation methods depending on geographical area and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Support from the Govt. in marketing of silk cocoons. Procedure and transportation methods to be adopted in marketing cocoons in Market. Differentiation in quality in different cocoons viz., By-Voltaine, variety, China Silk variety, Ericulture etc. Rearing appliances of mulberry silkworm and methods of disinfection. Diseases and its control methods for Mulberry. Pests and its control methods in different varieties of Mulberry plant. Common diseases and insect pest Management of worms from stage by stage. Silk worm rearing techniques – Scientific methods Climatic conditions and its factors attributing for rearing. Role of temperature, humidity and intensity of light on rearing.

Precautions to be observed in maintaining rearing house, Different pests that will attack the worms etc., Importance of grainage and its characteristics, Eggs to be hatched and eggs to be laid. Copulation of the Moth and egg laying. Importance of Chawki rearing Silkworms feeding methods. Methodology of feeding worm at different stages.

Practical

Identification of different Silkworm species.

Identification of different Mulberry species its cultivation practices and seasonal practices.

Identification of insect pest and disease of silkworm and Management practices.

Identification of various equipment's for rearing of silkworm and cocoon production

Course Outcomes:

At the end of the course, the students will be able to

- Understand the importance of embarking on self-employment and has developed the confidence and personal skills for the same.
- Establish sericulture unit and run it profitably
- Select suitable species and species of silkworm for Sericulture.
- Manage pests, diseases and other fluctuating conditions to ensure consistent production of cocoons.
- Package of practices of Mulberry cultivation for silkworms Understanding the life cycle of the Silk worm ,Rearing of silk worm.
- Aspects related to healthy rearing, impact of weather on cocoon production
- Use of various equipments for cocoon production.
- Aspects related to grading and sorting of Cocoons.

- Cocoon storage, handling and transportation.
- Understanding the dynamics of cocoon market and marketing of cocoon.
- Knowledge of various agronomic practices for mulberry cultivation
- Know the pests and diseases affecting the crop, how to control them , and their effects on crop yield.
- Understands which breed of Silk worm to rear, its advantages, market demand etc.
- Understands the life cycle of the Silkworm, different stages of lifecycle etc, how to feed when to feed, , when to change the trays, when to shift the larvae from trays to Chandrikas



SCHEME OF INSTRUCTION & SYLLABUS

FOR

MASTERS OF SCIENCE

IN

FOOD TECHNOLOGY

(w.e.f. Academic Session 2019)

Department of Food Technology

Invertis Institute of Applied Sciences & Humanities

INVERTIS UNIVERSITY, BAREILLY

Program Outcomes of M.Sc Food Technology

After completion of the program of M.Sc. in Food Technology, every student will know the following attributes

- PO1**Course imparts knowledge and understanding of Biology, Biochemistry, Food Chemistry, Food Microbiology, Food Science, Food processing, Food safety, Food Engineering, Food quality, Food product storage, Food product preservation, Food product packaging and Food product distribution.
- PO2**Provides sufficient understanding and cognitive abilities to design and develop technologies for food processing, preservation and packaging as per the legal and safety requirements.
- PO3**Imparts knowledge and training to develop carry out research, transferable skills and entrepreneurship abilities.
- PO4**To train students on use of various instrumentation for the evaluation of food quality and safety.
- PO5**To impart knowledge and understanding of technology of vegetables, fruits, meat, poultry, dairy and sea foods, bakery and confectionery to use it for further value addition and contribute towards food safety.
- PO6**To train students to conduct scientific experiments and document scientific investigations.
- PO7**Develops ability to extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data.

SCHEME OF EVALUATION
M.Sc. –FOOD TECHNOLOGY
I-YEAR, SEMESTER-I
(w.e.f. academic session 2019)

S. No.	Course Code	SUBJECT	PERIODS			CREDIT	MARKS DISTRIBUTION		
			L	T	P		IAM	ESM	TOTAL
THEORY									
1	MFT-101	Principle of Food Processing	3	1	0	4	30	70	100
2	MFT-102	Food Chemistry	3	1	0	4	30	70	100
3	MFT-103	Instrumentation and Analytical Techniques	3	1	0	4	30	70	100
4	MFT-104	Principles of Food Engineering	3	1	0	4	30	70	100
5	MFT-105	Enzymes in Food Processing	3	1	0	4	30	70	100
PRACTICAL / TRAINING / PROJECT / SEMINAR									
5	MFT-151	Food Processing Lab	0	0	4	2	15	35	50
6	MFT-152	Food Chemistry Lab	0	0	4	2	15	35	50
7	MFT-153	Instrumentation Lab	0	0	4	2	15	35	50
8	MFT-155	Seminar I	0	0	0	2	50	0	50
Total			15	5	12	28	245	455	700
L – Lecture; T – Tutorial; P – Practical; C – Credit; IAM – Internal Assessment Marks; ESM – End Semester Marks									

SCHEME OF EVALUATION
M.Sc. – FOOD TECHNOLOGY
I-YEAR, SEMESTER-II
(w.e.f. academic session 2019)

S. No.	Course Code	SUBJECT	PERIODS			CREDIT	MARKS DISTRIBUTION		
			L	T	P		IAM	ESM	TOTAL
THEORY									
1	MFT-201	Post Harvest Technology of Horticulture Crops	3	1	0	4	30	70	100
2	MFT-202	Food Microbiology	3	1	0	4	30	70	100
3	MFT-203	Packaging of Food Materials	3	1	0	4	30	70	100
4	MFT-204	Research Methodology, Biostatistics and Computer Applications	3	1	0	4	30	70	100
5	MFT-205	Technology of Meat and Poultry Products	3	1	0	4	30	70	100
PRACTICAL / TRAINING / PROJECT / SEMINAR									
6	MFT-251	Food Microbiology Lab	0	0	4	2	15	35	50
7	MFT-252	Meat and Poultry Products Lab	0	0	4	2	15	35	50
8	MFT-253	Food Engineering Lab	0	0	4	2	15	35	50
9	MFT-255	Seminar II	0	0	0	2	50	0	50
Total			15	5	12	28	245	455	700
L – Lecture; T – Tutorial; P – Practical; C – Credit; IAM – Internal Assessment Marks; ESM – End Semester Marks									

MFT-101 Principles of Food Processing	
Teaching Scheme Lectures: 1 hr./ week Tutorials: 1 Credits: 4	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Course Objectives:

- 1.To give knowledge of historical development of food processing and preservation.
- 2.To give knowledge of general aspects of methods of food processing and preservation.
- 3.Gives knowledge of effect of processing on different foods.
- 4.To impart knowledge on technology behind various food processings.

Detailed Syllabus

Module I
Introduction: Definition and scope of Food Science and Technology, historical development of food processing and preservation, general principles of food preservation. Preservation by heating: Principles of the method, Types of microorganisms, bacterial load, sterilization and commercial sterility, thermal resistance of the microorganisms and enzymes.
MODULE 2
Canning and bottling: General aspects of canning and bottling, processing operations exhausting and sealing, retorting, ultra-high temperature processes, determination of thermal process time, processing equipments, canning/bottling of various food products . Refrigeration and freezing preservation: Refrigeration and storage of fresh foods, major requirements of a refrigeration plant, controlled atmospheric storage, refrigerated storage of various foods, freezing point of selected foods, influence of freezing and freezing rate of the quality of food products, methods of freezing, storage and thawing of frozen foods.
MODULE 3
Drying and dehydrations: Sun drying of various foods , water activity and its effect on the keeping quality, sorption isotherms and their use. Characteristics of food substances related to their dehydration behavior, drying phenomenon, factors affecting rate of drying, methods of drying of various food products, type of driers and their suitability for different foods; intermediate moisture foods .
MODULE 4
Concentration (Evaporation): Application in food industry, processes and equipment for manufacture of various concentrated foods and their keeping quality, Properties of liquid, single and multiple effect evaporation, Radiations: Sources of radiations, effect on microorganisms and different nutrients; Radiation Modules and doses for foods, dose requirements for radiation preservation of foods, safe limits, irradiation mechanism and survival curve, irradiation of packaging materials. Microwave Heating: Principles and application in food processing.
MODULE5
Chemical preservation: Preservation of foods by use of sugar, salt, chemicals and antibiotics and by smoking . Effect of various food processing operations on the nutrients of foods.
TEXT / REFERENCE BOOKS

1. Arsdel W.B., Copley, M.J. and Morgen, A.I. 1973. Food Dehydration, 2nd Edn. (2 vol. Set). AVI, Westport.
2. Bender, A.E. 1978. Food Processing and Nutrition. Academic Press, London.
3. Fellows, P. and Ellis H. 1990. Food Processing Technology: Principles and Practice, New York.
4. Jelen, P. 1985. Introduction to Food Processing. Prentice Hall, Reston Virginia, USA.
5. Lewis, M.J. 1990. Physical Properties of Food and Food Processing Systems. Woodhead, UK.
6. Wildey, R.C. Ed. 1994. Minimally Processed Refrigerated Fruits and Vegetables. Chapman and Hall, London.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the historical development of food science and technology.
2. Understand the types of food processing methods.
3. Understand about the different terminology related to food processing.
4. Understand the different types of preservation methods.
5. Understand the basic principles, concepts and mechanism of food processings.

MFT-102 Food Chemistry	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give knowledge of various food molecules and their food chemistry.
- 2.To give knowledge about mechanism of reactions involved within food.
- 3.Gives knowledge of dietary requirements and nutritional value.
- 4.To impart knowledge on technology for food fortification..

Detailed Syllabus

MODULE 1
Energy metabolism: Basal metabolic requirements and activity. Recommended Dietary allowances: Concept of a balanced diet, Menu planning. Water: properties, bonding and chemistry. Carbohydrates: Classification, structure and properties of carbohydrates. Role of carbohydrates in food industry. Sugar, starch, cellulose, glucans, hemicelluloses, gums, pectic substances, polysaccharides. Dietary requirements, Deficiency, Metabolic defects such as diabetes associated with carbohydrates.Modified starch.
MODULE 2
Browning reaction in foods: Enzymatic and non-enzymatic browning in foods of vegetable and animal origin during storage and processing of foods. Proteins: Classification, structure, properties, purification and denaturation of proteins. Protein interaction and degradation, protein-protein interaction, protein-lipid complexes and protein-carbohydrate complex. <u>Single cell proteins</u> Major protein systems and factors affecting them, the nature of interaction in proteins derived from milk. Egg proteins, meat proteins, fish muscle proteins, oil seed proteins and cereal proteins . Metabolic antagonist and allergens associated with food proteins. Concept of protein quality, dietary requirements, deficiency symptoms
MODULE 3
Lipids: Classification and physico-chemical properties of food lipids. Refining of crude oils, hydrogenation and winterization. Vegetable and animal fat, margarine, lard, butter. Frying and shortening. Flavor changes in fats and oils, lipid oxidation, factors affecting lipid oxidation, auto-oxidation, biological significance of auto-oxidation of lipids. Dietary requirements, effects of excess and deficiency: obesity, cardiovascular diseases.Metabolic antagonist and allergens associated with food proteins. Modified protein. Enzymes: Nature, classification and properties of food enzyme, enzyme activity in different food systems, commercial availability. Food enzyme technology. Immobilization of enzymes, removal of toxicants through enzymes, flavor production by enzymes.
MODULE 4
Vitamins: Role of vitamins in food industry, effect of various processing treatments and fortification of foods . Food sources, effects of deficiency Minerals: Role of minerals in food industry, effects of various processing treatments. Effects of excess, if any, and deficiency.
MODULE 5
Biological changes in foods: Plant pigments and their roles in food industry. Bitter substance and tannins.Flavor Composition of Foods and beverages Emulsion: Definition, Theory, Emulsifiers: Properties, role & action in stabilizing an emulsion

Text/ References Books:

1. Aurand, L.W. and Woods, A.E. 1973. Food Chemistry. AVI, Westport.
2. Birch, G.G., Cameron, A.G. and Spencer, M. 1986. Food Science, 3rd Ed. Pergamon Press, New York.
3. Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
4. Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi.
5. Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.
6. Belitz HD.1999. Food Chemistry. Springer Verlag.
7. DeMan JM. 1976. Principles of Food Chemistry. AVI.
8. Fennema OR.1996. Food Chemistry. Marcel Dekker.
9. Meyer LH. 1987. Food Chemistry. CBS

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types energy metabolism.
2. Understand the steps of various food reactions.
3. Understand about the different molecules present in food, their structure and function.
4. Understand the different diseases related to over nutrition.
5. Understand the basic of technologies like immobilization and food fortification.

MFT-103 Instrumentation and Analytical Techniques	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give knowledge of various process variables in food processing.
- 2.To give knowledge about principles and equipments related to various food technologies.
- 3.Gives knowledge of various chromatographic techniques.
- 4.To impart knowledge on technology various sensor based system in food technology.

Detailed Syllabus

MODULE I
Process variables in food processing industries: Canned and bottled fruits and vegetables, Beer, Ciders, Soft drinks, Sugar, Jams and Jellies, Black tea. Classification of transducers: Definitions, active and passive transducers, resistive, capacitive, inductive, magnetic, optical, hall sensors. Moisture measurements: Role of moisture in food, weigh and dry method, microwave absorption method, RF, IR, DC resistance technique, moisture release measurement. Humidity measurement: Role in food processing, types, wet and dry bulb hygrometer, Electronic methods. Turbidity and colour: Role, standards and Modules, basic turbidity meter, light scattering type, absorption type, reflectance type colour measurement, digital image processing method.
MODULE II
Food flow and viscosity: Magnetic flow meter, flow meter, man flow meter, turbine flow meter, gravimetric feeder meter, definition of viscosity, Newtonian and non-Newtonian flow, various types of viscometers. Brix and pH: Brix standard, refractometer, pH scale, role of brix and pH in food. pH electrode.
MODULE III
Food enzymes and flavour: Importance of enzyme sensors, biosensors, human olfaction, Electronics Nose. Controllers and indicators: Basic control concept, Temperature controller in dryer, ration control in food pickling, atmospheric controller in food preservation, timers and indicators. Practicals Experiments on transducers such as Load Cell, Thermocouple, RPM Sensors, IC Sensor, LVDT, Optical sensor, E-Nose etc.
Module IV
Chromatography Techniques: TLC and Paper chromatography; Chromatographic methods for macromolecule separation - Gel permeation, Ion exchange, Hydrophobic, Reverse-phase and Affinity chromatography; HPLC and FPLC; Criteria of protein purity. Electrophoretic techniques: Theory and application of Polyacrylamide and Agarose gel electrophoresis; Capillary electrophoresis; 2D Electrophoresis; Disc gel electrophoresis; Gradient electrophoresis; Pulsed field gel electrophoresis
Module V
Centrifugation: Basic principles; Mathematics & theory (RCF, Sedimentation coefficient etc); Types of centrifuge - Microcentrifuge, High speed & Ultracentrifuges; Preparative centrifugation; Differential & density gradient centrifugation; Determination of molecular weight by sedimentation velocity methods. Microscopic Techniques: Simple, compound, inverted, stereo, fluorescence, phase contrast microscopy. Dark field and bright field microscope. Electron microscopy: Transmission Electron Microscope and Scanning Electron Microscope, Basic concept of confocal microscope.

Text/References:

1. M. Bhuyan , .”Measurement and Control in Food Processing””, CRC Press (1st ed), 2007.
2. R G. Moreira, T.P Coultate “Automatic Control for Food Processing System””. 2001.
3. D. Patranabis, “Industrial Instrumentation””, McGraw Hill, 1990.
4. B.G.Liptak,. Instrument Engineers Handbook: Process Measurement and Analysis”, 1995
5. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, Cambridge University.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types of process variables involved in food processing techniques.
2. Understand the principles of food rheology.
3. Understand about the different transducers and sensor based systems.
4. Understand the different chromatographic techniques.

MFT-104 Principles of Food Engineering	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give knowledge of concepts related to mass and energy balances.
- 2.To give knowledge about principles and equipments for many unit operations in food technology.
- 3.Gives knowledge of various membrane technologies.
- 4.To impart knowledge on engineering concepts related to various food processing techniques.

Detailed Syllabus

MODULE 1
Mass and energy balance Heat transfer: Steam injection, steam infusion, plate heat exchangers, tubular heat exchangers and scraped surface heat exchangers.
MODULE 2
Size reduction process: Principles, theories and laws, energy considerations, equipments. Mixing and forming, theory and applications, mixing indices, equipments for solid and liquid. Fluid flow, laminar, turbulent and transitional ranges, velocity distribution profiles, basic equations, thermal velocity calculations.
MODULE 3
Pasteurization: Theory and application, pasteurization of packaged and unpacked foods, pasteurization calculations, equipments. Thermal processing: Death kinetics, thermal death curve, decimal reduction time. Z-factor, heat penetration curve, process time calculations, mathematical curve, process time calculations. Mathematical and graphical solutions.
MODULE 4
Evaporation: heat and mass balance, steam economy, heat recovery, efficiency, process calculations, Food dehydration: constant and falling rate periods, drying rate calculations. Chilling, refrigeration and freezing: theories, characteristics curve, cooling rate calculations. Separation processes: Filtration and centrifugation, theories and mathematical descriptions, constant rate and constant pressure filtration, equipment. Extrusion: Theory and applications, extrusion cookers and cold extrusion, single and twin screw extruders, design considerations.
MODULE 5
Membrane Technology- Reverse osmosis and Ultra filtration, Micro filtration-Supercritical gas extraction Advances in fortification: Synthetic nutrients. Techniques of food fortification. Stability of nutrients in relation to processing. Encapsulations: design and structure of microcapsules, release rate and mechanism. Techniques of micro encapsulation, advantages and application of encapsulation. Non thermal Processing: High pressure processing, Pulsed electric processing, Ohmic heating.
Reference books / text books:
1. Batty, J.C. and Folkman, S.L. 1983. Food Engineering Fundamentals. John Wiley and Sons, New York.
2. Fennema O.R. Ed. 1985, Principles of Food Science: Part-II Physical Principles of food Preservation. Marcel Dekker, New York.
3. Harper, J.C. 1975. Elements of Food Engineering. AVI, Westport.
4. Heldman, D.R. and Lund, D.B. Ed. 1992. Hand book of Food Engineering marcel Dekker, New York.
5. "Non-Thermal Preservation of Foods," G.V. Barbosa-Canovas, U.R. Pothakumary, E. Palou, B.G. Swanson, Marcel Dekker, New York, 1998

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different concepts of food engineering.
2. Understand the types of equipments and their working.
3. Engineering behind many food processing operations.
4. Heat and mass balance concept implementation.
5. Understand the novel technologies like extrusion and membrane technology.

MFT-105 Enzymes in Food Processing	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Prerequisite:

Course Objectives:

- 1.To give knowledge of enzymes molecules,their properties,kinetics and immobilization.
- 2.To give knowledge about use of enzymes as processing aids.
- 3.Gives knowledge of various enzyme technologies and their effect of food molecules modification.
- 4.Gives knowledge of food flavour production by enzymes.

Detailed Syllabus

MODULE 1
Enzymes classification, properties, characterization, kinetics and immobilization; fermentative production of enzymes (amylases, proteases, cellulases, pectinases, xylanases, lipases) used in food industry and their downstream processing.
MODULE 2
Enzymes for starch modification (maltodextrins and corn syrup solids:liquefaction, saccharification, dextrinization, isomerization for production of high-fructose-corn-syrup, fructose and fructo-oligosaccharides). Enzymes for protein modification (hydrolysates and bioactive peptides), Enzymes for Lipid modification.
MODULE 3
Enzymes as processing aids: Role of enzymes in Dairy processing (cheese making and whey processing). Role of enzymes in meat processing (tenderization and flavour development) and fish processing (De-skinning, collagen extraction etc..) Egg processing.
MODULE 4
Role of enzymes in Brewing, Baking (fungal -amylase for bread making; maltogenic -amylases for anti-staling, xylanases and pentosanases as dough conditioners; lipases or dough conditioning; oxidases as replacers of chemical oxidants, synergistic effect of enzymes).
MODULE 5
Role of enzymes in the production of flavours (enzyme-aided extraction of plant materials for production of flavours, production of flavour enhancers such as nucleotides, MSG; flavours from hydrolyzed vegetable/animal protein)
Text books and References 1. Whitehurst,R.J. & Van-Oort,M., (2010), Enzymes in Food technology, Second edition, Blackwell Publishing Ltd 2. Aehle, W. (2007) Enzymes in Industry: Production and application. Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim 3. Rastall,R (2007) Novel enzyme technology for food applications Woodhead Publishing Limited, Abington Hall, Abington, Cambridge CB21 6AH, England 4. Kalaichelvan, P.T., (2002), Bio process technology, MJP publishers, Chennai 5. Enzymes in Food Processing by Tilak Nagodainthana and Gerald Reed. 6. Enzymes in Food Processing by G.A.Tucker and LFJ Woods.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the molecules of food enzymes and their uses.

2. Understand the modification techniques of enzymes.
3. Understand the role of enzymes in various food processing operations.
4. Understand the enzymes use in food flavor production.
5. Understand the basic concept of enzyme immobilization.

MFT-151 Food Processing Lab	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give practical knowledge of food proximate analysis.
- 2.Provides practical knowledge of various testing equipments.
- 3.Gives knowledge of various standard solutions preparation and their principles.

Detailed Syllabus

1. Preparation of standard solutions for the chemical analysis i.e. HCl, H₂SO₄, KmnO₄, Sodium Thiosulphate and Iodine.
2. Determination of pH and acidity of foods
3. Determination of proximate composition of Foods
 - a) Moisture,
 - b) Protein,
 - c) Fat,
 - d) Total ash,
 - e) Crude fibre
 - f) Carbohydrate
 - g) Calorific Value
4. Determination of minerals in food products
 - a) Calcium by Titration
 - b) Phosphorus by Spectrophotometer
 - c) Iron by Spectrophotometer
5. Estimation of reducing, non-reducing, total sugars in cereals and fruits & vegetable products.
6. Determination of starch content in food products.
7. Determination of trypsin inhibitors.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different concepts of titration and food analysis.
2. Understand the working of various food testing equipments.
3. Understand about basic principles of food analysis.

MFT-152 Food Chemistry Lab	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give practical knowledge of food chemistry.
- 2.Provides practical knowledge of various food analysis methods.
- 3.Gives knowledge of use of many equipments..

Detailed Syllabus

<ol style="list-style-type: none"> 1. Estimation of fats & Oils <ol style="list-style-type: none"> a) Free fatty acid b) Peroxide value c) Saponification value d) RM Number e) TBA test f) Iodine value g) Fat adulteration test 2. Determination of NaCl content in food products. 3. Determination of trypsin inhibitors 4. Qualitative analysis of compounds by chromatography techniques <ol style="list-style-type: none"> a) Thin layer Chromatography b) Paper Chromatography: Descending, Ascending and Circular Paper chromatography. c) By using High Performance Liquid Chromatography. d) Column chromatography: Separation of beta carotene 5. Use of electrophoresis in the determination of proteins. 6. Determination of Rheological properties by using texture analyzer.
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Course Outcomes:

After completing the course, students will be able to:

1. Understand the different concepts behind food analysis.
2. Understand the basics of food chromatography.
3. Understand about the different terminology related to food analysis.
4. Understand the working of food analysis equipments.

MFT-153 Instrumentation Lab

Teaching Scheme

Lectures: 1 hr./ week
Tutorials: Nil
Credits: 2

Examination Scheme

Class Test: 6 Marks
Teachers Assessment: 3 Marks
Attendance: 6 Marks
End Semester Exam: 35 Marks

Course Objectives:

- 1.To give practical knowledge of food equipments testing and their instrumentation.
- 2.Provides practical knowledge of various food analysis methods.
- 3.Gives knowledge about use of many equipments..

Detailed Syllabus

1. Moisture measurement in different food products.
2. Determination of pH effect on food products.
3. Preparation of buffers for protein isolation.
4. Qualitative and quantitative estimation of proteins by spectrophotometer.
5. Spectrophotometric estimation carbohydrate.
6. Determination of molecular weight of protein sample by SDS-PAGE.
7. Characterization of protein samples by coomassie brilliant blue and silver staining
8. Analysis of affinity difference by paper chromatography.
9. Estimation of fat, protein, vitamins in given food samples.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different instrumentation for food analysis.
2. Understand the basics of food chromatography.
3. Understand about the different terminology related to food analysis.
4. Understand the working of electrophoresis method.

MFT-155 Semiunar	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

To prepare students for compiling the knowledge and giving the presentation on any curriculum related topic so as to equip them with recent trends related to topic and also its effective delivery.

Detailed Syllabus

It's compulsory for all the students to give a seminar on the topic assigned by the Department of food technology in the starting of the semester, in the supervision of the assigned supervisor. If the discussion session of seminar / presentation is not found satisfactory then the next date for the said presentation will be given immediately.

Presentation Time duration : 30 - 45 minutes

Discussion duration : 15 - 20 minutes

Course Outcomes:

After completing the course, students will be able to:

Compile the essence and knowledge on any given topic in the form of presentation and ensure its further effective delivery also, by using recent technology in the teachingfield.

MFT-201 Post Harvest Technology of Horticultural Crops

Teaching Scheme

Lectures: 1 hr./ week

Tutorials: Nil

Credits: 2

Examination Scheme

Class Test: 6 Marks

Teachers Assessment: 3 Marks

Attendance: 6 Marks

End Semester Exam: 35 Marks

Course Objectives:

- 1.To give knowledge of chemical composition of fruits and vegetables ,their pre and post harvest changes.
- 2.To give knowledge about storage of fruits and vegetables and cause of their post harvest losses.
- 3.Gives knowledge of methods to prevent the post harvest losses.
- 4.To impart knowledge on technology for food preservation techniques.

Detailed Syllabus

MODULE 1

Fruits and vegetables as living products: Chemical composition; pre and post harvest changes, maturity standards for storage, desirable characteristics of fruits and vegetables of processing. Post harvest handling of fresh fruits and vegetables: Role of plants growth regulators in relation to storage; physical and chemical treatment to increase the shelf-life, conditions for transportation and storage, disease and injuries during marketing.

MODULE 2

Storage of fresh fruits and vegetables. Containers: Tin, glass and other packaging materials used in fruits and vegetables preservations. Canning and bottling: quality of raw materials, preparation of materials, preparation of syrups and brines, canning and bottling, effect of canning and bottling on nutritive value, spoilage of canned foods, detection and control.

MODULE 3

Fruit and vegetable juices: Preparation of juice, syrups, squashes, cordials, and nectars; concentrations and drying of juice, packaging and storage and concentrations and powders; fortified and soft drinks. Preparation of preserve and candied fruits.

MODULE 4

Preservation by freezing, general methods for freezing of fruits and vegetables; problem relating to storage of frozen products; standards for frozen food products. Dehydration of fruits and vegetables: Methods; packaging, storage, quality control during and after dehydration. Pickles and chutneys: Preparation of various types of pickles-theory and practice; preparation of sauces and chutneys; problems relating to the shelf life of pickles and chutneys; quality control.

MODULE 5

Tomato products: preparation of various tomato products, food standards and quality control. Pectin: Raw materials; processes and uses of pectin; products based on pectin manufacture and quality control. Food additives: Use in fruit and vegetable preservation. Vinegar: General methods of preparation, food standards and quality control. Uses and Utilization of waste from fruit and vegetables processing plant.

BOOKS FOR REFERENCE :

1. Haard, N.F. and Salunkhe, D.K. 1975. Postharvest Biology and Handling of Fruits and Vegetables. AVI, Westport.
2. Kader, A. A. 1992. Postharvest Technology of Horticultural Crops, 2nd Ed. University of California, Division of Agriculture and National Resources, California.
3. Salunkhe, D.K. and Kadam, S.S. Ed. 1998. Handbook of Vegetable Science and Technology. Marcel Dekker, New York, USA.
4. Wills, R.B.H., McGlasson, W.B., graham, D., Lee, T.H. and Hall, E.G. 1989. Postharvest: An Introduction to the Physiology and Handling of Fruits and Vegetables. BSP Professional Books, Oxford.
5. Preservation of Fruits and Vegetables–Girdhari Lal, Siddhapa and Tondon, ICAR, New Delhi.
6. Hand Book of Analysis and Quality Control of Fruits & Vegetable Products–S. Ranganna Tata McGraw Hill, New Delhi.
7. Thompson AK. 1995. Post Harvest Technology of Fruits and Vegetables. Blackwell Sci.

Course Outcomes

After completing the course, students will be able to:

1. Knowledge of chemical composition of fruits and vegetables their pre and post harvest changes.
2. Understand the different causes of post harvest losses.
3. Gives knowledge about canning and bottling of fruit and vegetables.
4. Imparts knowledge of food preservation methods to prevent post harvest losses
5.. Understand the various food standards and quality control for food preservation.
6.

MFT-202 Food Microbiology	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give knowledge of general characteristics ,classification of microorganisms and their uses and source of contamination in food industry.
- 2.To give knowledge about factors affecting harmful microbes growth and lethal effects of various food processing techniques.
- 3.Gives knowledge of methods to for fermented food preparations.
- 4.To impart knowledge about pathogens, their investigation and role of biotechnology in food microbiology.

Detailed Syllabus

MODULE 1
General characteristics of microorganisms: Classification and identification of yeasts, molds and groups of bacteria important in food industry. Source of contamination: Air, water, soil, sewage, post processing contamination.
MODULE 2
Intrinsic and extrinsic factors influencing growth of microorganisms in foods. Classification of foods and general principles involved in their preservation: Effects on microbes of: Low temperature preservation, lethal effects of chilling, freezing and thawing; high temperature preservation. Heat resistance of microorganism, heat penetration and thermal processing. Pasteurization, sterilization, canning and dehydration; chemical preservation and its toxic effects; irradiations.
MODULE 3
Food fermentations: Bacterial, yeast and mold cultures; single and mixed cultures, propagation, maintenance and evaluation of cultures; factors affecting activity of cultures, bacteriophages, residual antibiotics and chemicals.
MODULE 4
Microbiology of fermentation: Fermented milks. Cereal foods, vinegar, oriental foods, alcoholic beverages. Therapeutic value of fermented foods. Food spoilage: Spoilage of fresh and processed fruit and vegetables, spoilage of meat, fish, eggs and poultry products. Microbial toxins.
MODULE 5
Pathogens in foods: Microbial infections and intoxications. Growth and survival of pathogens in food. Food borne diseases. Investigation and control Food Biotechnology: Use of biotechnologically improved enzymes in food processing industry.

BOOKS FOR REFERENCE

1. Branen A.L. and Davidson, P.M. 1983. Antimicrobials in Foods. Marcel Dekker, New york.
2. Jay J.M. 1986. Modern Food Microbiology. 3rd Edn. VNR, New York.
3. Robinson, R.K. Ed. 1983. Dairy Microbiology. Applied Science, London.
4. Microbiology by Pelczar, Smith & Chan.
5. Food Microbiology by Frazier
6. Introduction to Microbiology by Stainier.
7. Food microbiology by V. Ramesh, MJP publishing.2007

Course Outcomes:

After completing the course, students will be able to:

1. Understand the different types of microorganisms and their structure.
2. Understand the effect of various processing on food microbes.
3. Understand about the different types of fermented foods and their production technologies..
4. Understand the different food spoilage causes.
5. Understand the microbiology of fermentation and biotechnological improved enzymes uses.

MFT-203 Packaging of Food Materials	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 2	Examination Scheme Class Test: 6 Marks Teachers Assessment: 3 Marks Attendance: 6 Marks End Semester Exam: 35 Marks

Course Objectives:

- 1.To give knowledge of definitions and functions of packaging.
- 2.To give knowledge about properties of packaging materials, metal cans and prediction of shelf life of various packaged food products.
- 3.To impart knowledge of methods of packaging like modified atmospheric packaging, intelligent packaging and their quality control.
- 4.To impart knowledge about package sterilization techniques.

Detailed Syllabus

MODULE I
Definitions and functions of packaging and packaging materials. Packaging requirements and selection of packaging materials; Types of packaging materials: paper: pulping, fibrillation and beating, types of paper and their testing methods; Glass: composition, properties, methods of making bottles and jars; Metals: Tin plate containers, tinning process, components of tin plate, tin free steel (TFS), types of cans, aluminum containers, lacquers; Plastics: types of plastic films, laminated plastic materials, coextrusion, edible films and biodegradable plastics.
MODULE 2
Properties of materials such as tensile strength, bursting strength, tearing resistance, puncture resistance, impact strength, tear strength, their methods of testing and evaluation; Barrier properties of packaging materials: Theory of permeability, factors affecting permeability, permeability coefficient, gas transmission rate (GTR) and its measurement, water vapour transmission rate (WVTR) and its measurement, prediction of shelf life of foods.
MODULE 3
Different packaging systems for dehydrated foods, frozen foods, dairy foods, fresh fruits and vegetables, meat, poultry and sea foods.Process of Packaging: Material handling, filling, air removal, sealing, retorting, Modified atmosphere packaging, vacuum and gas packaging. Package sterilization techniques, cushioning, modelling, palletizing, stacking and containerization.
MODULE 4
Quality Control: Evaluation of Packaging materials, toxicity, corrosion prevention, shelf life testing, minimization of transport losses, Hazards in handling and storage and packaging and their minimization.
MODULE 5
Packaging Laws and Regulations, Standards of Weights and Measures Act, Advancement in packaging Technology: Smart packaging, Active packaging, Anti-microbial packaging etc.

Text / Reference Books:

1. Painy, F.A. and Painy, H.Y. 1983. A Handbook of Food Packaging. Leonard Hill, Glasgow, UK.
2. Scicharow, S. and Griffin, R.C. 1970. Food Packaging. AVI, Westport.
3. Food Packaging Principles by Gordon Robertson, 2005.
4. Food Packaging by Takashi Kadoya, 1990.
5. Foods & Packaging Materials Chemical Interactions by Paul Acherman
6. S. K. Sharma, S.J.Mulvaney, and S.S.H.Rizvi, Food Process Engineering: Theory and Laboratory Experiments, Wiley and Sons, 2000
7. H. Pandey, H.K. Sharma, R.C.Chouhan, B.C. Sarkar and M.C. Bera, Experiments in Food Process Engineering, CBS Publishers and Distributors, 2004
8. M.A. Rao, S.S. H.Rizvi and A.K.Dutta, Engineering properties of Foods, 3rd ed., Marcel Dekker, 2005

Course Outcomes:

After completing the course, students will be able to:

1. Understand the functions of packaging ,types of packaging materials and their properties.
2. Understand the features of various packaging systems for all type of foods.
3. Quality control and evaluation methods of packaging materials and their barrier properties.
4. Understand the modified,gas,vacuum ,smart,active,antimicrobial and intelligent packaging techniques and process.
5. Gain knowledge about packaging laws and regulations.

MFT204: RESEARCH METHODOLOGY, BIO-STATISTICS AND COMPUTER APPLICATIONS	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Course Objectives:

- 1.To give scientific approach to research and its types.
- 2.To give knowledge about sampling design, measurements and their central tendency.
- 3.To impart knowledge about experimental designs,measures of variability,correlation and various statistical tests.
- 4.To impart knowledge about introduction of computer science and in food technology,application softwares and database management systems.

Detailed Syllabus

MODULE I
Scientific Approach to Research: Meaning, significance, types of research studies. Research Process: Formulating the problem, objectives, hypothesis, Experimental design, sample design, collecting data, analysis of data, interpretation, preparation of report.
MODULE 2
Sampling design: Census vs. sample survey. Steps, types. Scaling techniques: Continuum, Reliability, Validity, Scale construction techniques. Experimental designs: Randomized Block design Processing of data: Development of code book.
MODULE 3
Measurements: Nature of measurements, types of measurement scale, Frequency distribution, graphical presentation of data. Measures of Central Tendency: Computation of mean, median and mode, their uses.
MODULE 4
Measures of variability: Computation of mean deviations, Quartile deviation and standard deviation, their uses. Correlation: Regression, Meaning, Spearman and Pearson's techniques of correlation, Linear regression Chi Square: Tests of significance of difference between means: t-test. Analysis of Variance (ANOVA): One way and two ways. Applications to food quality assessments
MODULE 5
Introduction of computer science in food technology, computer and its role, parts of computer; Hardware and Software, windows, number systems and conversion method, Application software, word processors, spreadsheets, Database management systems, presentation graphics, integrated packages, management of biological data by office applications: MS-office, MS-Word, MS-Excel, and MS-PowerPoint. Use of computers for: preparing and presenting documents, spreadsheets, appropriate statistical and other relevant packages, Internet. Computer applications in Food Technology- Response Surface Methodology

TEXT / REFERENCE BOOKS:

1. Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social Research, Himalaya Publishing House, Mumbai.
2. Copper, H.M. (2002). Intergrating research : A guide for literature reviews (2nd Edition). California: Sage
3. Harman, E & Montages, I. (Eds.) (2007). The thesis and the book, New Delhi: Vistar.
4. Mukherjee, R. (1989): The Quality of Life: Valuation in School Research, Sage Publications, New Delhi.
5. Strass, A and Corbin, J. (1990): Basis of Qualitative Research: Grounded Theory Procedures and Techniques, Sage Publications, California.
6. Introduction to Information Technology, Pearson Education, New Delhi.
7. Norton, Peter, Introduction to Computers, Tata McGraw Hill, New Delhi.
8. Douglas, Comer E., Computer Networks and Internet, Pearson Education, New Delhi.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the methods and role of scientific approach to research
2. Understand the various experimental designs, methods of sampling their analysis and data collection.
3. Understand about the different terminology related to measurements, correlation, regression, central tendency.
4. Knowledge about test of significance of difference between means like t test, z test, chi square test, ANOVA.
5. Understand the management of biological data by office applications: MS Office
6. Computer applications in food technology like response surface methodology.

MFT205: TECHNOLOGY OF MEAT AND POULTRY PRODUCTS

Teaching Scheme

Lectures: 1 hr./ week

Tutorials: Nil

Credits: 3

Examination Scheme

Class Test: 12Marks

Teachers Assessment: 6 Marks

Attendance: 12 marks

End Semester Exam: 70 Marks

Course Objectives:

- 1.To give an overview about meat and poultry products industry,its composition and nutritive value in India.
- 2.To give knowledge about mechanism of rigor mortis,postmortem changes.factors affecting meat quality.
- 3.To impart knowledge about preservation methods of meat and poultry and meat tenderization techniques.
- 4.To impart knowledge about utilization of meat, poultry and fish industry by products.
- 5.To impart knowledge about egg, its composition, processing, properties and poultry processing industry.

Detailed Syllabus

MODULE 1
Scope of meat & meat products industry in India. Structure of meat tissue. Chemical composition and nutritive value of meat.
MODULE 2
Mechanism of muscle contraction and relaxation. Effect of processing parameters on product constituents, viz. lipid, protein, carbohydrates and flavor,Postmortem changes-factor affecting postmortem changes, thaw rigor and cold shortening. Composition and chemistry of chicken muscle, pre and post slaughter factors affecting poultry meat quality.Properties of fresh meat.
MODULE 3
Preservation of meat & poultry- chilling, freezing, curing, smoking, canning, dehydration, irradiation, freeze drying, antibiotics, microwave, chemicals Meat carcass grading and cuts. Restructured meat products. Pre-rigor processing of meat. Meat tenderization and its techniques. ; packaging and grading of poultry meat.
MODULE 4
Utilization of meat industry by-products. Eggs - structure, composition, nutritive value and functional properties of eggs. Internal quality of eggs- evaluation, quality troubleshooters in eggs, egg grading. Preservation and maintenance of internal quality of eggs . Microbial spoilage of egg and egg; products. Preparation of meat, fish and poultry products.
MODULE 5
Egg products-Egg powders, frozen eggs, egg foams, factors influencing foaming. Industrial uses of eggs. Collection, grading, cleaning, washing, packaging and transportation of eggs, preparation of egg products.Poultry -types, factors affecting quality, chemical composition and nutritive value of poultry meat,Poultry dressing-ante and postmortem examination, methods of stunning, slaughter, scalding& dressing. Tenderness of poultry, problem factors in poultry meat. Utilization of poultry industry by-products.

Reference books / text books:

1. Legarreta, I.G. (2010). Handbook of Poultry Science and Technology (Volume I and Volume II), John Wiley & Sons, Inc., Hoboken, New Jersey. U.S
2. Sam, A.R (2001) Poultry meat processing CRC Press Taylor & Francis Group
3. Hui YH. (2001). Meat Science and Applications. Marcel Dekker.
4. Kerry, J. (2002). Meat Processing. Woodhead Publ. CRC Press.
5. Levie A. (2002). Meat Hand Book. 4th Ed. AVI Publ.
6. Mead M. 2004. Poultry Meat Processing and Quality. Woodhead Publ.
7. Pearson, A.M. & Gillett, T.A. 2006. Processed Meat. 3rd Ed. Chapman & Hall.
8. Lawrie, R.A. 2006. Meat Science 7th Edn. Woodhead publishers .UK.
9. Govindan TK. 1985. Fish Processing Technology. Oxford & IBH.
10. Hui YH. 2001. Meat Science and Applications. Marcel Dekker. 32
11. Kerry J. et al. 2002. Meat Processing. Woodhead Publ. CRC Press.
12. Pearson AM & Gillett TA. 1996. Processed Meat. 3rd Ed. Chapman & Hall.

Course Outcomes:

After completing the course, students will be able to:

1. Understand about current scenario of meat and poultry industry in India.
2. Understand the various scientific changes that occurs after meat and poultry slaughtering.
3. Understand about the different terminology related to meat and poultry processing and its grading.
4. Understand the egg ,egg products and industrial uses of eggs.
5. Understand the basic principles of meat,poultry and egg preservation techniques.
6. Understand by product utilization of meat,poultry and fish processing industry along with the restructured meat products.

MFT-251 Food Microbiology Lab	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Course Objectives:

- 1.To give practical knowledge about determination of microbial quality assessment of food.
- 2.To attain expertise in analysis of canned food product microbial and chemical spoilage.

Detailed Syllabus

1. Determination of microbial counts:
 - a. Total viable,
 - b. thermophilic,
 - c. proteolytic,
 - d. lipolytic
 - e. aerobic spore farmers,
 - f. coliform counts,
 - g. yeast & mold count.
2. Determination of activity of starter cultures used and dairy industry.
3. Dye reduction test.
4. Determination of thermal resistance of enzymes and microorganisms
5. Analysis of canned food products for chemical and microbiological spoilage.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Understand the different methods of microbial assessment of food quality and safety as well. |
| 2. Understand the techniques to be employed in determining the activity of various starter cultures used in dairy industry. |

MFT-252 MEAT AND POULTRY PRODUCTS LAB	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Course Objectives:

- 1.To give practical knowledge about determination of egg quality assessment,its composition.
- 2.To attain expertise in slaughtering and dressing methods of poultry with knowledge of their various retail cuts.

Detailed Syllabus

1. Determination of Internal quality of eggs.
2. Determination of % of different components of egg.
3. Determination of egg constituents such as ash, total solids and moisture.
4. Preservation of internal quality of eggs by different methods.
5. To study slaughtering and dressing of poultry bird.
6. To make retail cuts of dressed chicken and calculating % yields.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the various methods of assessment of egg quality,its composition,constituents and its preservation also.
2. Understand slaughtering and dressing methods of poultry with knowledge of their various retail cuts.

MFT-253 FOOD ENGINEERING LAB	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Course Objectives:

- 1.To give practical knowledge about analysis of canned food products for chemical and microbiological spoilage.
- 2.To attain expertise in analysis of vitamin C,lycopene,tannins,saponins,pectin in food.
- 3.To understand the methods of preparation of dehydrated fruits and vegetables, their value addition by preparing ketchup,sauces,jam,jelly,marmalade,squash and cordials from them.
4. Determination method for chemical preservatives and use of flame photometry for Na and K in food.

Detailed Syllabus

1. Analysis of canned food products for chemical and microbiological spoilage 2. Tin coating test a) Tin coating weight measurement (Clarke's Test) b) Determination of the continuity of tin coating c) Sulphide stain test and corrosion resistance test 3. Determination of Ascorbic acid content in food products. 4. Determination of lycopene content 5. Determination of tannins and saponins in food products. 6. Dehydration of fruits and vegetables 7. Preparation of tomato products like ketchup, puree & past 8. Preparation of Jam, Jelly, marmalade, preserve and fruit candy 9. Pectin determination in fruits and vegetable products. 10. Determination of chemical preservatives in fruits and vegetables products. 11. Preparation and analysis of fruits beverages i.e. Squash and cordial. 12. Use of flame photometry in the estimation of trace metals like Sodium and Potassium
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Course Outcomes:

After completing the course, students will be able to:

1. Understand about analysis of canned food products
2. Understand the analysis methods of vitamin C,pectin,saponins,lycopene and tannins.
3. Understand methods of preparation of dehydrated fruits and vegetables, their value addition by preparing ketchup,sauces,jam,jelly,marmalade,squash and cordials
4. Understand the method of analyzing chemical preservatives in use and use of flame photometry for Na and K in food.

MFT-254 SEMINAR	
Teaching Scheme Lectures: 1 hr./ week Tutorials: Nil Credits: 3	Examination Scheme Class Test: 12Marks Teachers Assessment: 6 Marks Attendance: 12 marks End Semester Exam: 70 Marks

Course Objectives:

To prepare students for compiling the knowledge and giving the presentation on any curriculum related topic so as to equip them with recent trends related to topic and also its effective delivery.

It's compulsory for all the students to give a seminar on the topic assigned by the Department of food technology in the starting of the semester, in the supervision of the assigned supervisor. If the discussion session of seminar / presentation is not found satisfactory then the next date for the said presentation will be given immediately.

Presentation Time duration : 30 - 45 minutes

Discussion duration : 15 - 20 minutes

Course Outcomes:

After completing the course, students will be able to:

Compile the essence of any given topic in the form of presentation and ensure its further effective delivery also by using recent technology in the teaching field.

SCHEME OF EVALUATION
M.Sc. – FOOD TECHNOLOGY
II-YEAR, SEMESTER-III
(Effective from the academic session 2015-2016)

S. No.	Course Code	SUBJECT	PERIODS			CREDIT	MARKS DISTRIBUTION		
			L	T	P		IAM	ESM	TOTAL
THEORY									
1	MFT-301	Processing of Cereals, Pulses & Oil Seeds	3	1	0	4	30	70	100
2	MFT-302	Processing of Milk and Milk Products	3	1	0	4	30	70	100
3	MFT-303	Quality Control, Food Standards and Food Laws	3	1	0	4	30	70	100
4	MFT-304	Entrepreneurship in Food Processing	3	1	0	4	30	70	100
5	MFT-305	Fermentation Technology	3	1	0	4	30	70	100
PRACTICAL / TRAINING / PROJECT / SEMINAR									
5	MFT-351	Cereals, Pulses and Oil seeds Lab	0	0	4	2	15	35	50
6	MFT-353	Milk and Milk Products Lab	0	0	4	2	15	35	50
7	MFT-354	Quality Control Lab	0	0	4	2	15	35	50
8	MFT-355	Seminar III	0	0	0	2	50	0	50
Total			15	5	12	28	245	455	700
L – Lecture; T – Tutorial; P – Practical; C – Credit; IAM – Internal Assessment Marks; ESM – End Semester Marks									

MFT301: PROCESSING OF CEREALS, PULSES AND OIL SEEDS

UNIT 1

Wheat Technology: Composition of grain and environmental effects on its processing quality, enzymes of wheat and their role in the manufacture of wheat products; principles of wheat milling and its effect on composition of flour, aging of flour, byproducts, chemical improvers- bleaching and maturing agents, property of dough and its rheology, manufacture of wheat products bread, biscuits etc.; formulation of premixes for bakery products; pasta goods and processed cereal foods for infants.

UNIT 2

Rice Technology: Composition, type of proteins, starch content, amylose and amylopectin fractions; presence and effect of lipases; distribution of vitamins; minerals, and proteins in rice grain and its relation to milling; rice milling operations and its effect on nutritive value; cooking quality; byproducts of rice milling and their utilization; processed and prepared mixes based on rice.

UNIT 3

Legumes: Composition, anti-nutritional factors, processing methods, methods of cooking.

UNIT 4

Corn Technology: Composition, processing of corn for manufacture of corn grits, meal and flour; manufacture of corn flakes, corn syrup, cornstarch, corn steep liquor, corn oil and canned corn. Composition and Processing of millets like barley, sorghum. Oats etc.

UNIT 5

Oilseeds: Composition, processing of oilseeds as protein concentrations, properties and uses of oilseeds meals, technology vegetable protein isolates; Barrier compounds in the utilization of oil seed proteins. Low cost protein foods from oilseeds.

Text books and Reference books:

1. Chakrabarthy, M.M. (2003). Chemistry and Technology of Oils and Fats. Prentice Hall.
2. Dendy, D.A.V., & Dobraszczyk, B.J. (2001). Cereal and Cereal Products. Aspen.
3. Hamilton, R.J., & Bhati, A. (1980). Fats and Oils - Chemistry and Technology. App. Sci. Publ.
4. Hosney, R.S. (1994). Principles of Cereal Science and Technology. 2nd Ed. AACC.
5. Kay, D.E. (1979). Food Legumes. Tropical Products Institute.
6. Kent, N.L. (1983). Technology of Cereals. 4th Ed. Pergamon Press.

UNIT 1

Introduction: Physicochemical properties of milk, Platform tests, Chemical composition and nutritive value of milk, Factors affecting composition of milk. Importance of milk industry in India: Collection, chilling, transportation, cream separation, standardization, pasteurization, sterilization, homogenization, packaging, storage and distribution of fluid milk, Ultrahigh temperature processed milk.

UNIT 2

Preparation of various types of milks: Toned, homogenized, fortified, reconstituted and flavored milk. Technology of fermented milk products: Principles and practices of manufacture, packaging, storage and marketing of Dahi, cultured butter milk, acidophilus milk etc.

UNIT 3

Cheese: Manufacture of hard, semi hard, soft and processed cheeses. Storage, grading and marketing of cheese, cheese defects and their control. Butter: Manufacture, packaging, storage and marketing of butter; butter defects and their control, margarine.

UNIT 4

Technology of frozen milk products: Classification, manufacture, packaging, storage and marketing of ice cream, ices, sherbets etc. defects of frozen products and their control. Technology of evaporated and dried milk: Manufacture of evaporated milks and milk powders. Packaging storage defects and their control. Technology of condensed milk: Manufacture of condensed milks, Packaging storage defects and their control

UNIT 5

Technology of dairy by products: Utilization of skim milk, buttermilk and whey for the manufacture of casein, lactose etc. Technology of indigenous milk products: Principles and practices of manufacture, packaging, storage and marketing of ghee, Khoa, Chenna, shrikhand, paneer, rasogulla, gulabjamun and Milk based foods Preparation of soft curd milk, vitaminized milk, standardized milk, filled milk and imitation milk. Sanitary aspects: of dairy plant building, equipment and their maintenance. Disposal of dairy plant waste. Application of membrane technology in dairy industry.

Text books and Reference books:

1. Considine, D.M. Ed. 1982. Foods and Food Production Encyclopaedia, VNR, New York.
2. Dey, Sukumar. 1994. Outlines of Dairy Technology. Oxford Univ. Press, New Delhi.
3. Robinson, R.K. (2 vol. set). 1986. Modern Dairy Technology Elsevier Applied Science, UK.
4. Rosenthal, I. 1991. Milk and Milk Products. VCH, New York.
5. Warner, J.M. 1976. Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
6. Yarpar, WJ. and Hall, C.W. 1975. Dairy Technology and Engineering AVI, Westport.

MFT-304: ENTREPRENEURSHIP IN FOOD PROCESSING

UNIT I

Accounting and Finance Taking decision on starting a venture; Assessment of feasibility of a given venture/new venture; Approach a bank for a loan; Sources of financial assistance; Making a business proposal/Plan for seeking loans from financial institution and Banks; Funds from bank for capital expenditure and for working; Statutory and legal requirements for starting a company/venture; Budget planning and cash flow management; Basics in accounting practices: concepts of balance sheet, P&L account, and double entry bookkeeping; Estimation of income, expenditure, profit, income tax etc.

UNIT 2

Negotiations/Strategy With financiers, bankers etc.; With government/law enforcement authorities; With companies/**Institutions for technology transfer**; Dispute resolution skills; External environment/changes; Crisis/ Avoiding/Managing; Broader vision–Global thinking.

UNIT 3

Leadership skills; Managerial skills; Organization structure, pros & cons of different structures; Team building, teamwork; Appraisal; Rewards in small scale set up. Human resource planning: Planning and design of marketing system, worker's safety and plant hygiene

UNIT 4

Assessment of market demand for potential product(s) of interest; Market conditions, segments; Prediction of market changes; Identifying needs of customers including gaps in the market, packaging the product; Market linkages, branding issues; Developing distribution channels; Pricing/Policies/Competition; Promotion/ Advertising; Services Marketing

UNIT 5

Introduction to Operations Research: Definition, applications. Inventory control, Linear Programming. Queuing Theory, Transportation and Assignment Forecasting

Text books and Reference books:

1. Elementary Economics by Dewetl and Verma S Chand & company
2. Production (operations) Management by L.C. Jhamb
3. Entrepreneurship and Management inputs for entrepreneurs in food processing sector by Dinesh Awasthi and Rama Jaggi
4. Principles of Management by Ramaswamy (Himalaya Publication)
5. Industrial Engineering and Production Management by M. Telsang
6. Production and Operation Management by R. Panneerselvam (Prentice- Hall of India Pvt. Ltd.)

MFT-305: FERMENTATION TECHNOLOGY

UNIT 1

Fermentation, types of fermentation, Fermentation Pathways for Industrial Products: Biochemical pathways of metabolic reactions for utilization of carbon sources and formation of different metabolites by micro organisms; Strain Development -Various techniques of modifying the strains for increased production of industrial products. Use of chemicals, UV rays, genetic engineering to produce newer strains.

UNIT 2

Typical media, Media formulation: Carbon Source, Nitrogen source, Minerals, Growth Factors, Buffers, Precursors and Inhibitors, O₂ requirement and antifoams.

UNIT 3

Fermentor design, Instrumentation and control, Types of fermentors (Shake flask, Batch/stir tank, Continuous, Bubble column, airlift and Tower fermenter), Types of fermentation processes, aeration and agitation (The oxygen requirement for industrial fermentation, Determination of K_{La} values).

UNIT 4

Downstream Processing: Various equipment for product recovery; micro-filters and Ultrafiltration systems for separation of cells and fermentation medium and for concentration of medium containing product; chromatographic systems of separation; extraction of product with solvent; evaporation and crystallization; centrifugation, different types of centrifuges; drying techniques; instrumentation and controls.

UNIT 5

Fermentative Production: a) Foods: Processes for preparing fermented products including Yogurt (curd) and other Traditional Indian Products like idli, dosa, dhokla, shrikhand, etc., Soya based products like soya sauce, natto, etc., Cocoa, Cheese etc.; Alcoholic Beverages based on fruit juices (wines), cereals (whisky, beer, vodka etc.), sugar cane (rum) etc. Process description, quality of raw materials, fermentation process controls etc.) Industrial chemicals: Fermentative Production of Organic acids like (Citric Acid, Lactic Acid), Amino Acids (Glutamic acid, Lysine), Antibiotics (Erythromycin, Penicillin), Polysaccharides (Dextran, Xanthan) etc.; steroids transformation; process descriptions and key controls for optimal production.

Text books and Reference books:

1. Vogel, H.C. and C.L. Todaro, 2005 Fermentation and Biochemical Engineering Handbook: Principles, Process Design and Equipment, 2nd Edition, Standard Publishers.
2. El-Mansi, E.M.T, 2007, Fermentation Microbiology and Biotechnology 2nd Edition, CRC / Taylor & Francis.
3. Joshi, V.K. and Ashok Pandey, 1999, Biotechnology: Food Fermentation, Microbiology, Biochemistry and Technology, Vol. I & vol. II Educational Publisher.
4. Peppler, H.J. and D. Perlman, 2004, Microbial Technology: Fermentation Technology, 2nd Edition, Vol. II Academic Press / Elsevier.
5. Stanbury, P.F., A. Whitaker and S.J. Hall, 2005 Principles of Fermentation Technology, 2nd Edition Aditya Books (P) Ltd.

1.

MFT-352: MILK AND MILK PRODUCTS LAB

LIST OF EXPERIMENTS:

1. Plat form test for raw milk
2. Determination of moisture content in milk
3. Determination of fat content in Milk powders and ice-cream products.
4. Determination of Milk adulterants: Starch, Urea, Formaldehyde and Sugar, Hydrogen peroxide, salt and detergent.
5. Operation, cleaning and sterilization of dairy plant machinery involved in fluid milk processing
6. Preparation of toned, homogenized, fortified, reconstituted and flavored milks
7. Manufacture of fermented milks.
8. To study the kinetics of enzymes and manufacture of cheeses.
9. Manufacture of butter
10. Manufacture of ice- cream, ices, sherbats.
11. Manufacture of casein, ghee, khoa, chhena.

LIST OF EXPERIMENTS:

1. Sensory analysis of food products:
 - a) Paired comparison test
 - b) Duo-trio test
 - c) Hedonic test
 - d) Triangle test
 - e) Ranking test
 - f) Single sample test
 - g) Composite scoring test
2. Analysis of water used in food industries i.e. Alkalinity, Acidity, Hardness, pH, TPC and Coliform count

MMA 151 – C Programming Lab

Laboratory Outcomes

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to declare pointers of different types and use them in defining self-referential structures.
- To be able to create, read and write to and from simple text files.

Assignments for lab classes are as follows:

- 1: Problem solving using computers: Familiarization with programming environment
- 2: Variable types and type conversions: Simple computational problems using arithmetic expressions
- 3: Branching and logical expressions: Problems involving if-then-else structures
- 4: Loops, while and for loops: Iterative problems e.g., sum of series
- 5: 1D Arrays: searching, sorting: 1D Array manipulation
- 6: 2D arrays and Strings, memory structure: Matrix problems, String operations
- 7: Functions, call by value: Simple functions
- 8: Numerical methods (Root finding, numerical differentiation, numerical integration): Numerical methods problems
- 9: Recursion, structure of recursive calls: Recursive functions
- 10: Pointers, structures and dynamic memory allocation: Pointers and structures
- 11: File handling: File operations

MMA251 Lab Data Structure

1. Implementation of Stack Using Single Linked List.
2. Implementation of Stack Using Array.
3. Implementation of Queue Using Array.
4. Implementation of Queue Using Linked List.
5. Implementation of Circular Queue.
6. Implementation of Single Linked List.
7. Implementation of Double Linked List
8. Implementation of Circular Linked List.
9. Adding Two Polynomial equations.
10. Implementation of Binary Search.
11. Implementation of Postfix Expression Evaluation.
12. Implementation of Bubble Sort
13. Implementation of Selection Sort
14. Implementation of Insertion sort
15. Implementation of Merge sort
16. Implementation of Quick Sort
17. Conversion of Infix Expression to Postfix Expression
18. Conversion of Postfix Expression to Infix Expression
19. Implementation of Binary Search Tree Using Abstract Data Type
20. Implementation of Binary Tree Traversing.

MMA351 Matlab

Modeling of the following problems using *Matlab*

- (i) Plotting of graphs of function e^{ax+b} , $\log(ax+b)$, $1/(ax+b)$, $\sin(ax+b)$, $\cos(ax+b)$, $|ax+b|$ and be able to find the effect of a and b on the graph.
- (ii) Plotting the graphs of polynomial of degree 4 and 5, the derivative graph, the second derivative graph and comparing them.
- (iii) Matrix operation (addition, multiplication, inverse, transpose), Solution of linear system of equations using matrices.
- (iv) Taylor and Maclaurin series of $\sin x$, $\cos x$, $\log(1+x)$, e^x , $(1+x)^n$, maxima and minima, inverse of graphs.
- (v) Calculate derivatives of differentiable functions by using functions.

Modeling of the following problems using *Matlab*

- (i) Define elementary transformations on matrices.
- (ii) Find the rank of matrices by different ways.
- (iii) Solve system of linear equations by Gauss-Jacobi/Gauss-Seidel/SOR.(for three variables).
- (iv) Plot the solution of ODE of first/Second order.
- (v) Define complex NO's and their algebra (addition, subtraction, multiplication, division etc.)
- (vi) Find modulus and conjugate of complex no's.
- (vii) Define addition and multiplication modulo

MMA451 Project Work / Dissertation

MMA452 Matlab

Modeling of the following problems using Matlab

- (i) Plotting of Legendre polynomial for $n = 1$ to 5 in the interval $[0,1]$. Verifying graphically that all the roots of $P_n(x)$ lie in the interval $[0,1]$.
- (ii) Automatic computation of coefficients in the series solution near ordinary points
- (iii) Plotting of the Bessel's function of first kind of order 0 to 3.
- (iv) Automating the Frobenius Series Method
- (v) Random number generation and then use it for one of the following
 - (a) Simulate area under a curve
 - (b) Simulate volume under a surface
- (vi) Programming of either one of the queuing model
 - (a) Single server queue (e.g. Harbor system)
 - (b) Multiple server queue (e.g. Rush hour)
- (vii) Programming of the Simplex method for 2/3 variables

MPY 352- Computational Technique Lab

L T P

0 0 6

List of Experiments

1. To implement programs in C language
2. Time delay subroutine and a clock program.
3. Newton's and Lagrange's interpolation with algorithm, flow chart C Program and output.
4. Numerical integration by Trapezoidal/Simpson's rule with algorithm, flowchart C Program & output.
5. Solution of a polynomial equation and determination of roots by Newton Raphson method with algorithm, flowchart C Program and output.
6. Numerical solution of ordinary first order differential equation –Euler's method with algorithm, flowchart C Program and output.
7. Curve fitting - Least square fitting with algorithm, flowchart C program and output.
8. Matrix manipulation - Multiplication Transpose and Inverse with algorithm, Flow chart C program and output.
9. Iteration method, flowchart C program and output.
10. Gauss Interpolation, flowchart C program and output.
11. MATLAB – Matrix operations.
12. MATLAB: Digital Signal Processing
13. MATLAB: Solving Ordinary Differential Equation.
14. Determination of polynomial using method of least square curve fitting.
15. Determination of time response of an R-L-C circuit.

Reference Books:

1. R.A. Dunlap, *Experimental Physics: Modern Methods*, Oxford University Press.
2. B.K. Jones, *Electronics for Experimentation and Research*, Prentice-Hall.
3. P.B. Zbar and A.P. Malvino, *Basic Electronics: A Text-Lab Manual*, Tata Mc-Graw Hill.
4. L.A. Leventhal, *Micro Computer Experimentation with the Intel SDK-85*.

MPY452 Project Work / Dissertation

BHM551- C Programming Lab

Assignments for lab classes are as follows:

1. Introduction of Computer System: I/O devices, storage devices.
2. Getting familiar with software: OS and C compiler.
3. Write a program to print Hello.
4. Write a program to add two integers.
5. Write a program to compute factorial of a number.
6. Write a program to determine whether a number is prime or not.
7. Write a program to print Fibonacci series. .
8. Write a program in C to check whether a given number is Armstrong or not?
9. Write a program to calculate factorial of an integer using recursion.
10. Show with example (program) how arguments are passed using „Call by value“ and „Call by reference“ respectively.
11. Write a program to print the sum of all values of an array.
12. Write a program in C that accepts N x N matrix as input and prints transpose of this matrix.
13. Write a program to add the elements of two arrays in to third array using dynamic memory allocation.
14. Write a program in C to calculate the sum of series up to first 10 terms
 $1^4 + 2^4 + 3^4 + 4^4 + 5^4 + 6^4 + 7^4 + \dots + 10^4$
15. Write a program in C that takes input from a file and write it into another file.
16. Write a program to implement stack operation (Push & Pop).
17. Write a program to create a link list.

Reference Books:

1. Jeri R. Hanly, Elliot B. Koffman, “Problem Solving and Program Design in C”, Pearson Addison-Wesley, 2006.
2. Victor Alvarado, Mocygo San Jose,”M. S. Office For ME Word, Excel, Power Point, CA”
3. Balagurusamy, “Programming in ANSI „C“, TMH, 3rd Edition”.
4. Detiel & Detiel, “„C“ How to program, ISBN: 0132404168, 5th Edition, 2007”.

BHP552 - C Programming Lab

Assignments for **lab classes** are as follows:

1. Introduction of Computer System: I/O devices, storage devices.
2. Getting familiar with software: OS and C compiler.
3. Write a program to print Hello.
4. Write a program to add two integers.
5. Write a program to compute factorial of a number.
6. Write a program to determine whether a number is prime or not.
7. Write a program to print Fibonacci series. .
8. Write a program in C to check whether a given number is Armstrong or not?
9. Write a program to calculate factorial of an integer using recursion.
10. Show with example (program) how arguments are passed using „Call by value“ and „Call by reference“ respectively.
11. Write a program to print the sum of all values of an array.
12. Write a program in C that accepts N x N matrix as input and prints transpose of this matrix.
13. Write a program to add the elements of two arrays in to third array using dynamic memory allocation.
14. Write a program in C to calculate the sum of series up to first 10 terms
 $1^4 + 2^4 + 3^4 + 4^4 + 5^4 + 6^4 + 7^4 + \dots + 10^4$
15. Write a program in C that takes input from a file and write it into another file.
16. Write a program to implement stack operation (Push & Pop).
17. Write a program to create a link list.

Reference Books:

1. Jeri R. Hanly, Elliot B. Koffman, “Problem Solving and Program Design in C”, PearsonAddison-Wesley, 2006.
2. Victor Alvarado, Mocygo San Jose,”M. S. Office For ME Word, Excel, Power Point, CA”Balagurusamy, “Programming in ANSI „C“, TMH, 3rd Edition
3. Detiel&Detiel, “„C“ How to program, ISBN: 0132404168, 5th Edition, 2007”.

BHC604- Applications of Computers in Chemistry

Recapitulation of computer basics: PC hardware, operating systems, data storage and backup, networks, information technology. Basic operations using windows.

Computer programming: Constants, variables, bits, bytes, binary and ASCII formats, arithmetic expressions, hierarchy of operations, inbuilt functions. Elements of the BASIC language. BASIC keywords and commands. Logical and relative operators. Strings and graphics. Compiled versus interpreted languages. Debugging. Simple programs using these concepts. Matrix addition and multiplication. Statistical analysis. BASIC programs for numerical differentiation and integration (Trapezoidal rule, Simpson's rule), finding roots (quadratic formula, iterative, Newton-Raphson method), numerical solution of differential equations. Conceptual background of molecular modelling: Potential energy surfaces. Elementary ideas of molecular mechanics.

Recommended Texts:

1. Noggle, J. H. Physical chemistry on a Microcomputer. Little Brown & Co.(1985).
2. Venit, S.M. Programming in Basic: Problem solving with structure and style.Jaico Publishing House: Delhi (1996).
3. Engel, T. & Reid, P. Physical Chemistry 2nd Ed. Pearson (2010). Chapter on Computational Chemistry.

BHC652-Physical& Application of Computers in Chemistry Lab

Sec A:

• Colourimetry • Verification of Lambert-Beer's Law • Determination of pK (indicator) for phenolphthalein or methyl red • Study the formation of a complex between ferric and thiocyanate (or salicylate) ions. • Study the kinetics of interaction of crystal violet with sodium hydroxide calorimetrically. • Record the U.V. spectrum of a given compound (acetone) in cyclohexane (a) Plot transmittance versus wavelength. (b) Plot absorbance versus wavelength.

Sec B:

Word processing: Incorporating chemical structures into word processing documents, presentation graphics, on- line publication (www/html). Handling numeric data: spreadsheet software (Excel), simple calculations, statistical analysis, plotting graphs using a spreadsheet, graphical solution of equations, solving equations numerically (e.g. pH of a weak acid ignoring/ not ignoring the ionization of water, volume of a van der Waals gas, equilibrium constant expressions). Numeric modelling, numerical curve fitting, linear regression (rate constants from concentration-time data, molar extinction coefficients from absorbance data).

Molecular modelling: Visualization of 3D structures, calculation of molecular structures and properties (e.g., conformational energies of butane).

Note: 1. Software: Microsoft Office, ChemOffice (Free alternatives: OpenOffice (www.openoffice.org), ISIS Draw (<http://www.mdli.com>; registration required), ArgusLab (www.planaria-software.com)). 2. References: Internet, documentation of software.

Note: Experiments may be added/deleted subject to availability of time and facilities.

BMR 551- Data Structure Lab

List of Experiment

P1: Write a program to find the average of any two numbers. P

2: Write a program to convert the temperature F to C.

P3: Write a program to perform arithmetic operation.

P4: Write a program to find roots of quadratic equation.

P5: Write a program to calculate the simple interest. P

6: Write a program to check the given numbers is even or odd.

P7: Write a program to print the array of element.

P8: Write a program to print a triangle.

1

1 2

1 2 3

1 2 3 4

P9: Write a program to print a triangle.

1

2 2

3 3 3

4 4 4 4

P10: Write a program print title, author, cost and edition using structure. P11: Write a program to check the given number is Armstrong or not. P12: Write a program to find the sum of the element of the given array

Reference Books:

1. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", PearsonAddison-Wesley, 2006.

2. Victor Alvarado, Mocygo San Jose,"M. S. Office For ME Word, Excel, Power Point,

BBA 102: Principles of Economics	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1) To Gain basic knowledge and learning of economic principles and concepts.
2) Understanding of demand and supply in price determination
3) Learn how to apply economic theory in order to understand production and cost phenomenon.
4) Demonstrate how economic analysis can be applied to economic decision making
5) Acquire an understanding of the market structures
6) Basic understanding of National income mechanism.

Detailed Syllabus

Unit-1 Definition, Nature, Scope and Limitation of Economics. Economics as an art or Science, Relevance of Economics in Business Management.
Unit-2 A) Demand Analysis: Meaning of Demand, Demand Schedule , Demand Curve and Nature of Curves, Movements v/s Shifts in demand curve and Law of Demand B) Supply Analysis: Meaning and Determinants of Supply, Supply function. Supply Schedule Supply Curve, Movements v/s shifts in supply curve C) Elasticity of Demand & Supply: Meaning and Types
Unit-3 Utility Analysis: Marginal Theory of Utilities and Equi-marginal theory of Utility, Indifference Curve analysis, Consumer equilibrium and Consumer Surplus, Price, Income and Substitution Effect.
Unit-4 A) Cost Concept and Analysis: Relationship between TC, AC and MC Short Run and Long Run Cost Curves. B) Theory of Production: Production Concept, Production function, Single Variable Law of Proportions, Two Variable Law of Return to scale. Iso-quant Curves.
Unit-5 Market Structure Nature of market, Types of Markets and their characteristics under different market structure, - Perfect Competition, monopoly, monopolistic competition and oligopoly, price discrimination under monopoly.
Unit-6 National Income: Meaning ,components, Methods of Measurement

Text and Reference Books-

1. Management Economics , Adhikari M,Excel Books, 2nd edition
2. Managerial Economics , Gupta, GS; Tata McGraw-Hill, 2006
3. Principles of Economics , Vaish & Sundaram, Sultan Chand and Sons, 13th edition

Course Outcomes:

1. To state economics principles and concepts.
2. To understand the economic theories and principles
3. To solve the problems based on economic theories and principles
4. To analyse the impact of economic theories and principles
5. To find out the relationship between economic variables
6. To explain the economic theories and its outcomes

BBA 204: Marketing Management	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To get an idea of the basic concepts of Marketing Management.
2. To understand the concept of Marketing Environment and Research.
3. To understand Segmentation, targeting & Positioning.
4. To know and understand about Consumer Behavior and Branding.
5. To get an understanding of Price, Place, Promotion.
6. To understand various recent trends in the field of Marketing

Detailed Syllabus**Unit-1**

Introduction - Meaning, Importance of Marketing, Core Concept of Marketing, Marketing vs Selling, Marketing Process, Holistic marketing; Marketing mix, Relevance of marketing in a developing economy

Unit-2

Marketing Environment, Analysis of Micro and Macro Environmental factors, Market Research: importance, process and scope,

Unit-3

Market Segmentation, Basis for market segmentation; Market Targeting: concept, types, Product/Service positioning; Importance of STP in marketing.

Unit-4 Consumer Behavior- introduction, importance & process; Marketing Mix Decisions: Product decisions- New Product Development, Product mix, PLC, Branding and Packaging.
Unit-5 Pricing – meaning, Factor affecting price, Pricing objective, Pricing methods; Channels of Distribution – Characteristics, Importance, Selection, Types of channels, Promotion: Promotion mix, Advertising, Publicity, Sales promotion, Personal selling
Unit-6 Recent trends in E – Marketing, E – Commerce, Rural Marketing, Social media marketing, Relationship marketing, Green Marketing and Social Responsibility Marketing.
Text and Reference Books 1) Principles of Marketing, Philip Kotler, Pearson, 14th edition. 2. Marketing Management, Rajan Saxena, TMH,3rd edition. 3. Marketing Management , Namakumari ,Macmillan,4th edition

Course Outcomes

1. To recognize the importance of the various concepts of Marketing Management
2. To understand the various methods Marketing Environment.
3. To apply STP Concept in decision making
4. To determine consumer behavior and Marketing Mix
5. To classify the various concepts of Marketing, price, place, promotion.
6. To determine the various trends in marketing.

BBA 206: Corporate Law	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. The objective of the course is to impart basic knowledge of the provisions of the Companies Laws and the Depository Laws.
2. To understand the formation, management and other activity of the companies.
3. To introduce to the students the nuance of corporate law and the obligations of it towards society in discharging its trade relations and to be a good corporate citizen.
4. To inform the students about the elementary ideas and the logic of the corporate law.

Detailed Syllabus

Unit-1 Company – Definition, Meaning, Nature and its Characteristics, Corporate Personality: Kinds of Company, Promotion and Incorporation of Companies .
Unit-2 Memorandum of Association, Articles of Association, Prospectus, Doctrine of Constructive Notice, Indoor Management and Ultra virus .
Unit-3 Shares, Share Capital, Members, Shares - Transfer and Transmission , Directors-Managing Director, Whole Time Director.
Unit-4 Capital Management-Borrowing powers, mortgages and charges, debentures, Company Shareholders Meetings-kinds quorum , voting resolutions, proxy, minutes of the meeting.
Unit-5 Majority Powers and minority Rights, Prevention of oppression and mismanagement, winding up-Kinds and Conduct.
Unit-6 One Person Company (OPC), Small Company, Postal Ballot, Small Shareholders on Board, Director Identity Number (DIN), Corporate Identity Number (CIN), Online Filing of Documents, Online Registration of Company , Insolvency and Bankruptcy Code (IBC).
Text and Reference Books- 1. Grower L.C.B. Principles of Modern Company Law, Stevens & Sons, London 2. Ramaiya A. Guide to the Companies Act. Wadhwa & Co., Nagpur 3. Singh, Avtar Company Law, Eastern Book Co., Lucknow 4. Kuchal, M.C. Modern Indian Company Law, Sri Mahavir Books, Noida 5. Kapoor, N.D. Company Law- Incorporating the Provisions of the Companies Amendment Act, 2000, Sultan & sons

Course Outcomes:

1. Apply principles of corporate law in a rigorous and principled manner.
2. Apply corporate law to generate solutions to complex legal problems, and critique the operation of corporate law from a policy perspective.
3. Exercise appropriate strategic professional judgment in the resolution of a corporate law problem in an academic environment.
4. Reflect on individual ability to effectively undertake work as a member of a team, and use that reflection to inform improvement.

BBA 302: Management Accounting	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To recognized about Management accounting as well as know the relationship of Management Accounting with Financial Accounting and Cost Accounting.
2. To understand various costing technique as a managerial tool.
3. To recognize and define Budget and Budgetary control.
4. To analyze Standard costing and Variance.
5. To know the significance of Responsibility Accounting in large and decentralized companies.
6. To be familiar with the role of Transfer Pricing in decentralized companies.

Detailed Syllabus

Unit-1

Meaning, Nature, Scope, Functions, Relevance, Relationship of Management Accounting with Financial Accounting and Cost Accounting.

Unit-2

Marginal Costing versus Absorption Costing, Cost-Volume-Profit Analysis and P/V Ratio Analysis and their implications, Concept and uses of Contribution & Breakeven Point and their analysis.

Unit-3

Concept of **Budget and Budgeting**, Advantages and Limitations of Budget formation, Procedure of budget formation. Types of Budget, Static and Flexible Budgeting, Preparation of Cash Budget, Sales Budget, Production Budget, Materials Budget, Capital Expenditure Budget and Master Budget.

Unit-4

Concept of standard costs, establishing various cost standards, calculation of Material Variance, Labour Variance and its applications and implications.

Unit-5

Concept and various approaches to Responsibility Accounting, concept of investment center, cost center, profit center and responsibility center and its managerial implications.

Unit-6**Transfer Pricing:** concept, types & importance.**Text and Reference Books-**

1. Management Accounting, Tata McGraw-Hill, 2000, 3rd Ed).
2. Management Accounting, Pandey I M, Vikas Publications, 2004, 3rd Ed.)
3. Introduction to Management Accounting, Horngren et al: Pearson, 2002, 12th edition
4. Management Accounting, S.N. Maheshwari, Sulthan Chand & Sons

Course Outcomes:

- | |
|---|
| 1. Understand about Management accounting along with Financial and Cost Accounting. |
| 2. Be aware of various costing technique as a managerial tool. |
| 3. Identify and define various types of Budget. |
| 4. Examine the Standard costing and various Variances. |
| 5. Importance of Responsibility Accounting in a company. |
| 6. Well-known about Transfer Pricing in a company. |

BBA 304: Organizational Behaviour**Teaching Scheme**

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Course Objectives:

- | |
|---|
| 1. To understand the meaning of organization & organization behaviour |
| 2. To understand the role of various psychological various in organization's setting |
| 3. To understand the root-causes of individual behaviour & its impact in organization |
| 4. To apply knowledge organizational betterment |

Detailed Syllabus**Unit-1**

Introduction: Concept, nature, scope and importance of Organisational Behaviour. Its interdisciplinary nature. Individual and group behavior. Emerging Challenges in OB.

Unit-2

Perception: Definition and importance of perception. Perceptual process.

Attitude: Concept of Attitude, Attitude and behavior, attitude formation, factors determining attitude formation, Attitude measurement, Johari window and its managerial applications.

Unit-3 Motivation: Importance of Motivation. Theories of motivation – Maslow’s, Hertzberg’s, McClelland’s. Expectancy theory. Merits and demerits. Learning: Principles of learning. Factors in Human learning . Theories of Learning.
Unit-4 Inter-personal behaviour: Importance of inter-personal relationships in organisations. Transactional analysis and its applications in organizations , Johari Window Group Dynamics: Concept of Groups & team. Types of Groups. Stages of Group Development. Group norms and roles. Organizational leadership . Leadership theories, skills and styles. Leadership style in Indian Organisation
Unit-5 Conflict and Change: Meaning and Process of conflict, causes, sources, consequences of conflict, conflict resolution strategies. Types of change, identification of the problem and implementation of change , resistance to change, overcoming resistance to change.
Unit-6 Organizational Effectiveness: Concept of organizational effectiveness, efficiency, effectiveness and productivity, approaches of organizational effectiveness , contributing factors of organizational effectiveness. Organizational development- concept and process.
Text and Reference Books- 1. Organizational Behavior: Luthans Fred, Tata McGraw Hill, 10th ed. 2. Organizational Behavior: Robbins Stephen P., Pearson Education, 13th ed. 3. Human Behavior at Work: Davis Keith, McGraw Hill Publications, 12th edition. 4. Organizational Behavior: Prasad L M, S Chand Publication 8th ed. 5. Organizational Behavior: Ashwathappa K., Himalaya Publishing House, 8th ed.

Course Outcomes:

1. It help to understand the role of individual a micro & macro level.
2. It help to understand the functioning of organization & its effects on individual behavior.
3. Organizational Behaviour help to apply various psychological variables.
4. It help to minimize dispute at all level.
5. It create a sense of empathy.

BBA 402: Business Environment	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To get an idea of the basic concept of Business Environment.
2. To understand the concept of economic environment.

3. To understand the concept of Political Environment.
4. To know the concept of Social Environment.
5. To get an understanding of the concept of Multi National corporations.
6. To understand the concept of Financial Sector.

Detailed Syllabus

Unit-1

Concept, Significance and Nature of Environment of Business, Elements of Environment- Internal and External, Interaction between internal and external Environment, **Techniques of Environmental Scanning and Monitoring**.

Unit-2

Economic Environment: Significance and elements of economic environment, Mixed Economy- Role of Public and Private Sector, Performance of Public Sector Undertaking.

Unit-3

Critical Elements of Political Environment, Government and Business. Government Policies – Industrial Policy, Fiscal and Monetary Policy, Exim Policy
Changing dimensions of legal Environment in India: Competition Act, FEMA, Consumer Protection Act.

Unit-4

Social Environment: Meaning and scope, Concept of Social Sector and Social Infrastructure, Social responsibility of business, Overview of Corporate Governance
Technological Environment in India: **Policy on R& D**, Technology transfer

Unit-5

Multinational corporations: Definitions and Meaning, MNCs in India, Foreign Collaborations and Indian Business, Merger and Acquisitions, Global Competitiveness.

Unit-6

Financial Sector: Meaning and reforms, **Stock Exchange and its Regulation:** Meaning, importance and functions of stock exchange, NSE and BSE, SEBI.

Text and Reference Books

- 1) Economic Environment of Business, Mishra SK & Puri VK, Himalaya Publishing House, 3rd Edition.
- 2) Business Environment Text and cases, Paul Justin Tata Mc Graw Hill, latest edition.
- 3) Business environment, Shaikh & Saleem, Pearson, 1st Edition
- 4) Business Environment, Suresh Bedi, Excel Books, 1st edition
- 5) Business Environment : Text and cases, Francis Cherunilam, Himalaya Publishing House, 8th Edition.

Course Outcomes

1. To recognize the importance of the Business Environment.
2. To understand the importance of Economic Environment.
3. To understand the importance of Political Environment.
4. To recognize the importance of Social Environment.
5. To recognize the meaning and significance of MNCs .
6. To understand the Concept and working of financial sector.

BBA 404: Income Tax Law and Accounts	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To make aware about provisions of direct tax with regarding to Income Tax Act, 1961, and rules, 1962.
2. To make aware about agriculture income, residential status and incidence/charge of tax.
3. To understand the provisions and procedure to compute income from salary.
4. To understand the provisions and procedure to compute heads income i.e. house property and gain from business or profession.
5. To understand the provisions and procedure to compute income from capital gain and other sources.
6. To understand the provisions and procedure for clubbing and aggregation of income, set-off & carry forward of losses and various deduction to be made for GTI U/s-80-C to U/s-80-U in computing total income.

Detailed Syllabus

Unit-1 Basic Concepts- Income, Agriculture Income, Casual Income, Assessment year, previous Year, Gross Total Income, Total Income, Person, tax evasion, tax avoidance.
Unit-2 Basis of charge- Scope of total income, residence and tax liability, income which does not form part of Total Income.
Unit-3 Heads of Income- Income from Salaries.
Unit-4 Heads of Income- Income from House Property and Profits and Gains of Business and profession.

Unit-5

Heads of Income - Capital Gains and Income from other sources.

Unit-6

Aggregation of Income, Set off carry forward of losses, Deduction from Gross Total Income.

Text and Reference Books-

1. Students' guide to Income Tax , Singhanian Vinod ,Taxmann Allied
2. Students' Approach to Income Tax, Ahuja Girish, Bharat Law House Pvt. Ltd.
3. Income Tax Law and Accounts, Mehrotra H.C, Sahitya Bhawan Publications.
4. Income Tax Law and Accounts, Agarwal B.K., Nirupam Publication, Agra.
5. Income Tax Law and Accounts, Jain R.K., SBPD Publication, Agra.

Course Outcomes:

1. To introduce the basis concept of Income Tax.
2. In order to familiarize the different know-how and heads of income with its components.
3. Able to file IT return on individual basis.
4. Able to compute total income and define tax complications and structure.
5. Able to understand amendments made from time to time in Finance Act.
6. Differentiate between direct and indirect tax assessment.

BBA 406: Research Project Management	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. Understand the concept / fundamentals of research and their types.
2. Understand the Different research designs & various measurement scales.
3. Understand the different types of sampling techniques
4. Understand the various types of data, data collection methods and procession and analysis of data
5. Understanding and applying the concept of statistical analysis which includes various parametric test and non-parametric test.
6. Understanding the technique of report writing.

Detailed Syllabus

Unit-1

Introduction –Meaning of Research ,Objectives of Research Motivation in Research ,Types of Research, Significance of Research, Research methods versus methodology, Research process, Criteria of Good Research, Problems encountered by Researchers in India, Research problems in Management.

Unit-2

Meaning of Research design, Features of a Good Research design, Different research design (Exploratory, descriptive and causal), Measurement scales: Nominal, Ordinal, Interval and ratio; Likert scale; Sources of error in measurement.

Unit-3

Sampling Design- Census and Sample Survey, Steps in Sample design, on-probability and Probability sampling designs (Sample random, Stratified random, Systematic, Cluster sampling), Determination of Sample size.

Unit-4

Primary versus Secondary data, Methods of Primary data collection (Observation, Interview, Questionnaire, and Schedule method), Guidelines for constructing questionnaire, Collection of secondary data. Processing and Analysis of data –Processing operations (Editing, Coding, Classification, Tabulation), Measures of Central tendency, Measures of dispersion.

Unit-5

Correlation and regression, Association of Attributes, Hypothesis Testing-Hypothesis Formulation, Null and alternative hypotheses, Types of errors, Level of significance, Tests based on Z, Chi –square, t and F- statistics.

Unit-6

Data Presentation-Diagrams, Graphs and Charts ,Report Writing-Significances of Report Writing, Different steps in writing report, Layout of the research report, Types of reports, Mechanics of writing a research report, precautions for writing research reports.

Text and Reference Books-

1. Research Methodology ,Kothari,C.R,2ND Edition, New Age International Publishers
2. Business Research Methods ,Zikmund ,William G,Thomson Learning
3. Panneerselvam, R.:Research Methods ,Prentice-Hall of India Private Limited ,New Delhi

Course Outcomes:

1. Knowledge of concept / fundamentals for different types of research.
2. Applying relevant research techniques.
3. Understanding relevant scaling & measurement techniques and should use appropriate sampling techniques
4. Synthesizing different techniques of coding, editing, tabulation and analysis in doing research.
5. Evaluating statistical analysis which includes various parametric test and non-parametric test.

6. Techniques to prepare report.

BBA 501: Human Resource Management	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. In this course, students will learn basic concepts and frameworks of Human Resource Management (HRM) and understand the role that HRM has to play in effective business administration.
2. It will provide insight into how to use Human Resource as a resource for strategies implementation.

Detailed Syllabus

Unit-1 Introduction: Concept, function, Scope of HRM, Functions, and Responsibilities of HR Manager, Difference between Personnel Management & Human Resource Management, Concept of Human Resource Development, Introduction to Human Capital Management, Contemporary issues in HRM.
Unit-2 Human resource planning; concept and process, recruitment and selection, concept, sources of recruitment, steps of selection process, Concept of placement and induction.
Unit-3 Training and Development: Concept and Importance, and Process, Types of Training, evaluation of training Management Development Programmes.
Unit-4 Performance Appraisal: Purpose of Appraisal, Appraisal criteria, Methods of Appraisal, traditional and modern
Unit-5 Compensation: concept, nature and components of pay structure in India, job evaluation; concepts and types. Employee separation safety and health, Promotion, Transfer, Demotion.
Unit-6 Industrial Relations: Concept, importance, Collective Bargaining, Workers Participation in Management, Grievance Management, Trade Unions.

Text and Reference Books-

1. Managing Human Resource, Garry Dessler & Bijju Barkey, Pearson Education, 12th Edition
2. Personnel Management, Edwin B. Flippo, Tata Mc Graw Hills, 5th Edition
3. Personnel Management, M. J. Jucius, Prentice Hall of India Pvt. Ltd, 3rd Edition
4. Personnel/Human Resources Management, David A. Decenzo and Stephen P Robins; Prentice Hall of India Pvt.Ltd.2004
5. Designing and Managing Human Resources Systems, Parekh Udai and Rao T.V; New Delhi Oxford and IBH, 198

Course Outcomes:

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| 1. Synthesize the role of human resources management as it supports the success of the organization, including the effective development of human capital as an agent for organizational change. |
| 2. Demonstrate knowledge of laws that impact behavior in relationships between employers and employees that ultimately impact the goals and strategies of the organization. |
| 3. Demonstrate knowledge of the practical application of training and employee development as it impacts organizational strategy and competitive advantage. |
| 4. Understand the performance appraisal and its various methods, which help the organization to evaluate employee's performances well as helps in making decisions regarding their increment, promotion and transfer further training & development. |
| 5. Understand the role of employee benefits and compensation as a critical component of employee performance, productivity, and organizational effectiveness. |
| 6. Show evidence of the ability to analyze, manage, and problem-solve to deal with the challenges and complexities of the practice of collective bargaining, grievance management, trade unions, & workers' participation management. |

BBA 502: Financial Management	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment – 6 Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To develop the knowledge of business finance and financial management decisions.
2. To learn different techniques and problem solving skills.
3. To study rising of funds effectively.
4. To provide knowledge of various concepts like capital structure planning, cost of capital, dividend policies and working capital.
5. To teach a sense of responsibility and capacity for financial management.
6. To enable an awareness of the global environment in which financial management operate.

Detailed Syllabus

Unit-1 Introduction Meaning, Scope and objectives of financial management- Profit Vs Wealth maximization Functions of Finance Manager in Modern Age, Financial decision areas, Time Value of Money, Risk and Return Analysis.
Unit-2 Capital expenditure Decisions: Appraisal of project; Concept, Process & Techniques of Capital Budgeting and its applications.
Unit-3 Working Capital Decisions: Concept, components, factors affecting working capital requirement, Working Capital Management: Management of cash, inventory and receivables; Introduction to Working Capital Financing.
Unit-4 Capital Structure: Determinants of Capital Structure, Capital Structure Theories. Cost of Capital: Cost of equity, preference shares, debentures and retained earnings, weighted average cost of capital and implications.
Unit-5 Leverage Analysis: financial, operating and combined leverage along with implications; EBIT-EPS Analysis & Indifference Points.

Unit-6

Financing Decision: Long-term sources of finance; potentiality of equity shares; preference shares; debentures and bonds as sources of long-term finance; Medium and Short term sources of finance; Exposure to International Sources of Finance – ADR and GDR

Text and Reference Books-

01. S.N.Maheshwari
02. Khan & Jain

Financial Management
Financial Management

Course Outcomes:

1. To provide introduction to business finance terms and concepts.
2. To describe the financial concepts used in making financial management decision.
3. To learn effective communication skills to promote respect and relationship for financial deals.
4. To utilize information by applying a variety of business and industry major financial function.
5. Demonstrate a basic understanding of financial management.

BBA 603: International Trade**Teaching Scheme**

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12 Marks
Teachers Assessment – 6 Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Course Objectives:

1. To give an overview of the need of international trade and rationale of globalization.
2. To examine the significance of economic, political, legal and socio-cultural factors to international business.
3. To get an understanding of the concept of Balance of Trade and Balance of Payment.
4. To understand several trade theories and their implications on international business.
5. To get an understanding of the tariff and non-tariff barriers to trade.
6. To understand the role of international trade bodies such as the WTO.

Detailed Syllabus**Unit-1**

A brief historical introduction of Theory and practice of International Trade. Globalization - Forces, Meaning, dimensions and stages in Globalization.

Unit-2 International Business Environment: Economic, political, legal and cultural environment.
Unit-3 Trade Theories: Introduction to theories of International Trade by Adam Smith, Ricardo and Ohlin & Heckler
Unit-4 Balance of payments- Concepts and measurements – Balance of trade transfers – current and capital accounts – deficits and surplus – Equilibrium in the BOPs – National income and BOPs –Disequilibrium and adjustments of BOPs.
Unit-5 Instruments of Trade Policy: Theory of Tariffs, Tariffs and income distribution – optimum Tariffs, effects of Tariffs. Non-Tariff barriers – Quotas, Exchange control and other quantitative restrictions, international cartel, dumping, International agreements and services
Unit-6 Bilateral and Multilateral Trade Laws - General Agreement on Trade and Tariffs, (GATT), World Trade Organization - Seattle and Doha round of talks - Dispute settlement mechanism under WTO – TRIPS and TRIMS - International convention on competitiveness.
Text and Reference Books 1. K. Aswathapa, “International Business”, Tata-McGraw-Hill, 4th Edition 2. Paul J, “International Business”, Prentice Hall 3. Daniels, “International Business”, Pearson Education 4. Varma M.L., “International Trade”, Vikas Publishing House, 2007 5. Mannur H.G., “International Economics”, Vikas Publishing House, 1999 6. Cherulinam Francis, “International Business”, Himalaya, 4 th Edition 7. Hill Charles, “International Business”, McGraw-Hill, 7th Edition

Course Outcomes

1. To recognize the importance of International Trade in the era of Globalization.
2. To understand the various components of International Business Environment.
3. To apply the principles of various trade theories in International Trade.
4. To analyze the reasons of disequilibrium in Balance of Trade and Balance of Payment and their adjustment.
5. To classify the instruments of Trade Policy w.r.t. Tariff and Non-Tariff Barriers.
6. To evaluate the role of WTO and other international bodies in global world.

BBA 605: Entrepreneurship Development	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. Understanding basic concepts in the area of entrepreneurship.
2. Understanding the role and importance of entrepreneurship for economic development.
3. Developing personal creativity and entrepreneurial initiative.
4. Adopting of the key steps in the elaboration of business idea.
5. Understanding the stages of the entrepreneurial process and the resources needed for the successful development of entrepreneurial ventures.

Detailed Syllabus

Unit-1

Entrepreneurship: Definition of Entrepreneur, Internal and External Factors, Functions of an Entrepreneur, Entrepreneurial motivation and Barriers, Classification of Entrepreneurship, Theory of Entrepreneurship, The entrepreneurial Culture; Stages in entrepreneurial process. Concept of Entrepreneurship-Evolution of Entrepreneurship; Development of Entrepreneurship;

Unit-2

Entrepreneurship and environment-Policies governing entrepreneurs, entrepreneurial development programmes (EDP's) - Institutions for - entrepreneurship development. Problems of EDP's.

Unit-3

Entrepreneurial Venture; Idea Generation, Screening and Project Identification, Creative Performance, Feasibility Analysis: Economic, Marketing, Financial and Technical; Project Planning: Evaluation, Monitoring and Control segmentation..

Unit-4

International Entrepreneurship Opportunities: The nature of international entrepreneurship, Importance of international business to the firm, International versus domestic's' entrepreneurship, Stages of economic development.

Unit-5

Women entrepreneurship: Need – Growth of women entrepreneurship, Problems faced by women entrepreneurs, prospects.

Unit-6

Entrepreneurship in Informal Sector: Rural Entrepreneurship – Entrepreneurship in Sectors like Agriculture, Tourism, Health Care, Transport & Allied Services.

Text and Reference Books-

1. Entrepreneurship: New Venture Creation, Holt; Prentice-Hall, 1998
2. Entrepreneurship, Dollinger M J; Prentice-Hall, 1999
3. Entrepreneurship, Hisrich; McGraw-Hill Higher Education, 7th edition
4. Dynamics of Entrepreneurship Development, Vasant Desai Himalaya Publications, 11th edition.

Course Outcomes:

1. Appreciate the importance of embarking on self-employment and has developed the confidence and personal skills for the same.
2. Identify business opportunities in chosen sector / sub-sector and plan and market and sell products / services.
3. Consider the legal and financial conditions for starting a business venture.
4. Specify the basic performance indicators of entrepreneurial activity.

BBA 606: Retail and Service Marketing	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To Identify the key concepts and issues pertaining to retail environment of firms and their retail marketing strategies.
2. To recognize of how retailers develop a retail mix to build a sustainable competitive advantage
3. To Demonstrate a knowledge of the extended marketing mix for services
4. To understand integration of merchandise management and supply chain strategies
5. leading to excellent customer service
6. To apply adaptations to the marketing mix to meet the needs of retail management
7. To analyze service blueprinting, the integration of new technologies, and other key issues facing today's customer service providers and service managers.
8. To generate retail business strategies with effective service plan.

Detailed Syllabus

Unit-1

Introduction to Services Marketing: Growing Importance of Services Sector; Meaning Characteristics of services; Emergence & Reasons for growth of service sector in India

Unit-2

Services Marketing Mix: 7 P's, People, Process and Physical evidence; Services Marketing Process, Service Pricing Strategy, Services Promotions, Services Distributions.

Unit-3

Service Models- Service quality Gap Model, Gronross Model of service quality (Internal marketing, external marketing and Interactive marketing). Challenges in Marketing of services

Unit-4

Introduction: Definition and Concept, Retail Mix, Retail formats, Building and Sustaining Relationship, Retailing Scenario, FDI in Retail, Socio Demographic and Economic Change, Trading Area Analysis, Store Location, Site Selection

Unit-5

External & Internal Layout, Atmospherics: Graphics and Signage's, Floor Space Management, Merchandising, Display Techniques, Mannequins, Store and non-store Based Retailing, Retail Market Strategy: The Strategic Retail Planning Process, Entry Strategies

Unit-6

Multichannel Retailing, HRM in Retail, Private Labels, Retail communication and consumerism, Retail Pricing, Financial Dimensions of Retailing, IT in Retailing

Text and Reference Books-

1. Hoffman, K. D. J. & Bateson, E.G. (2003), Essential of Service Marketing: Concepts Strategies and Cases, Thomson South Western.
2. Barry Berman & Joel R. Evans: Retail Management: A Strategic Approach, PHI, 2007, 11th Ed.
3. Dravid Gilbert: Retailing Marketing, Prentice Hall - Pearson Education 2007, 2nd Ed.
4. Gibson G. Vedamani: Retail Management: Jaico Publishing House 2004, 9th Ed.
5. Michael Levy, Barton A. Weitz & Ajay Pandit: Retailing Management, TMH 2008, 2nd Ed.
6. Bajaj C; Tuli R., Srivanstava N.V. (2005), Retail Management, Oxford University Press, Delhi.
7. Dunne P.M, Lusch R.F. and David A. (2002), Retailing, 4th ed., South-Western, Thomson Learning Inc
8. Swapna Pradhan: Retailing Management-TMH 2009, 3rd Ed.

Course Outcomes:

1. Understand the major elements needed to improve the marketing of services.
2. Understand the complexity of retail channels (store and non-store) used as alternative routes to market.
3. Understand the conceptual and organizational aspects of the retail sector, including strategic planning and management in the retail industry.
4. Understand the nature of the retail mix, and the unique marketing emphases for retailers.
5. Understanding of decisions retailers make to satisfy customer needs in a rapidly changing and competitive environment through retail and service marketing.

BCM 101: Business Organization and Management	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. The purpose of this course is to impart to the students an understanding of state of the art of management & business concepts practices.
2. This course makes the learner prepare to face the emerging challenges of managing resources, managing business processes and managing managers.
3. To inculcate entrepreneurial skills among the students.
4. To understand various aspects of Planning and Decision Making.
5. To analyze about Internal and External environment of business.
6. To generate learning about various aspects of staffing, leading and controlling.

Detailed Syllabus

Unit-1

Foundation of Indian Business Spectrum of Business Activities, Manufacturing and Service Sectors. India's experience of globalization, and privatization, Multinational corporations and Indian transnational.

Unit-2

Entrepreneurial opportunities in contemporary business environment: Networking marketing, Franchising, Business Process Outsourcing, E-commerce and M-Commerce. Process of setting up a business enterprise. Opportunity and idea generation – role of creativity and innovation. Feasibility study and preparation of business plan

Unit-3

Forms: (a) Forms of business including LLP, small venture enterprise and one person company, Choice of suitable form of business ownership (b) Operations: business size and location decisions. Lay out: mass production and mass customization, productivity, quality and logistics. (c) Functional aspects of business: Conceptual framework of functional areas of management: Finance; Marketing and Human Resources.

Unit-4

Development of Management Thought: Classical, Neo-classical, Systems, Contingency and Contemporary Approach to Management – Drucker, Porter, Senge, Prahalad, Hammer, and Tom Peters.

Unit-5

Process of Managing (a) Planning: corporate Strategy – Environmental Analysis and Diagnosis, Formulation of Strategic Plan; Growth strategies – internal and external; Decision-making – concept, Process, Rationality and Techniques, Information Technology and Decision-Making, Decision Support System (b) organizing and Staffing: Contemporary Organizational Formats – Project, Matrix and Networking, (c) Management in Action: Motivation – concept and Theories: Maslow, Herzberg, McGregor, and Ouchi; Leadership – Concept and Theories: Leadership Continuum, Managerial Grid, Situational Leadership. Transactional and Transformational Leadership: Communication – formal and Informal Networks, Barriers and Principles (d) control: Concept and Process, Effective Control System, Modern Control Techniques – Stakeholder Approaches (Balanced Score Card) Accounting Measures (Integrated Ratio Analysis), and Economic and Financial Measures (Economic Value Added and Market Value Added) Behavioral Aspects of Management Control.

Unit-6

Management in Perspective: Management of Strategic Change, Knowledge Management, Learning Organization.

Text and Reference Books-

1. Basu. Business Organisation and Management. Tata McGraw Hill, New Delhi.
2. Gupta, C.B. Modern Business Organisation. Mayur Paper Backs, New Delhi.
3. Lele, R.K. and J.P. Mahajan. Business Organisation. Pitamber Publishing, New Delhi.
4. Mishra, N. Modern Business Organisation. SahityaBhawan, New Delhi.

5. Prasad, Lallan and S.S. Gulshan. Management Principles and Practices. S. Chand & Co. Ltd., New Delhi.
6. Chhabra, T.N. Principles and Practice of Management. Dhanpat Rai & Co., Delhi. 7
7. Singh, B.P. and T.N. Chhabra. Business Organisation and Management. Dhanpat Rai & Co., Delhi.

References:

1. Jim, Barry, John Chandler, Heather Clark. Organisation and Management. Thomson Learning
2. Bushkirk R.H. et al Concepts of Business: An Introduction to Business System. Dryden Press, New York.
3. Bowen, H.R. Social Responsibilities of Business. Harper and Row, New York.
4. Allen L.A. Management and Organisation. McGraw Hill, New York.
5. Ansoff, H.J. Corporate Strategy. John Wiley, New York.
6. Burton Gene and Manab Thakur. Management Today Principles and Practice. Tata McGraw Hill, New Delhi.

Note: Latest edition of text book may be used.

Course Outcomes:

1. Develops managerial and business skills among the learners..
2. To understand various aspects of Planning and Decision Making.
3. To apply knowledge in elimination of wrong management practices.
4. To understand about Internal and External environment of business.
5. It inculcate entrepreneurial skills.
6. To generate learning about various aspects of staffing, leading and controlling.
7. This course makes the learner aware about the practices of a business organization.

BCM102: FINANCIAL ACCOUNTING	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To know about accounting & book-keeping, accounting conventions.
2. To understand the process of recording financial transactions and preparing final accounts.
3. To know the importance of Accounting Standards & ICAI.
4. To be able to deal with critical issues in computing business income.
5. To understand leasing and hire purchase transactions.
6. To be able to maintain head-office and branch accounts.
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Detailed Syllabus

Unit-1

THEORETICAL FRAMEWORK

- Accounting as an information system, the users of financial accounting information and their needs. Qualitative characteristics of accounting, information. Functions, advantages and limitations of accounting. Branches of accounting. Bases of accounting; cash basis and accrual basis.
- The nature of financial accounting principles – Basic concepts and conventions: entity, money measurement, going concern, cost, realization, accruals, periodicity, consistency, prudence (conservatism), materiality and full disclosures.
- Financial accounting standards: Concept, benefits, procedure for issuing accounting standards in India.
- Salient features of Accounting Standard (AS): I(ICAI). International Financial Reporting Standards (IFRS): - Need and procedures.
Accounting process: Recording of business transactions to preparation of trial balance, an overview only.

Unit-2

BUSINESS INCOME

- Measurement of business income-Net income: the accounting period, the continuity doctrine and matching concept. Objectives of measurement.
- Revenue recognition: Salient features of Accounting Standard (AS): 9 (ICAI) Recognition of expenses.
- The nature of depreciation. The accounting concept of depreciation. Factors in the measurement of depreciation. Methods of computing depreciation: straight line method and diminishing balance method; Disposal of depreciable assets change of method. Salient features of Accounting Standard (AS): 10(ICAI) regarding depreciation
- Inventories: meaning. Significance of inventory valuation. Inventory Record Systems:

periodic and perpetual. Methods: FIFO, LIFO and Weighted Average. Salient features of Accounting Standard (AS): 2 (ICAI)
Unit-3 FINAL ACCOUNTS Capital and revenue expenditures and receipts: general introduction only. i) Preparation of financial statements: <ul style="list-style-type: none"> a) of non-corporate business entities from a trial balance; b) of not-for-profit organizations; c) from incomplete records: statement of affairs method and conversion method.
Unit-4 ACCOUNTING FOR HIRE PURCHASE AND INSTALMENT SYSTEMS Concepts of operating and financial lease (theory only)
Unit-5 ACCOUNTING FOR INLAND BRANCHES Concept of dependent branches; accounting aspects; debtors system, stock and debtors system, branch final accounts system and whole sale basis system-Independent branches: concept – accounting treatment: important adjustment entries and preparation of consolidated profit and loss account and balance sheet.
Unit-6 ACCOUNTING FOR DISSOLUTION OF THE PARTNERSHIP FIRM Insolvency of partners, sale to a limited company and piecemeal distribution. OR Computerized Accounts (By using any popular accounting software) Creation of vouchers and recording transactions, preparing reports – cash book and bank book, ledger accounts, trial balance, Profit and Loss Account (Income Statement) and Balance Sheets.
Text and Reference Books- <ol style="list-style-type: none"> 1. Anthony, R.N. and J.S. Reece. Accounting Principles. Richard D. Irwin, Inc. 2. Monga, J.R. Financial Accounting: Concepts and Applications. Mayoor Paper Backs, New Delhi. 3. Shukla, M.C., T.S. Grewal and S.C.Gupta. Advanced Accounts. Vol.-I. S. Chand & Co., New Delhi. 4. Maheshwari, S.N. and S. K. Maheshwari. Financial Accounting. Vikas Publishing House, New Delhi. 5. Sehgal, Ashok, and Deepak Sehgal. Advanced Accounting. Part –I. Taxmann Applied Services, New Delhi. 6. Tulsian, P.C. Advanced Accounting. Tata McGraw Hill, New Delhi.

Course Outcomes:

1. Knowledge about accounting & book-keeping.
2. Understanding the process of recording financial transactions and preparing final accounts.
3. Understanding the importance of Accounting Standards & ICAI.
4. To understand the process of recording financial transactions and preparing final accounts.
5. To know the importance of Accounting Standards & ICAI.
6. Computing business income.

7. Understanding leasing and hire purchase transactions.
8. Understanding branch accounting.
9. Able to maintain accounts in case of dissolution of partnership firms.
10. Maintaining accounts in a computerized environment using accounting software

BCM 103: Micro Economics I	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To acquaint the students with the concepts of microeconomics dealing with consumer behaviour
2. To understand the supply side of the market through the production
3. To analyze the cost behavior of firms
4. To evaluate different types of markets
5. Analyse the tools and techniques to make effective economic decisions
6. Ability to apply the knowledge of subject practically in real life situations

Detailed Syllabus

Unit-1

The concept of demand and the elasticity of demand and supply: Demand curves: Individual's demand curve, market demand curve, Movements along versus shifts in the demand curve, Elasticity of demand: price, income and cross. Concept of revenue: Marginal and Average: Revenue and elasticity of demand.

Unit-2

Consumer Behaviour: Notion of indifference and preference. Indifference curve analysis of consumer behaviour; Consumer's equilibrium (necessary and sufficient conditions). Price elasticity and price consumption curve, income consumption curve and Engel curve, price change and income and substitution effects. Consumer surplus. Indifference curves as an analytical tool (cash subsidy v/s. kind subsidy). Revealed Preference

Unit-3

Production: Fixed and variable inputs, production function, total, average and marginal products, law of variable proportions. Linear homogeneous production function. Production isoquants, marginal rate of technical substitution, economic region of production, optimal combination of resources, the expansion path, isoclines, returns to scale.

Unit-4

Cost of Production: Social and private costs of production, difference between economic and accounting costs, long run and short run costs of production. Economies and diseconomies of scale and the shape of the long run average cost. Learning curve.

Unit-5

Distinction between Perfect and pure Competition: Assumptions, price and output decisions. Equilibrium of the firm and the industry in the short and the long runs, including industry's long run supply, difference between accounting and economic profits, producer surplus. Stability analysis – Walrasian and Marshallian. Demand -supply analysis.

Text and Reference Books-

1. Pindyck, R.S. and D.L. Rubinfeld. Microeconomics. Pearson Education (Singapore) Pvt.Ltd. , Delhi.
2. Bilas, Richard A. Microeconomic Theory: A Graphical Analysis. McGraw - Hill Book Co. Kogakusha Co. Ltd.
3. Browning Edgar K., and JacquesLine M. Browning. Microeconomic Theory and Applications. Kalyani Publishers, New Delhi.
4. Green, H.A.J. Consumer Theory. The Macmillan Company of India Ltd., New Delhi.
5. Gould, John P., and Edward P. Lazear. Microeconomic Theory. All India Traveller Bookseller, New Delhi.
6. Maddala, G.S., and E. Miller. Microeconomics: Theory and Applications. McGraw - Hill Internatiodition, Singapore.
7. Salvatore, D. Schaum's Outline of Theory and Problems of Microeconomic Theory. McGraw - Hill, International Edition, New Delhi.
8. Varian, H.R. Intermediate Microeconomics: A Modern Approach. Affiliated East - West Press, New Delhi.

Course Outcomes:

The students would be able to apply tools of consumer behaviour and firm theory

1. Understanding the basic concepts of demand & supply.
2. To analyze various social structures on the basis of caste, class etc.
3. To understand social evils and their elimination on the part of society.
4. Understand government functioning and its impact.
5. Understanding various forms of Government and its working.
6. Understanding role of International organizations and their role in world peace.

BCM 203 : MICRO ECONOMICS-II	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To provide knowledge of basic concepts of the micro economics..
2. To understand different types of market structures.
3. To analyze the concept of Investment decisions
4. To evaluate the importance of general equilibrium .

Detailed Syllabus

Unit-1 Monopoly Market Structure: Kinds of monopoly, Monopolist's decision and equilibrium, Shifts in demand curve and the absence of the supply curve. Measurement of monopoly power and the rule of thumb for pricing. Horizontal and vertical integration of firms. Comparison of pure competition and monopoly. The social costs of monopoly power. Price discrimination.
Unit-2 Monopolistic Competition and Oligopoly: Monopolistic competition price and output decision- equilibrium. Monopolistic Competition and economic efficiency Oligopoly and Interdependence - Cournot's duopoly model, Stackelberg model, Kinked demand model. Prisoner's dilemma, collusive oligopoly - price-leadership model - dominant firm, cartels, sales maximization. Contestable markets theory. Pricing of Public Utilities, Peak-load pricing.

Unit-3

Monopolistic Competition and Oligopoly: Monopolistic competition price and output decision- equilibrium. Monopolistic Competition and economic efficiency Oligopoly and Interdependence - Cournot's duopoly model, Stackelberg model, Kinked demand model. Prisoner's dilemma, collusive oligopoly - price-leadership model - dominant firm, cartels, sales maximization. Contestable markets theory. Pricing of Public Utilities, Peak-load pricing.

Unit-4

Inter-temporal Analysis and Choice under Uncertainty: Intertemporal choice –Stocks versus flows, present discounted values, capital investment decisions, investment decisions by consumers, determination of interest rates. Risk, preferences towards risk, reducing risk.

Unit-5

General Equilibrium and Market Failure: General equilibrium & efficiency (in Pareto optimal terms). Market failure and the sources of market failure. Market power and inefficiency, asymmetric information - quality uncertainty, market signaling, moral hazard, principal-agent problem, Public goods and externalities.

Text and Reference Books-

1. Pindyck, R.S., and D.L. Rubinfeld. Microeconomics. Prentice-Hall of India Pvt. Ltd.
2. Baumol, William J. Economic Theory and Operations Analysis. Prentice-Hall of India
3. Browning, E.K., & J.M. Browning. Microeconomic Theory and Applications. Kalyani
4. Gould, J.P., & E.P. Lazear. Microeconomic Theory. All India Traveller Bookseller,
5. Lipsey, R.G., and K.A. Chrystal. Principles of Economics. Oxford University Press.
6. Maddala G.S., and E. Miller. Microeconomics: Theory and Applications. McGraw-Hill
7. Salvatore, D. Schaum's Outline of Theory and Problems of Microeconomic Theory.

McGraw-Hill, International Edition.

Course Outcomes

1. Understanding the functioning of Micro economics.
2. It is expected that students will be able to apply this knowledge to business firms' decision making process in the framework of markets.
3. 3.In understanding why the market fails .

BCM 204: Corporate Laws	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. The objective of the course is to impart basic knowledge of the provisions of the Companies Laws and the Depository Laws.
2. To understand the formation, management and other activity of the companies.
3. To introduce to the students the nuance of corporate law and the obligations of it towards society in discharging its trade relations and to be a good corporate citizen.
4. To inform the students about the elementary ideas and the logic of the corporate law.
5. To understand various legal aspects of company.

Detailed Syllabus

Unit-1 Introduction: Characteristics of a company, concept of lifting of corporate veil. Types of companies, association not for profit, illegal association. Formation of company – Promoters, their legal position, pre-incorporation contract and provisional contracts. Documents – Memorandum of Association, Articles of Association, Doctrine of Constructive Notice and Indoor Management, Prospectus and Book Building
Unit-2 Share Capital – issue, allotment and forfeiture of share, Demat of share, transmission of shares, buyback, share certificate and share warrant Members and shareholder – their rights and duties. Shareholders meetings, kinds, convening and conduct of meetings.
Unit-3 Management – Directors, classification of directors, dis-qualifications, appointment, legal position, powers and duties, disclosures of interest, removal of directors, board meetings, other managerial personnel and remuneration. Dividend Provisions and issue of bonus shares. Investigations. Winding up – concept and modes of winding up.

Unit-4

Emerging issues in company law: One Person Company (OPC), Small Company, Postal Ballot, Small Shareholders on Board, Director Identity Number (DIN), Corporate Identity Number (CIN), MCA-21, Online Filing of Documents, Online Registration of Company, National Company Law Tribunal (NCLT), Limited Liability Partnership (LLP), Insider Trading, Rating Agencies, Producer Company – concept and formation.

Unit-5

Depositories Act 1996: Definitions, Rights and Obligations of Depositories, Participants Issuers and Beneficial Owners, Inquiry and Inspections, Penalty.

Text and Reference Books-

1. Sharma J. P, “*An Easy Approach to Corporate Laws*”, Ane Books Pvt Ltd, New Delhi.
2. Bharat Law House, New Delhi, “*Manual of Companies Act, Corporate Laws and SEBI Guidelines*”.
3. Wadhwa and Company, “*A Ramaiya Guide to Companies Act*”, Nagpur
4. Kannal, S., & V.S. Sowrirajan, “*Company Law Procedure*”, Taxman’s Allied Services (P) Ltd., New Delhi (Latest Edn)
5. Singh, Harpal, “*Indian Company Law*”, Galgotia Publishing, Delhi.

Course Outcomes:

1. Apply principles of corporate law in a rigorous and principled manner.
2. Apply corporate law to generate solutions to complex legal problems, and critique the operation of corporate law from a policy perspective.
3. Exercise appropriate strategic professional judgment in the resolution of a corporate law problem in an academic environment.
4. Analyze the impact of corporate law from a policy perspective, in the context of social and cultural diversity.
5. Reflect on individual ability to effectively undertake work as a member of a team, and use that reflection to inform improvement.

BCM302: Income Tax law and Practice	
Teaching Scheme Lectures: 4hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To provide basic knowledge and equip students with application of principles and provisions Income-tax Act, 1961.
2. To provide basic knowledge process of e return file

Detailed Syllabus

<p>Unit-1</p> <p>Basic concepts: Income, agricultural income, person, assessee, assessment year, previous year, gross total income, total income, maximum marginal rate of tax.</p>
<p>Unit-2</p> <p>Residential status, Scope of total income on the basis of residential status. Exempted income under section 10.</p>
<p>Unit-3</p> <p>Income from Salary and Income from house property</p>
<p>Unit-4</p> <p>Profits and gains of business or profession, Capital gains, Income from other sources, Total income and tax computation and Income of other persons included in assessee's total income</p>
<p>Unit-5</p> <p>Aggregation of income and set-off and carry forward of losses, Deductions from gross total income, Rebates and reliefs, Computation of total income of individuals and firms, Tax liability of an individual and firm, Five leading cases of Supreme Court, Preparation of return of income:- Manually and PAN, On-line filing of Returns of Income & TDS. Provision & Procedures of COMPULSORY ONLINE filing of returns for specified assesses</p>
<p>Text and Reference Books-</p> <ol style="list-style-type: none"> 1. Singhanian, Vinod K. and Monica Singhanian. Students' Guide to Income Tax. 2. Ahuja, Girish and Ravi Gupta. Systematic Approach to Income Tax. Bharat Law House, Delhi. 3. Chandra, Mahesh., S.P. Goyal and D.C. Shukla. Income Tax Law and Practice. Pragati Prakashan, Delhi 4. Mehrotra, H.C. Income Tax Law. Sahitya Bhawan, Agra 5. Lal, B.B. Income Tax Law and Practice. Konark Publications, New Delhi.

Course Outcomes:

1. Understanding the provisions of income tax act 1961.
2. To analyze various options regarding tax planning.
3. Understand process of e return file.
4. Students will gain a working knowledge regarding computation of taxable income and tax liability pertaining to individuals/firms.

BCM 303 : MACRO ECONOMICS	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To provide knowledge of basic concepts of the macro economics..
2. To understand the government policies
3. To understand the components of aggregate demand & supply
4. To analyze the concept of Inflation & unemployment
5. To evaluate the importance of open economy

Detailed Syllabus

Unit-1 Introduction – concepts and variables of macroeconomics, income, expenditure and the circular flow, components of expenditure. Static macro economic analysis short and the long run – determination of supply, determination of demand, and conditions of equilibrium.
Unit-2 Economy in the short run – IS–LM framework, fiscal and monetary policy , determination of aggregate demand, shifts in aggregate demand, aggregate supply in the short and long run, and aggregate demand- aggregate supply analysis
Unit-3 Inflation, causes of rising and falling inflation, inflation and interest rates , social costs of inflation. Unemployment – natural rate of unemployment, frictional and wait employment. Labour market and its interaction with production system. Phillips curve, the trade-off between inflation and unemployment, sacrifice ratio, role of expectations adaptive and rational.

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Unit-4 Open economy – flows of goods and capital, saving and investment in a small and a large open economy, exchange rates, Mundell – Fleming model with fixed and flexible prices small open economy with fixed and with flexible exchange rates, interest-rate differentials case of a large economy.
Unit-5 Behavioral Foundations- Investment –determinants of business fixed investment , effect of tax, determinants of residential investment and inventory investment. Demand for Money – Portfolio and transactions theories of demand for real balances, interest and income elasticities of demand for real balances. Supply of money
Text and Reference Books- 1.Mankiw, N. Gregory. Macroeconomics. Macmillan Worth Publishers New York, Hampshire U.K. 2.Dornbusch, Rudiger, and Stanley. Fischer. Macroeconomics. McGraw - Hill. 3.Dornbusch, Rudiger., Stanley. Fischer and Richard Startz. Macroeconomics. Irwin/McGraw - Hill, Singapore. 4. Deepashree, “Macro Economics”, ANE Books Pvt. Ltd. New Delhi. 5.Barro, Robert J. Macroeconomics. MIT Press, Cambridge MA. 6.Burda, Michael, and Wyplosz. M acroeconomics A European Text. Oxford University Press, Oxford. 7.Salvatore, Dominick. International Economics. John Wiley & Sons Singapore. 8.Branson, William H. Macroeconomic Theory and Policy. HarperCollins India Pvt. Ltd. .

Course Outcomes:

1. Understanding the functioning of Macro economics.
2. Tounderstand the impact of macro policies on an economy and business, in the context of the international economy.

BCM 304: Principles of Marketing	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To comprehend marketing decisions, based upon the combination of product, price, promotion, and distribution elements.
2. To understand firm foundation in marketing theory and marketing lexicon.
3. To apply key frameworks and methods, and develop analytical skills to solve marketing problems.
4. To analyze organizations identify customers and their wants/needs.
5. To evaluate industry trends and meet customer demands.
6. To generate marketing information and research to develop marketing strategies for organizations

Detailed Syllabus

Unit-1 Introduction: Nature, scope and importance of marketing; Evolution of marketing concepts; Marketing mix, marketing environment. Consumer Behavior – An Overview: Consumer buying process; Factors influencing consumer buying decisions
Unit-2 Market Selection: Market segmentation – concept, importance and bases; Target market selection; Positioning concept, importance and bases; Product differentiation vs. market segmentation. Product: Meaning and importance. Product classifications; Concept of product mix; Branding packaging and labeling; After-sales services; Product life-cycle; New Product Development.
Unit-3 Pricing: Significance. Factors affecting price of a product. Pricing policies and strategies. Promotion: Nature and importance of promotion; Communication process; Types of promotion advertising, personal selling, public relations & sales promotion, and their distinctive characteristics; Promotion mix and factors affecting promotion mix decisions; Communication planning and control.
Unit-4 Distribution: Channels of distribution - meaning and importance; Types of distribution channels; Wholesaling and retailing; Factors affecting choice of distribution channel; Physical Distribution. Retailing: Types of retailing – store based and non-store based

retailing, chain stores, specialty stores, supermarkets, retail vending machines, mail order houses, retail cooperatives; Management of retailing operations: an overview; Retailing in India: changing scenario.

Unit-5

Rural marketing: Growing Importance; Distinguishing characteristics of rural markets; Understanding rural consumers and rural markets; Marketing mix planning for rural markets.

Recent issues and developments in marketing: Social Marketing, Marketing ethics; Recent developments in marketing – online marketing, direct marketing, services marketing, green marketing, sustainable marketing and relationship marketing.

Text and Reference Books-

1. Kotler, Philip and Gary Armstrong. Principles of Marketing. 13th edition. PrenticeHall of India, New Delhi.
2. Michael, J Etzel., Bruce J Walker and W. J. Stanton. Marketing. 13th edition. McGraw Hill, New York.
3. McCarthy, E. Jerome., and William D. Perreault. Basic Marketing. Richard D. Irwin.
4. Lamb, Charles W., Joseph F. Hair and Carl McDaniel. Principles of Marketing. South Western Publishing, Ohio.
5. Pride, William M., and D.C. Ferrell. Marketing: Planning, Implementation & Control. Cengage Learning.
6. Majaro, Simon. The Essence of Marketing. Prentice Hall, New Delhi.
7. Zikmund William G. and Michael D'Amico. Marketing; Creating and Keeping Customers in an E-Commerce World. Thomson Learning.
8. Chhabra, T.N., and S. K. Grover. Marketing Management. Fourth Edition. DhanpatRai& Company.
9. The Consumer Protection Act.
10. Michael, J. Etzel, Bruce J. Walker, William J Staton and Ajay Pandit. Marketing Concepts and Cases. (Special Indian Edition).

Note: Latest edition of text book may be used.

Course Outcomes:

1. Develop customer relationships and value through marketing.
2. Link marketing and corporate strategies.
3. Scan the marketing environment.
4. Recognize organizational markets and buyer behavior.
5. Turn marketing information into action.
6. Identify market segments and targets.
7. Develop new products and services.
8. Formulate pricing strategies for products and services.
9. Create strategies for managing marketing channels and supply chains.
10. Integrate marketing communications and direct marketing.

11. Analyze advertising, sales promotion, and public relations.
12. Implement interactive and multichannel marketing

BCM 402: Corporate Accounting	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment – 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To help the students to acquire the conceptual knowledge of the fundamentals of the corporate accounting and to learn the procedure of issue and redemption of shares and debentures.
2. To learn the techniques of preparing the financial statement of the banking company and non-banking company.
3. To provide the methods of valuation of goodwill and shares.
4. To provide the knowledge of amalgamation and internal reconstruction of the company.
5. To learning about accounts of Holding Company.
6. To learn techniques and uses of Cash Flow Statement.

Detailed Syllabus

Unit-1 ACCOUNTING FOR SHARE CAPITAL & DEBENTURES: Issue, forfeiture and reissue of forfeited shares- concept & process of book building. Issue of rights and bonus shares. Buy back of shares, Redemption of preference shares, Issue and Redemption of Debentures.
Unit-2 FINAL ACCOUNTS: Preparation of profit and loss account and balance sheet of corporate entities, excluding calculation of managerial remuneration. Disposal of company profits. VALUATION OF GOODWILL AND VALUATION OF SHARES: Concepts and calculation - simple problem only.
Unit-3 AMALGAMATION OF COMPANIES: Concepts and accounting treatment as per Accounting Standard: 14 (ICAI) (excluding intercompany holdings). Internal reconstruction: concepts and accounting treatment excluding scheme of reconstruction.

<p>Unit-4</p> <p>ACCOUNTS OF HOLDING COMPANIES/PARENT COMPANIES: Preparation of consolidated balance sheet with one subsidiary company. Relevant provisions of Accounting Standard: 21 (ICAI).</p>
<p>Unit-5</p> <p>BANKING COMPANIES: Difference between balance sheet of banking and non banking company; prudential norms. Asset structure of a commercial bank. Non-performing assets (NPA).</p>
<p>Unit-6</p> <p>CASH FLOW STATEMENT: Concepts of funds. Preparation of cash flow statement as per Accounting Standard (AS): 3 (Revised) (ICAI): Indirect method only.</p>
<p>Text and Reference Books-</p> <p>01. Monga, J.R. Fundamentals of Corporate Accounting. Mayur Paper Backs, New Delhi. 02. Agarwal A.K., Corporate Accounting, Navyug Publication, Agra 03. Shukla, M.C., T.S. Grewal, and S.C. Gupta. Advanced Accounts. Vol.-II. S. Chand & Co., New Delhi. 04. Maheshwari, S.N. and S. K. Maheshwari. Corporate Accounting. Vikas Publishing House, New Delhi. 05. Sehgal, Ashok and Deepak Sehgal. Corporate Accounting. Taxman Publication, New Delhi. 06. Naseem Ahmed, "Corporate Accounting", ANE Books Pvt. Ltd. New Delhi. 07. Gupta, Nirmal. Corporate Accounting. Sahitya Bhawan, Agra. 08. Jain, S.P. and K.L. Narang. Corporate Accounting. Kalyani Publishers, New Delhi. 09. Compendium of Statements and Standards of Accounting. The Institute of Chartered Accountants of India, New Delhi.</p> <p>Note: Latest edition of text book may be used.</p>

Course Outcomes:

1. Understanding the features of Shares and Debentures.
2. Develop an understanding about redemption of Shares and Debentures and its methods.
3. To give an exposure to company final accounts and to provide knowledge on valuation of goodwill and Shares.
4. Students can get an idea about amalgamation and internal reconstruction of company.
5. Understanding role of consolidation financial statement of holding and subsidiary companies.
6. Understanding role and uses of Cash Flow Statement in the company.

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BCM404: HUMAN RESOURCE MANAGEMENT	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To recognize about the learning of Human Resource and it's functioning.
2. To understand various factors associated with Organizations, Recruitment, and Selection etc.
3. To apply knowledge in identifying the gap between current HR challenges and their implications.
4. To analyze about recent advances in HRM, especially Technological Trends.
5. To evaluate different forms of Appraisal and T&D.

Detailed Syllabus

Unit-1 Human Resource Management: Relevance and spectrum, HRD: concept and evolution, Organization of HR Department, Role, Status and competencies of HR Manager, HR Policies, An overview of Government Policy since 1991 affecting Human Resources.
Unit-2 Acquisition of Human Resource: Human Resource Planning- Quantitative and Qualitative dimensions; job analysis – job description and job specification; recruitment – Concept and sources; selection – Concept and process; test and interview; placement induction.
Unit-3 Training and development; concept and importance; identifying training and development needs; designing training programmes; role specific and competency based training; evaluating training effectiveness; training process outsourcing; management development systems; career development.
Unit-4 Performance appraisal system; nature and objectives; techniques of performance appraisal; potential appraisal and employee counseling; job changes - transfers and promotions.
Unit-5 Compensation: concept, policies and administration; job evaluation; methods of wage payments and incentive plans; fringe benefits; performance linked compensation.
Unit-6 Maintenance: employee health and safety; employee welfare; social security; grievance handling and redressal.

Unit-7

Emerging Horizons in Human Resource Management; Human Resource Information System; Downsizing; VRS; empowerment, workforce diversity.

Suggested Readings:

1. Decenzo, D.A. and S.P. Robbins, "Personnel/Human Resource Management", Prentice Hall of India, New Delhi.
2. Dessler. Human Resource Management. Prentice Hall of India, New Delhi.
3. French, W. The Personnel Management Process. HaughtonMifflin, Boston.
4. Ivancevich, John M. Human Resource Management. McGraw Hill.
5. Wreather and Davis. Human Resource Management. Prentice Hall, New Jersey.
6. Robert L. Mathis and John H. Jackson. Human Resource Management. Thomson Learning.
7. Storey. Human Resource Management. Thomson Learning.
8. Singh, A.K. and B.R Duggal. Human Resources Management. Sunrise Publication, New Delhi.
9. Saiyalaim, M.S. Human Resource Management. Tata McGraw-Hill, New Delhi.
10. Chhadha, T.N. Human Resource Management. DhanpatRai & Co., Delhi.
11. Dwivedi, R.S. Personnel Management. Oxford & I.B.H., New Delhi.
- 12. Singh, B.P. Personnel Management & Industrial Relations. DhanpatRai & Co., Delhi.**

Course Outcomes:

1. Understanding of Human Resource and it's functioning.
2. Understanding of various factors associated with Organizations, Recruitment, and Selection etc.
3. Applying knowledge in identifying the gap between current HR challenges and their implications.
4. Learning about recent advances in HRM, especially Technological Trends.
5. Identification of different forms of Appraisal and T&D.

BCR 501: Management Accounting	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

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| 1. To impart the students' knowledge about use of financial, cost and other data for the purpose of planning, control and decision making. |
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Detailed Syllabus

Unit-1 Nature and Scope, Difference between cost accounting and management accounting, cost control, cost reduction, cost management.
Unit-2 Budgeting and budgetary control : Concept of budget and budgetary control objectives, merits, and limitations, Budget administration, Functional budgets, Fixed and flexible budgets, Zero base budget, Program me and performance budgets.
Unit-3 Standard costing and variance analysis : Meaning of standard cost and standard costing: advantages, limitations and applications, Variance analysis – material, labour, overhead and sales variances, Disposition of variances, Control ratios.
Unit-4 Absorption versus variable costing : Distinctive features and income determination. Cost-Volume-Profit Analysis: Break-even analysis-algebraic and graphic methods. Contribution / sales ratio, key factor. Margin of safety. Angle of incidence. Determination of cost indifference point.
Unit-5 Decision making: Costs for decision making, variable costing and differential analysis as aids in making decisions – fixation of selling price , exploring new market, make or buy, product mix, operate or shut down, sellor process further.
Unit-6 Responsibility Accounting: Concept, Significance, Different Responsibility Centers, Divisional Performance Measurement – Financial Measures.

Text and Reference Books-

1. Lal, Jawahar. Cost Accounting. Tata McGraw Hill Publishing Co., New Delhi.
2. Nigam, B.M. Lall. and I.C. Jain. Cost Accounting, Principles and Practice, Prentice. Hall of India, New Delhi.
3. Mittal, D.K. and Luv Mittal. Cost Accounting. Galgotia Publishing Co., New Delhi.
4. Arora, M.N. Cost Accounting – Principles and Practice. Vikas Publishing House, New Delhi.
5. Shukla, M.C., T.S. Grewal and M.P. Gupta. Cost Accounting, Text and Problems. S. Chand & Co. Ltd., New Delhi.
6. H.V. Jhamb, “Management Accounting”, ANE Books Pvt. Ltd. New Delhi
7. Maheshwari, S.N. and S.N. Mittal. Cost Accounting, Theory and Problems. Shri Mahabir Book Depot, New Delhi.
8. Jain, S.P. and K.L. Narang. Cost Accounting, Principles and Methods. Kalyani Publishers, Jalandhar.
9. Iyengar, S.P. Cost Accounting. Sultan Chand & Sons, New Delhi.
10. Singh, S. K. and Gupta Lovleen. Management Accounting – theory and Practice. Pinnacle Publishing House.

Course Outcomes:

2. To recognize the importance of Management Accounting in area of Financial Analysis, Planning, Cost controlling and decision making.
3. To understand the different principles, tools and techniques used while doing financial analysis, budgeting, Cost Controlling, and making decisions.
4. To use different principles and techniques (Standard Costing , budgeting) of Cost controlling and Decision making(Marginal Costing) .
5. To analyse the impact of different tools and techniques applied in Management accounting (Decision making areas)
6. To Evaluate the result of application of different, techniques of cost planning and cost controlling , principles of decision making with the help of practical cases.
7. To Create some new tools, techniques, or models which can be used in financial analysis, cost controlling and decision making.

BCM 502: Financial Management	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To familiarize the students with the principles and practices of financial Management

Detailed Syllabus

Unit-1 Scope and objective, Time value of money, Risk and return (including Capital Asset Pricing Model), Valuation of securities – Bonds and Equities.
Unit-2 The Capital Budgeting Process, Cash flow Estimation, Payback Period Method, Accounting Rate Of Return, Net Present Value (NPV) Net Terminal Value, Internal Rate of Return (IRR), Profitability Index, Capital budgeting under Risk – Certainty Equivalent Approach and Risk- Adjusted Discount Rate.
Unit-3 Cost of Capital and Financing Decision: Sources of long-term financing Estimation of components of cost of capital. Methods for Calculating cost of equity capital, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average cost of capital (WACC) and Marginal cost of capital. Capital structure – Theories of Capital Structure (Net Income, Net Operating Income, MM Hypothesis, Traditional Approach). Operating and financial leverage. Determinants of capital structure.

Unit-4

Dividend Decision – Theories for Relevance and irrelevance of dividend decision for corporate valuation. Cash and stock dividends. Dividend policies in practice.

Unit-5

Working Capital Decisions: Concepts of working capital, the risk-return trade off, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management and payables management.

Text and Reference Books-

1. Horne, J.C. Van. Financial management and policy. 10th ed. New Delhi Prentice Hall of India.
2. Horne, J.C. Van. Fundamentals of Financial Management. 9th ed. New Delhi Prentice Hall of India.
3. Levy H. and M. Sarnat . Principles of Financial Management. Engelwood Cliffs, Prentice hall
4. Johnson, R.W. Financial Management. Boston Allyn and Bacon.
5. Joy, O.M. Introduction to Financial Management. Homewood: Irwin.
6. Khan and Jain. Financial Management text and problems. 2nd ed. Tata McGraw Hill New Delhi.
7. Pandey, I.M. Financial Management. Vikas Publications.
8. Bhalla, V.K. Financial Management & Policy. Anmol Publications, Delhi.
9. Chandra, P. Financial Management- Theory and Practice. (Tata McGraw Hill).
10. Rustagi, R.P. Fundamentals of Financial Management. Galgotia Publishing House, Delhi)
11. Singh, J.K. Financial Management- text and Problems. 2nd Ed. DhanpatRai and Company, Delhi.
12. Sharma, G.L. and Y. P.Singh. ed. Contemporary Issues in Finance and Taxation. Academic Foundation Delhi.
13. Singh, Surender and Kaur Rajeev. Fundamentals of Financial Management. Book Bank International.

Course Outcomes:

2. To recognize the importance of Financial management in area of Fund Management (procurement of funds and its effective utilisation) and decision making such as

Dividend decisions.
3. To understand the different tools and techniques used while procuring (e.g. Cost of capital, Leverage analysis) and utilising funds (Capital expenditure decisions, management of Working capital).
4. To apply the different theories and techniques regarding funds acquisition and its effective utilization.
5. To analyse the impact of different techniques and theories applied in financial management.
6. To Evaluate different theories and techniques in practical cases.
7. To Create some techniques, theories and models which are useful in managing funds.

BCM511: AUDITING	
Teaching Scheme Lectures: 4hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To provide knowledge of auditing principles, procedures and techniques in accordance with current legal requirements and professional standards.

Detailed Syllabus

Unit-1 Introduction: Meaning, Objects, Basic Principles and Techniques. Classification of Audit. Audit Planning. Internal Control – Internal Check and Internal Audit
Unit-2 Audit Procedure – Vouching and verification of Assets & Liabilities..
Unit-3 Audit of Limited Companies:-Company Auditor: (i) Qualifications and disqualifications, Appointment, Removal, Remuneration, Rights, Duties and Liabilities. (ii) Audit Committee (iii) Auditor's Report: Contents and Types. Auditor's certificates (iv) Emphasis on Companies (Auditor's Report) order, 2003 (CARO – 2003) (v) Liabilities of Statutory Auditors in case of non-compliance.
Unit-4 Special Areas of Audit: Special features of Cost audit. Tax audit and Management audit. Recent Trends in Auditing: Basic considerations of audit in EDP Environment. Relevant Auditing and Assurance Standards (AASs). Relevant Case Studies/Problems.

Text and Reference Books-

1. Jha, Aruna. A Student's Guide to Auditing. Taxmann.
2. Tandon, B. N., S. Sudharsanam and S. Sundharabahu. A Handbook of Practical Auditing. S. Chand and Co. Ltd., New Delhi.
3. Institute of Chartered Accountants of India. Auditing and Assurance Standards. ICAI, New Delhi.
4. Gupta, Kamal and Ashok Arora. Fundamentals of Auditing. Tata Mc-Graw Hill Publishing Co. Ltd., New Delhi.
5. Ghatalia, S.V. Practical Auditing. Allied Publishers Private Ltd., New Delhi.
6. Sharma, T.R. Principles and Problems. Sahitya Bhawan Publication, Agra.
7. Singh, A. K. and Gupta Lovleen. Auditing Theory and Practice. Galgotia Publishing Company.
8. Publication ICAI. (CARO).

Course Outcomes:

1. Understanding the provisions of CARO.
2. Understand process of Auditing .
3. Understand process of Auditing and Assurance Standards (AASs).

BCM 601: International Business	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To understand the role of international business.
2. To expose students to the concept , importance and dynamics of international business and India's involvement with global business operations.
3. To understand the theoretical foundations of international business to the extent these are relevant to understand the mechanics of global business operations & development

Detailed Syllabus**Unit-1**

Introduction to International Business: Globalisation and its growing importance in world economy; Impact of globalization; International business contrasted with domestic business -complexities of international business; Modes of entry into international business.

International Business Environment: National and foreign environments and their components - economic, cultural and political-legal environments; Global trading environment - recent trends in world trade in goods and services; Trends in India's foreign trade.

Unit-2

Theories of International Trade – an overview; Commercial Policy Instruments - tariff and nontariff measures; Balance of payment account and its components. International Organizations and Arrangements: WTO – Its objectives, principles, organizational structure and functioning; An overview of other organizations – UNCTAD, World Bank and IMF; Commodity and other trading agreements.

Unit-3

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Regional Economic Co-operation: Forms of regional groupings; Integration efforts among countries in Europe, North America and Asia. International Financial Environment: International financial system and institutions; Foreign exchange markets and risk management; Foreign investments - types and flows; Foreign investment in Indian perspective.

Unit-4

Organisational structure for international business operations; Key issues involved in making international production, finance, marketing and human resource decisions; International business negotiations. Developments and Issues in International Business: Outsourcing and its potentials for India; Strategic alliances, mergers and acquisitions; Role of IT in international business; International business and ecological considerations.

Unit-5

. Foreign Trade promotion measures and organizations in India; Special economic zones (SEZs) and 100% export oriented units (EOUs); Measures for promoting foreign investments into and from India; Indian joint ventures and acquisitions abroad. Financing of foreign trade and payment terms.

Text and Reference Books-

Suggested Readings:

- 1. Charles, W.L. Hill and Jain, Kumar, Arun. International Business. New Delhi: Tata McGraw-Hill.**
- 2. Johnson, Derbe., and Colin Turner. International Business - Themes & Issues in the Modern Global Economy. London: Routledge.**
- 3. Cherunilam, Francis. International Business: Text and Cases. Prentice Hall of India Ltd.**
- 4. Daniels John, D. Lee H. Radenbaugh and David P. Sullivan. International Business. Pearson Education (Singapore) Pvt. Ltd.**
- 5. Justin, Paul. International Business. Prentice Hall of India Ltd.**

6. Michael R. Czinkota. et al. International Business. Fortforth: The Dryden Press.
7. RBI. Report on Currency & Finance, various issues.
8. Griffin, Ricky W. and Michael W. Pustay. International Business - A Managerial Perspective. Prentice Hall.
9. Bennett, Roger. International Business. Delhi: Pearson.
10. UNCTAD Reports.
11. WTO, Annual Report, various issues.

Course Outcomes

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|---|
| 1. Understanding the functioning of International business |
| 2. Exposure of students to the concept, importance and dynamics of international business and India's involvement with global business operations |

BCM 613: FUNDAMENTALS OF INVESTMENTS	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

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| 1. To familiarize students with different investment alternatives, |
| 2. To introduce them to the framework of their analysis and valuation |
| 3. To highlight the role of investor protection |
| 4. To demystify the process of using money to make money . |

Detailed Syllabus

Unit-1
The Investment Environment - The investment decision process, Types of Investments – Commodities, Real Estate and Financial Assets, the Indian securities market, the market participants and trading of securities, security market indices, sources of financial information, Concept of return and risk (including Capital Asset Pricing Model), Impact of Taxes and Inflation on return.

Unit-2 Fixed Income Securities - Bond features, types of bonds, estimating bond yields, types of bond risks, default risk and credit rating .
Unit-3 Approaches to Equity Analysis: Introductions to Fundamental Analysis, Technical Analysis and Efficient Market Hypothesis, dividend capitalisation models , and price-earnings multiple approach to equity valuation.
Unit-4 Portfolio Analysis and Financial Derivatives: Portfolio and Diversification , Portfolio Risk and Return . Commodities, real estate, and mutual funds. Introduction to Financial Derivatives, Financial Derivatives Markets in India.
Unit-5 Investor Protection – SEBI & role of stock exchanges in investor protection , investor grievances and their redressal system, insider trading, investors’ awareness and activism .
Text and Reference Books 1) Jones, C.P., “Investments Analysis and Management”, Wiley, 8th ed. 2) Bhalla, V.K., “Investment Management”, S. Chand & Co. 3) Singh, Preeti.,” Investment Management”, Himalaya Publications. 4) Prasanna, Chandra., “Investment Analysis and Portfolio Management”, Tata McGraw Hill. 5) Vohra, N.D., and B.R. Bagri, “Futures and Options”, 2nd ed. (2003), Tata McGraw Hill Publishing Company Ltd. 6) Prasanna, Chandra., “How to Win Investment Game”, Tata McGraw Hill

Course Outcomes

1. Understand different investment alternatives in the market
2. Understand how securities are traded in the market
3. Be able to analyze and price different securities
4. Be able to manage a portfolio
5. Understand basics in derivatives

BCR 104: Book Keeping and Basic Accounting	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To introduce the basic need and concepts of Book keeping and Accounting.
2. To analyze various transactions related Accounting and their Subsidiary Books.
3. To identify the various types of Revenue and Expenditure items.
4. To recognize the concept of Joint venture and Consignment along with Accounting

procedure.
5. To understand the analysis of financial statement of companies and other organizations.

Detailed Syllabus

Unit-1 Need, development, and definition of accounting; Bookkeeping and accounting; Persons interested in accounting; Disclosures; Branches of accounting; Objectives of accounting; International accounting standards (only outlines); Accounting principles; Accounting standards in India.
Unit-2 Accounting Cycle; Journal; Rules of debit and credit; Compound journal entry; Preparation of ledger; Subsidiary Books including Cash Book and Trial Balance; Rectification of Errors.
Unit-3 Classification of Income; Classification of expenditure; Classification of receipts; Preparation of Bank Reconciliation Statement.
Unit-4 Meaning, Concept and features of Joint Venture, methods of recording joint venture transactions and treatment of cash discount; Consignment- some important terms and accounting procedure.
Unit-5 Manufacturing account; Trading account; Profit and loss account; Balance sheet; Adjustment entries. Familiarity with Accounting standard Package (Ex-Tally)
Text and Reference Books- 1. Anthony, R.N. and Reece, J.S.: Accounting Principles; Richard Irwin Inc. 2. Gupta, R.L and Radhaswamy, M: Financial Accounting; Sultan Chand and Sons, New Delhi. 3. Monga J.R., Ahuja Girish, and Sehgal Ashok: Financial Accounting; Mayur Paper Back, Noida. 4. Shukla. M.C., Grewal T.S., and Gupta, S.C.: Advanced Accounts; S. Chand & Co. New Delhi. 5. Compendium of Statement and Standards of Accounting: The Institute of Chartered Accountants of India, New Delhi 6. Agarwala A.N., Agarwala K.N.: Higher Sciences of Accountancy: KitabMahal, Allahabad. 7. Mishra A.K.: Financial Accounts, SahityaBhawan Publishers and Distributors. 8. Jha, B.K.: Financial Accounting, KedarNath& Ram Nath, Meerut.

Course Outcomes:

7. Understanding the basic concept of Accounting and its Functioning.
8. Recording the transactions and maintenance various Books.
9. Identifying the various Revenue and Expenditure items.
10. Knowledge of Accounting procedure of Joint venture and Consignment.
11. Evaluation of financial statement analysis.

BCR 202: BUSINESS LAWS	
Teaching Scheme	Examination Scheme

Lectures: 5 hrs/Week Tutorials: 1 hr/Week Credits: 5	Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Course Objectives:

1) To get an idea of the basic concepts of Business Law.
2) To understand the concept of law and application of law on various cases.
3) To understand the legal relationship in business contracts .
4) To know various forms of special contracts.
5) To get an understanding of the use of consumer protection Act 1986.

Detailed Syllabus

Unit-1 Law of Contract (1872): Nature of contract; Classification; Offer and acceptance; Capacity of parties to contract; Free consent; Consideration ; Legality of object; Void and Agreement Voidable Agreement ; Performance of contract; Discharge of contract; Remedies for breach of contract
Unit-2 Special Contracts: Indemnity; Guarantee; Bailment and pledge; Agency .
Unit-3 Sale of Goods Act 1930: Formation of contracts of sale; Goods and their classification, price; Conditions, and warranties; Transfer of property in goods ; Performance of the contract of sales; Unpaid seller and his rights , sale by auction; Hire purchase agreement.
Unit-4 Negotiable Instrument Act 1881: Definition of negotiable instruments; Features; Promissory note; Bill of exchange & cheque ; Holder and holder in the due course; Crossing of a cheque, types of crossing; Negotiation; Dishonour and discharge of negotiable instrument
Unit-5 The Consumer Protection Act 1986: Salient features; Definition of a consumer ; Grievance redressal machinery Foreign Exchange Management Act 2000: Definitions and main provisions
Text and Reference Books 1. Desai T.R.: Indian Contract Act, Sale of Goods Act and Partnership Act; S.C. Sarkar & Sons Pvt. Ltd., Kolkata.. 1. Khargamwala J.S: The Negotiable Instruments Act; N.M.Tripathi Pvt. Ltd, Mumbai. 2. Singh Avtar: The Principles of Mercantile Law; Eastern Book Company, Lucknow. 3. Kuchal M.C: Business Law; Vikas Publishing House, New Delhi. Kapoor N.D: Business Law; Sultan Chand & Sons, New Delhi

Course Outcomes

1) To recognize the importance of the various concepts of business law.
2) To understand the various laws of contract and sale.
3) To apply various laws in business decisions.
4) To determine the availability of law for consumers.
5) To classify the special laws related to business like indemnity, guarantee, contingent contracts.

BCR 305: Fundamentals of Entrepreneurship	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. This course is designed to help students understand the basic nuances of Entrepreneurship.
2. From this course the students will come to know about the motivation behind entrepreneurship. Students undergoing the course will be appraised on how to shape a business idea.
3. The course will help students to identify the components of a Business Plan
4. Developing personal creativity and entrepreneurial initiative.
5. To recognize challenges associated with growing a venture and strategies for successful scaling.

Detailed Syllabus

Unit-1 Introduction: The entrepreneur; Definition; Emergence of entrepreneurial class; Theories of entrepreneurship; Role of socio-economic environment; Characteristics of entrepreneur; Role of Entrepreneur in Economic development
Unit-2 Promotion of a Venture: Idea Generation, Business plan and its implementation, feasibility and analysis : Start up Ventures, Opportunities analysis; External environmental analysis - economic, social, and technological; Competitive factors; Legal requirements for establishment of a new unit, and raising of funds; Venture capital sources and documentation required,
Unit-3 Entrepreneurial Behaviour: Innovation and entrepreneur; Entrepreneurial behavior and Psycho-Theories, Social responsibility
Unit-4 Entrepreneurial Development Programmes (EDP): EDP, their role, relevance, and achievements; Role of Government in organizing EDPs; Critical evaluation.
Unit-5 Institutions supporting Entrepreneur;- Central and state level institutions, Policies governing Entrepreneur, Incubation Center.
Text and Reference Books 1. Tandon B.C: Environment and Entrepreneur; Chugh Publications, Allahabad. 2. Siner A David: EntrepreneurialMegabuks; John Wiley and Sons, New York. 3. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi. 4. Prasanna Chandra: Project Preparation, Appraisal, Implementation; Tata McGraw Hill, New Delhi. 5. Pandey I.M: Venture Capital - The Indian Experience; Prentice Hall of India. 6. Holt: Entrepreneurship-New Venture Creation; Prentice Hall of India. 7. Shukla, M.B.; Entrepreneurship. 8. Entrepreneurship Development- SS Khanka, S. Chand

Course Outcomes

1. To identify the concept of entrepreneurship, its emergence and its need for society.
2. To generate a business idea and diagnose for a new business opportunity.
3. To prepare a business plan.
4. To identify different institutional support available to the entrepreneur.
5. To consider the legal and financial conditions as well as the importance of the entrepreneurial infrastructure for starting a business venture

BCR-402: INCOME TAX LAW AND ACCOUNTS	
Teaching Scheme Lectures: 4 hrs/Week Tutorials: 1 hr/Week Credits: 5	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

1. To provide basic knowledge and equip students with application of principles and provisions Income-tax Act, 1961.
2. To understand various mode of tax planning

Detailed Syllabus

Unit-1 Basic Concepts: Income, Agricultural Income, Casual Income, Assessment year, Previous year, Gross Total Income, Total Income, person; Tax evasion, Avoidance, and Tax planning. Basis of Charge: Scope of total income, Residence and Tax liability, income which does not form part of total income.
Unit-2 Heads of Income: Salaries; Income from House Property;
Unit-3 Profit and Gains of business or profession, including provisions relating to specific business; Capital Gains; Income from Other Sources.
Unit-4 Computation of Tax Liability: Computation of Total Income and Tax liability of an individual, Aggregation of income; Set-off and carry forward of losses; Deduction from Gross Total Income.

Unit-5

Tax Management: Tax deduction at source; Advance payment of Tax; Assessment procedures; Tax planning for individuals; Tax Administration: Authorities, appeals, penalties.

Text and Reference Books-

1. Singhanian V.K: Students' Guide to Income Tax; Taxmann, Delhi.
2. Prasad, Bhagwati: Income Tax Law & Practice ; Wiley Publication, New Delhi.
3. Mehrotra H.C: Income Tax Law & Accounts ; Sahitya Bhawan, Agra.
4. Agarwal B.K: Income Tax Law & Accounts; Navyug Publication, Agra.
5. Dinker Pagare: Income Tax Law and Practice ; Sultan Chand & Sons, New Delhi.
6. Girish Ahuja and Ravi Gupta: Systematic approach to income tax ; Sahitya Bhawan Publications, New Delhi.
7. Chandra Mahesh and Shukla D.C.: Income Tax Law and Practice; Pragati Publications, New Delhi.

Course Outcomes:

1. Students will gain a working knowledge regarding computation of taxable income and tax liability pertaining to individuals.

BCR-504: INDIAN BANKING SYSTEM

Teaching Scheme

Lectures: 4 hrs/Week

Tutorials: 1 hr/Week

Credits: 5

Examination Scheme

Class Test - 12 Marks

Teachers Assessment - 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Course Objectives:

1. To understand the Indian Banking System.
2. To attain knowledge of the legal framework governing the banking system.
3. To understand the working of the RBI.
4. To have knowledge regarding the technological advancements in the banking field.

Detailed Syllabus

Unit-1

Indian Banking System: Structure and organization of banks; Reserve Bank of India; Apex banking institutions; Types and functions of Banks- Commercial banks; Regional rural banks; Cooperative banks; Development banks, Basics of Micro Finance

Unit-2

Banking Regulation Act, 1949: History; Social control; Banking Regulation Act as applicable to Banking Companies and Public Sector Banks; Banking Regulation Act as applicable to Cooperative Banks.

Unit-3

Regional Rural and Co-operative Banks in India: Functions; Role of regional rural and Cooperative Banks in rural India; Progress and Performance.

Unit-4

Reserve Bank of India: Objectives; Organization; Functions and Working; Monetary policy; Credit Control measures and their Effectiveness. NPA control policies of RBI

Unit-5 Technology and Banking: Role of Technology in Banking Operations; Latest Technological trends in Banking Industries- RTGS, NEFT, IMPS, Plastic Money, E-Banking.
Text and Reference Books- <ol style="list-style-type: none"> 1. Basu A.K: Fundamentals of Banking-Theory and Practice; A. Mukherjee and Co., Calcutta. 2. Sayers R.S: Modern Banking ; Oxford University Press. 3. Panandikar S.G. and Mithani D.M: Banking in India; Orient Longman. 4. Reserve Bank of India: Functions and Working. 5. Dekock: Central Banking; Crosby Lockwood Staples, London. 6. Tennan M.L: Banking -Law and Practice in India; India Law House, New Delhi

Course Outcomes:

1. Understanding of the Indian Banking System.
2. Knowledge of the legal framework governing the banking system.
3. Understanding of the working of the RBI.
4. Knowledge regarding the technological advancements in the banking field.

BCR 601: Financial Management	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment – 6 Marks Attendance – 12 Marks End Semester Exam – 70 marks

Course Objectives:

7. To develop the knowledge of business finance and financial management decisions, and learn different techniques and problem solving skills.
8. To study rising of funds effectively.
9. To provide knowledge of various concepts like capital structure planning, cost of capital, dividend policies and working capital.
10. To teach a sense of responsibility and capacity for financial management.
11. To enable an awareness of the global environment in which financial management operate.

Detailed Syllabus

Unit-1 Financial Management: Financial goals; Profit v/s wealth maximization; financial functions - investment, financing, and dividend decisions; financial planning.
Unit-2 Capital Budgeting: Nature of investment decisions, investment evaluation criteria, payback period, accounting rate of return, net present value, internal rate of return profitability index; NPV and IRR comparison.

Unit-3

Cost of Capital: Significance of cost of capital; Calculating cost of debt; Preference shares, equity capital, and retained earnings; Combined (weighted) cost of capital.

Operating and Financial Leverage: Their measure; Effects on profit, analyzing alternate financial plans, combined financial and operating leverage.

Unit-4

Capital Structure: Theories and determinants Dividend Policies: Issues in dividend policies; Walter's model; Gordon's model; M.M. Hypothesis, forms of dividends and stability in dividends, determinants.

Unit-5

Management of Working Capital: Nature of working capital, significance of working capital, operating cycle and factors determining of working capital requirements; **Management of working capital -cash, receivables, and inventories.**

Suggested Readings:

1. Van Home J.C: Financial Management and Policy; Prentice Hall of India, New Delhi.
2. Van Home J.C: Fundamentals of Financial Management; Prentice Hall of India, New Delhi.
3. Khan M.Y.and Jain P.K: Financial Management, Text and Problems; Tata McGraw Hill, New Delhi.
4. Prasanna Chandra: Financial Management Theory and Practice; Tata McGraw Hill, New Delhi.
5. Pandey I.M: Financial Management: Vikas Publishing House, New Delhi.
6. Brigham E.F, Gapenski L.C., and Ehrhardt M.C: Financial Management -Theory and Practice; Harcourt College Publishers, Singapore.
7. Bhalla V.K.: Modern Working Capital Management, Anmol Pub, Delhi.

Course Outcomes:

1. To provide introduction to business finance terms and concepts.
2. To describe the financial concepts used in making financial management decision.
3. To learn effective communication skills to promote respect and relationship for financial deals.
4. To utilize information by applying a variety of business and industry major financial function.
5. Demonstrate a basic understanding of financial management.

BFM 101: Indian Financial Market	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

7. To gain a broad understanding about the Indian Financial Market
8. To understand the various players in the market and the systems within which they operate
9. To Identify the various products of investment
10. To provide participants with the knowledge of risks and rewards of investing
11. To understand the various regulators and the regulatory environment in these markets
12. To understand the difference between primary and secondary market

Detailed Syllabus

Unit-1 Introduction to Indian financial system
Unit-2 Capital Market and Money Market- comparative study
Unit-3 Financial Instruments and Participants
Unit-4 Alternative Investment Schemes and other Investment Products
Unit-5 Regulator & Regulations, Public Issues and Process
Unit-6 Case studies on IPOs and OFS
Unit-7 Index, Demit and Bolt , Trading
Unit-8 Clearing and Settlement
Unit-9 Investor Services,
Unit-10 Factors affecting share prices
Unit-11 Corporate Actions
Unit-12 Mutual funds-I, Mutual funds-II , Mutual funds - III
Unit-13 International Stock Exchanges
Unit-14 Case studies on current scenario in stock market I & II
Text and Reference Books-
Investing in Stock Market : Vinod Kumar & Raj Sethi Nangia, Ane Books Pvt Ltd India's Financial Market: Ajay Shah, Susan Thomas & Michael Gorham.

Course Outcomes:

12. Enabling students to be conversant with the financial market in general and Stock market in particular
13. Enabling the student to understand the regulations and regulators who operate in the market
14. Enabling the student to identify the risks and rewards associated with investment
15. Understanding the difference between primary and secondary market
16. Enabling the students to identify the factors affecting the price of a stock
17. Enabling the student to understand the principles of investment

BFM 201: FINANCIAL REPORTING ANALYSIS AND FINANCIAL ACCOUNTING	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain a broad understanding about the concept of Accounting
2. To understand the Double Entry system
3. To learn about Accounting Concepts and Accounting Conventions
4. To provide participants with the knowledge of Basic Accounting Process
5. To understand the Final Accounts
6. To understand the Inventory Accounting
7. To understand the Accounting for Depreciation and Accounting for Capitalization
8. To gain knowledge about the Financial Statements, Financial Statements Analysis
9. To provide knowledge about Balance Sheet, Profit & Loss Account
10. To provide knowledge about Ratio Analysis and related case studies
11. To provide an understanding of the Cash Flow Statement and Fund flow Statement
12. To gain a broad perspective of the Annual Reports as also Case Study on annual reports
13. To provide **knowledge about Reporting Requirements**

Detailed Syllabus

Unit-1 Introduction to Accounting
Unit-2 Double Entry
Unit-3 Accounting Concepts , Accounting Conventions
Unit-4 Basic Accounting Process
Unit-5 Final Accounts -I, Final Accounts -II
Unit-6 Inventory Accounting

Unit-7 Accounting for Depreciation ,Accounting for Capitalization
Unit-8 Financial Statements, Financial Statements Analysis
Unit-9 Balance Sheet, Profit & Loss Account
Unit-10 Ratio Analysis
Unit-11 Case Study on ratio analysis
Unit-12 Cash Flow Statement , Fund flow Statement
Unit-13 Annual Reports, Case Study on annual reports
Unit-14 Reporting Requirements
Text and Reference Books-
1. Financial Reporting and Analysis by <u>Lawrence Revsine</u> , <u>Daniel Collins</u> , <u>Bruce Johnson</u> , <u>Mittelstaedt</u>
2. Financial Reporting and Analysis: Using Financial Accounting Information by <u>Charles H. Gibson</u>

Course Outcomes:

1. Enabling students to be conversant with the concept of Accounting
2. Enabling the student to understand the the Double Entry system
3. Enabling the student to understand Accounting Concepts and Accounting Conventions
4. Understanding the Basic Accounting Process
5. Enabling the students to understand the Final Accounts
6. Enabling the student to understand the Inventory Accounting
7. Understanding the Accounting for Depreciation and Accounting for Capitalization
8. Understanding the concepts about the Financial Statements, Financial Statements Analysis
9. Understanding the Balance Sheet, Profit & Loss Account
10. Enabling the student to understand about Ratio Analysis and related case studies
11. Understanding the Cash Flow Statement and Fund flow Statement
12. Understanding the Annual Reports as also Case Study on annual reports
13. Enabling the student to learn about Reporting Requirements

BFM 301: FINANCIAL MANAGEMENT	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain a broad understanding about the corporate Finance
2. To understand the sources of funds available and methods of evaluating the same for the benefit of Company
3. To Identify the various products best suited for the company
4. To provide participants with the knowledge of risks trading on equity
5. To understand the various concept of NPV, IRR and Discounting models
6. To understand the capital structure of the company
7. To understand the Dividend theory
8. To gain knowledge about corporate governance
9. To understand the cash flow management, Working capital and receivable management.
10. To provide knowledge about corporate restructuring

Detailed Syllabus

Unit-1 Introduction to Corporate Finance
Unit-2 Time Value of money
Unit-3 Capital Budgeting I , Capital Budgeting II
Unit-4 Capital Structure I , Capital Structure II
Unit-5 Final Accounts -I, Final Accounts -II
Unit-6 Cost of capital I , Cost of capital II
Unit-7 Leverage
Unit-8 Corporate Governance
Unit-9 Working Capital Management I, Working Capital Management II
Unit-10 Cash Management I , Cash Management II
Unit-11 Receivables Management I , Receivables Management II
Unit-12 Dividend Theory
Unit-13 Corporate Restructuring I ,Corporate Restructuring II
Unit-14 Case study using Annual report

Text and Reference Books-

1. **Financial Management**
By : I. M. Pandey
2. **Financial Management Theory and practice**
By: Prasanna Chandra

Course Outcomes:

1. Enabling students to be conversant with the corporate financial
2. Enabling the student to understand the types of funds available for the company
3. Enabling the student to identify the best source of fund
4. Understanding the concept of trading on equity
5. Enabling the students to identify the factors affecting the price of a stock
6. Enabling the student to understand the Cash Management, Receivable management and working capital management
7. Understanding the corporate restructuring

BFM 302: Marketing and Selling of Financial Products	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain an understanding about the concept of marketing
2. To differentiate between macro-and micro- environments
3. To understand different types of market segments and how to segment the customers
4. To understand how to position a brand in customer's minds
5. To understand consumer buying behavior
6. To understand 7 P's of marketing
7. To understand how to develop products/services that add value to customers and organizations
8. To understand how to price financial products
9. To gain knowledge about marketing mix
10. To know about different types of sales and various sales techniques
11. To gain an insight in the area of handling the customers objections and how to close a sale successfully

Detailed Syllabus

Unit-1 Introduction to Marketing
Unit-2 Analyzing the Macro Environment
Unit-3 Segmentation

Unit-4 Targeting
Unit-5 Positioning
Unit-6 Developing the Market Mix
Unit-7 Introduction to Services Marketing
Unit-8 Communicating the Marketing Mix
Unit-9 Different Types of Sales
Unit-10 Various Sales Techniques
Unit-11 Objection Handling
Unit-12 Closing a Sale
Unit-13 Role Play
Unit-14 Role Play
Text and Reference Books-
<ol style="list-style-type: none"> 1. Marketing Management by <u>Philip T. Kotler</u> , <u>Kevin Lane Keller</u> 2. Kotler on Marketing by <u>Philip T. Kotler</u>

Course Outcomes:

1. Enabling students to be conversant with the concepts of marketing and sales
2. Enabling the student to understand the importance of macro- and micro- environment in the area of marketing
3. Enabling the student to gain an insight of S-T-P approach (Segmentation-Targeting-Positioning)
4. Understanding and analyzing the importance of 7 P's of marketing concepts
5. Enabling the student to understand how to develop products/services that add value to all stakeholders
6. Understanding the marketing mix
7. Enabling the students to know about different types of sales and various sales techniques
8. Enabling the students to learn how to handle the customers' objections and how to close a sale successfully

BFM 303: Security & Financial Services Regulation	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain a broad understanding about the Securities and Financial Services Regulation
2. Describe the concept of Securities Contracts Act.
3. Understand the history of Stock exchange.
4. Explain contracts & options in securities.
5. Know procedure for listing of securities.
6. Understand what is a Company and Types of Companies
7. Understand what is the Company Act
8. Describe Indian Capital Market.
9. Learn the History of Capital Markets in India.
10. Have an understanding of Capital Markets Categorization.
11. Explain the role of stock exchange.
12. Legal Frameworks.
13. Understand and explain SEBI (Intermediaries) Regulations, 2009
14. Understand SEBI (Insider Trading) (Amendment) Regulations 2002
15. Understand Depositories Act 1996
16. Understand Need of the Market regulator
17. Understand Importance, Functions and Powers of SEBI
18. Understand Measures taken by SEBI to protect Investors.
19. To understand the various regulators and the regulatory environment in Financial Markets

Detailed Syllabus

Unit-1 Introduction to Indian Capital Markets
Unit-2 SEBI Act 1992 -I
Unit-3 SEBI Act 1992 -II
Unit-4 SEBI Act 1992 -III
Unit-5 Banking Securities Contract (Regulations) Act 1956-I
Unit-6 Banking Securities Contract (Regulations) Act 1956-II
Unit-7 Companies Act 2013 - I

Unit-8 Companies Act 2013 - II
Unit-9 Companies Act 2013 - III
Unit-10 Company Formation
Unit-11 Company Formation
Unit-12 Company Governance
Unit-13 Other Regulations
Unit-14 Other Regulations
Text and Reference Books-

Course Outcomes:

1. Enabling students to be conversant with the Securities and Financial Services Regulations
2. Enabling the student to understand the regulators who operate in the market
3. Enabling the student to identify the risks and rewards associated with investment
4. Understanding the difference between primary and secondary market
5. Enabling the students to identify the factors affecting the price of a stock
6. Enabling the student to understand the principles of investment
7. Understanding how mutual funds work, the different types of mutual funds and advantages of mutual funds
8. Understanding the concepts of NAV & AUM
9. Understanding the operations and working of International stock Exchanges
10. Gaining a fair understanding about corporate governance

BFM 401: DERIVATIVES	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain a broad understanding of concepts and Elements of Derivatives market
2. To understand the concept of Index and its constituents.
3. To understand the need of derivatives and derivatives markets in India
4. To understand clearing and settlement Systems in derivatives markets.
5. To understand the forward contracts and OTC derivatives
6. To Understand the difference between forward and futures
7. To Understand the future markets and different types of margins
8. To understand the pricing of futures and options.
9. To understand the concept of Counterparty and Counterparty risk.
10. To understand the Risks and Pitfalls in derivatives
11. To understand the Concept of hedging and hedging strategies.
12. To understand Basics of options, options terminologies, advantages and disadvantages in options.
13. To understand the Golden rules for options.
14. To understand Intrinsic value, time value, Options premium and limited and unlimited risks in options.
15. To understand option Greeks.
16. To understand and use options strategies for managing risk.
17. To be able to make appropriate profitable derivatives strategies
18. To understand Legal and Regulatory environment surrounding derivatives
19. To understand the Accounting and Taxation of Derivatives.

Detailed Syllabus

Unit-1 Introduction to Derivatives
Unit-2 Understanding Index
Unit-3 Derivative Products
Unit-4 Basic of Futures , Pricing of Futures
Unit-5 Futures Strategies –I, Futures Strategies –II
Unit-6 Case studies on Futures Strategies –II
Unit-7 Basic of Options

Unit-8 Options Strategies –I , Options Strategies –II
Unit-9 Options Greeks
Unit-10 Case studies on Options Strategies –II
Unit-11 Introduction to clearing and settlement Systems
Unit-12 Types of Margins , Legal and Regulatory environment
Unit-13 Accounting and Taxation, Sales Practices and Investor Protection Services
Unit-14 Industry visit
Text and Reference Books- <ol style="list-style-type: none"> 1. NISM Equity derivatives Module VIII Workbook 2. Futures and Options Introduction to Equity Derivatives by R. Mahajan publisher : Vision Books

Course Outcomes:

1. Enabling students to be conversant with the derivatives market in general and Stock market in particular
2. Enabling the student to understand the regulations governing derivatives markets
3. Enabling the student to identify the risks and be able to hedge the risk
4. Understanding the difference between futures and forwards
5. Understand and identify margin requirements.
6. Enable the student to understand time value, intrinsic value and the concept of strike prices
7. Understanding how option Greeks affect the value of option
8. Understand how futures are priced
9. Understanding the concepts of open interest
10. To be able to make options strategies in different market scenarios considering the risk and reward.
11. Understanding in the money and out of the money options
12. Understand the benefits and risks of buying and selling futures and options.

BFM 402: Debt Markets	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain a broad understanding about the Indian Debt Markets
2. To understand the various types of bonds.
3. To Identify the various types of risks in bonds and how to mitigate the same
4. To provide participants with the knowledge of yield, return, holding period return, Yield to maturity.
5. To understand the various regulators and the regulatory environment in these markets
6. To understand the difference actual yield and yield to maturity.
7. To understand the pros and cons of bonds
8. To gain knowledge about the valuation of bonds
9. To understand about the options in bonds
10. To provide knowledge about Mortgage Backed Security, Asset Backed Security and Collateralized Debt Obligation.

Detailed Syllabus

Unit-1 Introduction to Debt Markets
Unit-2 Bond Structure
Unit-3 Bonds with Options
Unit-4 Risks in Bonds I
Unit-5 Risks in Bonds II
Unit-6 Introduction to bond Valuation I
Unit-7 Introduction to bond Valuation I
Unit-8 Bond Valuation II
Unit-9 Bond Valuation II
Unit-10 MBS & ABS

Unit-11 Valuation of MBS
Unit-12 Valuation of ABS
Unit-13 Numericals on debt markets
Unit-14 Case Studies
Text and Reference Books- Book Name : Fixed Income Securities By: Pietro Veronesi Copyright : Wiley& Sons U.K. 2nd Book Book Name : Financial Management Theory & Practice By: Prasanna Chandra Tata McGraw Hill Publishers

Course Outcomes:

1. Enabling students to be conversant with the debt Market
2. Enabling the student to understand the regulations and regulators who operate in the market
3. Enabling the student to identify the risks and rewards associated with Bonds
4. Understanding the difference between yield, Average return, yield to maturity, actual return.
5. Understanding the different types of bonds available
6. Enabling the students to identify the factors affecting the price of a bonds
7. Enabling the student to understand the methods of valuation of bonds
8. Understanding how to mitigate the risks in bonds
9. Understanding the concepts ABS, MBS, CDO and CMO
10. Understanding the options available in bonds

BFM 403: Investment Banking	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. Gain an overview of Investment Banking
2. Understand the various activities performed by investment bankers.
3. Understand the process of IPO
4. Get introduced to Private Equity
5. Understand the role of invest banks in the financial system.
6. Understand how investment banks help in raising funds in the international market.
7. Get introduced to Mergers and Acquisition.
8. Get an understanding of corporate restructuring.

Detailed Syllabus

Unit-1 Overview of Investment Banking
Unit-2 Investment Banking Activities :
Unit-3 Raising Equity Capital
Unit-4 IPO Process
Unit-5 Private Equity Investments
Unit-6 Role of Investment Banks in Debt Markets
Unit-7 Raising Finance from International Markets
Unit-8 Introduction to M&A
Unit-9 M&A Analysis
Unit-10 Corporate Restructuring
Text and Reference Books-

Course Outcomes:

1. Understood what Investment Banking is .
2. What are the different parts of Investment banks and what are their roles .
3. Understood the various types of activities investment banks do.
4. Understood how investment banks help in raising funds from the equity market.
5. Learnt about the process of IPO.
6. Understood how investment banks help in raising funds from the debt market.
7. Understood what is private equity and the role of investment banks in it.
8. Learnt how investment banks help in raising funds from international markets.
9. Understood what is Merger and Acquisition and how it is carried out.
10. Learnt about corporate restructuring with examples.

BFM 501: Technical Analysis	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To understand what is Technical Analysis.
2. Its historical development.
3. Dow theory and its main tenets.
4. How technical analysis is useful.
5. Basic theories of Technical Analysis
6. Assumptions of Technical analysis
7. Basis of Technical Analysis
8. Steps to Technical Analysis
9. Other important elements of Technical Analysis
10. Strengths and weaknesses of Technical Analysis
11. Support and Resistance Levels
12. Supply and Demand
13. Traders' remorse
14. How support becomes Resistance
15. How Resistance becomes support
16. Some important points on Support and Resistance
17. Trend Indicators
18. Understand charts.
19. Basic patterns and their significance
20. Various important continuation patterns and the significance of each.
21. Various important reversal patterns and the significance of each.
22. Trends and their characteristics, uptrend, downtrend and side trend.
23. Trend lines and what do they show.
24. Channels, Channel lines, Validation, Angles, Internal Trend lines.
25. Understand the importance of volume?
26. Why is it a confirmatory tool?
27. On Balance Volume charts and their uses.
28. Understand what are moving averages (MAs) and their types?
29. Understand Elliott wave concept and Fibonacci retracement
30. Understand the difference between Fundamental and Technical Analysis

Detailed Syllabus

Unit-1 Introduction to Technical Analysis
Unit-2 Theories, Techniques & Benefits
Unit-3 Important Aspects of Technical Analysis
Unit-4 Charts & Their Patterns
Unit-5 Technical Indicators
Unit-6 Introduction & Basic Assumptions
Unit-7 Fundamental Analysis vs. Technical Analysis
Unit-8 Trend Lines – Support and Resistance
Unit-9 Importance of Volume
Unit-10 Charts and Chart Types , Chart Patterns
Unit-11 Moving Averages , Indicators & Oscillators
Unit-12 Conclusion

Unit-13

Technical Analysis Step by Step

Unit-14

Important Concepts – Explanations , Case Studies

Text and Reference Books-**Course Outcomes:**

1. Enabling students to understand the psychology behind the financial markets.
2. Understand the basic principles of Technical Analysis
3. Being able to perform the analysis and give recommendations independently.
4. Gain a thorough understanding about the various theories on Technical Analysis including the Dow Theory.
5. Understand various charting methods, such as , line graphs, bar graphs, candle stick charts etc.
6. Understand how chart patterns form and how do they work.
7. Understanding various indicators
8. Understanding how and when to use different indicators.
9. Understand the difference between the leading and lagging indicators.
10. Understand when to use momentum oscillators or when to use trend indicators.
11. Gain a thorough understanding about volatility.
12. Enable them to calculate and make use of volatility using standard deviations.
13. Understand the Elliott wave theory and its applications.
14. Get introduced to other theories like Gann method.
15. Understand the importance of volumes and how to forecast on this basis.
16. Understand the importance of Open interest and how to make use of it.

BFM 502: Foreign Exchange Markets	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To understand the meaning and concept of foreign exchange and its importance
2. To learn about regulatory norms, FEDAI and business infrastructure of the authorized dealers, like, Banks etc.
3. To understand SWIFT and various types of forex trades
4. To gain knowledge about different types of exchange rates and their calculations
5. To understand factors affecting foreign exchange rates
6. To gain knowledge about forex derivatives and hedging forex risk
7. To gain knowledge about foreign exchange risk management
8. To have an insight of international market, LIBOR and raising funds in international market
9. To understand bond market and types of bond in different currencies

Detailed Syllabus

Unit-1 What is Foreign Exchange, its need and Administration in India
Unit-2 FEDAI, Forex Business Infrastructure in Banks
Unit-3 SWIFT, Different types of forex trades
Unit-4 Different Types of Exchange Rates
Unit-5 Foreign Exchange Arithmetic
Unit-6 Determination of Forex Rates- the factors that affect them
Unit-7 Foreign Exchange Derivatives
Unit-8 Hedging foreign exchange risk
Unit-9 Foreign Exchange Risk Management , Numerical on Forex
Unit-10 Introduction to International Markets, LIBOR
Unit-11 Raising Funds in the International Markets,

Unit-12

Introduction to Bond Markets

Unit-13

Types of Bonds in Different Currencies

Unit-14

Basic Types of Foreign Currency Derivatives

Text and Reference Books-

1. Foreign exchange practice, concepts and control by C. Jeevanandam
2. Foreign exchange operations by David E De Rosa

Course Outcomes:

1. Enabling students to be conversant with the concepts of foreign exchange and its importance
2. Enabling the student to understand regulatory guidelines, FEDAI and authorized dealers in foreign exchange, like Banks
3. Enabling the student to learn about SWIFT
4. Understanding various types of foreign exchange trades
5. Enabling the student to understand various types of foreign exchange rates and their calculations
6. Understanding the factors affecting foreign exchange rates
7. Enabling the students to know about foreign exchange derivatives and hedging foreign exchange risk
8. Enabling the students to learn international market, LIBOR and fund raising in international market
9. Enabling students to understand bond market and types of bond in different currencies

BFM 503: Commodities Markets	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. Get introduced to the Commodity Futures
2. Understand the contract specifications
3. Hedging using commodity derivatives
4. Understand the clearing and settlement process
5. Learn about the prominent commodity exchanges globally.
6. Understand the tools available for research in commodities
7. Understand various commodity groups.
8. Get to know the trading softwares for commodities
9. Know how risk management is done in commodity markets

Detailed Syllabus

Commodity Futures Trading – History
Introduction to Commodity
Unit-4 Timing & Return
Unit-5 Product Specification
Unit-6 Commodity Hedging
Unit-7 Clearing & Settlement
Unit-8 Risk Management
Unit-9 Market Watch

Unit-10 Trading Software
Unit-11 Commodity Research
Unit-12 Do's and Don'ts for dealing in Commodity Futures
Unit-13
Unit-14
Text and Reference Books-

Course Outcomes:

1. Learnt about the history and evolution of the commodity markets globally.
2. Got introduced to the Indian Commodity markets.
3. Learnt about various commodity derivatives traded on Indian commodity exchanges.
4. Learnt about the various commodity exchanges in India.
5. Understood about various tools used in researching commodities.
6. Understood how hedging is done in the commodity spot as well as futures markets.
7. Understood the different types of risks involved and how to mitigate them.
8. Learnt about the contract specifications in different commodities.
9. Learnt how the clearing and settlement takes place in this market.

BFM 601: PORTFOLIO MANAGEMENT & FINANCIAL PLANNING	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain an understanding about the concept of portfolio management
2. To understand portfolio management models and security analysis
3. To understand the concept of financial planning and financial statements
4. To understand cash flow and debt management
5. To know about the assets to invest in
6. To understand Insurance Policies and various Strategies
7. To understand the concept and principles of Investment Planning
8. To understand Education Planning
9. To gain knowledge about Tax Planning
10. To know about Retirement Planning and Special circumstances
11. To gain an insight in the area of Risk and Return

Detailed Syllabus

Unit-1 Introduction to Portfolio Management
Unit-2 Portfolio Management Models
Unit-3 Portfolio Manager, Security Analysis
Unit-4 Financial Planning and Personal Financial Statements
Unit-5 Cash Flow and Debt Management
Unit-6 Investments Asset and Acquisition
Unit-7 Assets to Invest in
Unit-8 Insurance Policies and Strategies
Unit-9 Investment Planning
Unit-10 Education Planning

Unit-11 Tax Planning
Unit-12 Retirement Planning and Special circumstances
Unit-13 Risk and Return
Unit-14 Case Studies and Practical Applications
Text and Reference Books-
1. Introduction to Financial Planning by Indian Institute of Banking and Finance 2. Risk analysis, Insurance and Retirement Planning by Indian Institute of Banking and Finance 3. Taxation by Taxmann

Course Outcomes:

1. Enabling students to be conversant with the concepts of portfolio management
2. Enabling the student to understand the importance of portfolio management models and security analysis
3. Enabling the student to gain an insight of financial planning and financial statements
4. Understanding and analyzing about the assets to invest in
5. Enabling the student to understand cash flow and debt management
6. Understanding the Insurance Policies and various Strategies
7. Enabling the students to know about concept and principles of Investment Planning
8. Enabling the students to learn about Education Planning
9. Enabling the students to learn about the concept of Tax Planning
10. Enabling the students to learn about the concept of Retirement Planning and Special circumstances
11. Enabling the students to gain an insight in the area of Risk and Return

BFM 602: Mergers & Acquisitions	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To gain a broad understanding about the concept of Investment Banking
2. To understand about various Investment banking Activities: Raising Equity Capital , IPO Process , Private Equity Investments
3. To assess the Role of investment Banks in Debt Markets
4. To provide participants with the knowledge regarding Raising Finance from International Market
5. To understand various Valuations models
6. To understand Dividend Discount Model (DDM)
7. To understand Discounted Cash Flows (DCF)
8. To gain knowledge about the Relative Valuation - Enterprise Valuation & Equity Value
9. To gain knowledge about Comparable Transaction (Acquisition) Analysis
10. To provide knowledge about the Sum of Parts, Residual Income Method
11. To provide an understanding of the M&A Analysis
12. To provide an understanding of Basic Merger Modelling
13. To discuss M&A Case Studies
14. To know about Corporate Restructuring

Detailed Syllabus

Unit-1 Advantage Excel
Unit-2 Overview of Investment banking
Unit-3 Investment banking Activities: Raising Equity Capital , IPO Process , Private Equity Investments
Unit-4 Role of investment Banks in Debt Markets
Unit-5 Raising Finance from International Markets
Unit-6 Introduction to Valuations Dividend Discount Model (DDM)
Unit-7 Discounted Cash Flows (DCF)

Unit-8 Relative Valuation - Enterprise Valuation & Equity Value
Unit-9 Comparable Transaction (Acquisition) Analysis
Unit-10 Sum of Parts , Residual Income Method
Unit-11 M&A Analysis
Unit-12 Basic Merger Modelling
Unit-13 M&A Case Studies
Unit-14 Corporate Restructuring
Text and Reference Books- 1. Mergers & acquisitions from A to Z by Andrew Sherman 2. Mergers, Acquisitions, and Corporate Restructurings by Patrick A Gaughan

Course Outcomes:

1. Enabling students to be conversant with the concept of Investment Banking
2. Enabling the student to understand various Investment banking Activities: Raising Equity Capital, IPO Process, Private Equity Investments
3. Enabling the student to identify the Role of investment Banks in Debt Markets
4. Gaining knowledge regarding Raising Finance from International Market
5. Enabling the students to know about various Valuations models
6. Enabling the student to understand Dividend Discount Model (DDM)
7. Understanding Discounted Cash Flows (DCF)
8. Understanding the concepts of the Relative Valuation - Enterprise Valuation & Equity Value
9. Understanding about Comparable Transaction (Acquisition) Analysis
10. Enabling students to be conversant with the Sum of Parts, Residual Income Method
11. Enabling students to understand the M&A Analysis
12. Understanding of Basic Merger Modelling
13. Enabling students to be conversant with various case studies relating to M&A
14. Enabling students to understand about Corporate Restructuring

BFM 604: Financial Risk Management	
Teaching Scheme Lectures: Tutorials: Credits: 4	Examination Scheme Class Test - 12Marks Teachers Assessment - 6Marks Attendance - 12 Marks End Semester Exam - 70 marks

Course Objectives:

1. To understand the basic risk types, how to measure them and their management tools.
2. Creating value with risk management governance and corporate governance.
3. To Identify risk transfer mechanisms through various models, data aggregation and risk reporting.
4. To provide participants with the knowledge of risks and rewards of investing.
5. To understand the various financial disasters and risk management failures.
6. To understand the structures and functions of financial institutions, over-the-counter (OTC) and exchange markets.
7. To understand valuation of forwards, futures, swaps and options. Hedging with derivatives.
8. To gain knowledge about Interest rates and measures of interest rate sensitivity.
9. To gain knowledge about Foreign exchange risk and measures of currency sensitivity.
10. To gain knowledge about Corporate bonds, Mortgage-backed securities and the risk associated in managing them.
11. To provide an understanding of the complexities of Value-at-Risk (VaR), Estimating volatility and correlation, Options valuation, Fixed income valuation, Hedging.
12. To gain a broad perspective of the operational risk, Country and sovereign risk models and management. Ethics and the Risk Managers Code of Conduct.

Detailed Syllabus

Unit-1 Introduction to risk management
Unit-2 Enterprise risk management
Unit-3 Corporate Governance and Corporate Risk Management
Unit-4 Basic Quants and Statistics
Unit-5 Capital Asset Pricing Model
Unit-6 Arbitrage and Arbitrage Pricing Theory – Multi-factor Model
Unit-7 Banking Sector
Unit-8 Information Risk , Data Quality Management and Risk Reporting
Unit-9 Role of Exchanges and Central Counterparty in Capital Market Trades
Unit-10 Interest Rate Derivatives

Unit-11 Commodities Market
Unit-12 Fixed Income Market
Unit-13 Foreign Exchange Market
Unit-14 Case Studies
Text and Reference Books- Financial Risk Manager Handbook by Philippe Jorion

Course Outcomes:

1. Enabling students to be conversant with the concept of risk and compare risk management with risk taking. Distinguish between expected loss and unexpected loss and provide examples of each.
2. Enabling the student to understand the risk management process, tools used to measure and manage risk including quantitative measures, qualitative assessment and enterprise risk management.
3. Enabling the student to interpret the relationship between risk and reward and explain how conflict of interest can impact risk management.
4. Enabling the student to describe and differentiate between the key classes of risk, explain how each type of risk can arise, and assess the potential impact of each type of risk on an organization.
5. Enabling the students to Compare different strategies a firm can use to manage its risk exposures and explain situations in which a firm would want to use each strategy.
6. Enabling the student to apply appropriate methods to hedge operational and financial risks, including pricing, foreign currency and interest rate risk.
7. Enabling the student to explain Modern Portfolio Theory and interpret the Markowitz efficient frontier, CAPM, interpret the capital market line, interpret beta and calculate the beta of a single asset or portfolio.
8. Enabling the student to calculate, compare and interpret the performance measures, the Sharpe performance index, the Treynor performance index, the Jensen performance index, the tracking error, information ratio and Sortino ratio.
9. Enabling the student to explain the Arbitrage Pricing Theory (APT), compare the APT to the CAPM. Explain models that account for correlations between asset returns in a multi-asset portfolio. Describe and apply the Fama-French three-factor model in estimating asset returns.
10. Enabling the student to explain the potential benefits of having effective risk data aggregating and reporting. Describing the impact of data quality on model risk and the model development process.
11. Enabling the student to understand the responsibility of a Risk Manager, professional integrity, ethical conduct, conflicts of interest, confidentiality of information and adherence to generally accepted practices in risk management.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Molecular Biology	BST302	B.Sc. - BIOTECHNOLOGY	NA	NA	YES	2013

Detailed Syllabus

Unit-1

Genes and Chromosomes: Structure of DNA Molecules , Bacteria Contain Chromosomes and Extrachromosomal DNA, Organelles of Eukaryotic Cells Contain DNA, DNA Supercoiling , Chromatin and Nucleoid Structure, DNA as the genetic material. Hershey and Chase experiment. Conrat and Senger's experiment. Structure of DNA. Watson & Crick's Model, Types of DNA. Meselsen & Stahl's experiment, DNA replication with Enzymes and Protein factors in DNA Replication, genome complexity.

Unit-2

DNA Dependent synthesis of RNA, RNA Polymerases, Structure and types of RNA and their functions, Basic Concept of RNA Processing, Transcription in prokaryotes and eukaryotes. Steps in transcription, Translation; Genetics code, Protein synthesis: Ribosomes, tRNA, Aminoacyl-tRNA Synthetases. Comparison between prokaryotic and eukaryotic translation. Post translational processing of proteins in Eukaryotes and Prokaryotes.

Unit-3

Genetic recombination, Molecular aspects of recombination, Homologous and heterologous recombination. Holliday Model. Gene regulation: principles and protein Gene expression and organization in mitochondrion and chloroplast Regulation of expression in prokaryotes and eukaryotes. Operon concept - details of lac and tryp operon.

Text and Reference Books

1. Molecular Biology of the Gene -Lewin
2. Molecular biology JD Watson.

Course Outcomes:

After completing the course, students will be able to:

1. Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions.
2. Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
3. Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
4. Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.
5. Students will be able to explore new areas of research in both molecular biology and allied fields of science and technology.
6. Research Development and Practice that is Formulate and carry out independent and collaborative research projects.
7. Students will be able to develop the communication skills in presenting their research findings through effective oral and written presentations.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Computer Application & Biostatistics	BST305	B.Sc. - BIOTECHNOLOGY	NA	NA	YES	2013

Detailed Syllabus

Unit-1

Introduction of computer science in biotechnology, Computer software's & hardware's, Relationship between hardware, system software, application software and user of a computer, ways of accruing software, steps involved in software development, Firmware & middleware. Planning a program: Algorithm, Flowchart, Pseudo code, Plan of logic computer program, Commonly used program for planning. Basic of Computer Language: Machine, Assembly and High Level Languages.

Unit-2

Introduction to Biostatistics, Common terms, notions and Applications; Statistical population and Sampling Methods; Diagrammatic and graphical presentation, Measures of Central Tendency (Mean, Median, Mode), Measures of dispersion (Range, Mean Deviation, Standard Deviation, Standard error, Quartile Deviation), combined mean and variance, covariance, Coefficient of variation.

Unit-3

Fundamental principle of counting. Factorial, Permutations and combinations, derivation of formulae and their connections, simple applications, Hypothesis testing, Chi square test and F-tests, Variant, One way and two way analysis of variants, ANOVA, Principles of experimental design and analysis.

Reference Books:

1. N.T.J. Baily; Statistical Methods in Biology; English University Press
2. R. Rangaswami; A text Book of Agricultural Statistics, New Age Int. Pub.
3. Zar J; Biostatistics; Prentice Hall London
4. P.S.S. Sunder Rao; An Introduction to Biostatistics; Prentice Hall

Course Outcomes:

After completing the course, students will be able to:

1. Students will gain knowledge about to Know the various statistical methods to solve different types of problems.
2. Students will gain knowledge to Operate various statistical software packages.
3. This course will provide complete package to the students to identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development
4. Students will be able to clearly communicate and Appreciate the importance of Computer in hospital and Community Pharmacy
5. Students will be able to explore new areas of research allied fields of science and technology.
6. Students will Appreciate the statistical technique in solving the pharmaceutical problems
7. Apply the knowledge of computing fundamentals to pharmaceutical applications for any given requirement and design and develop solutions to analyze pharmaceutical problems using computers.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Analytical Techniques I	BST 501	B.Sc. Biotechnology	NA	NA	YES	2013

Detailed Syllabus

Unit-1 Microscopic Techniques: History, basic types of light microscopy and their applications in brief; Simple, compound, inverted, stereo, fluorescence, dark field and bright field microscope. Phase contrast microscopy: Amplitude and phase objects, wave terminology, positive or dark phase contrast and negative or bright phase contrast microscopy. Electron microscopy: Transmission Electron Microscope and Scanning Electron Microscope, sample preparation for EM, basic concept of confocal microscope.
Unit-2 Electrophoresis: Principle and types of electrophoresis. Gel electrophoresis: Agarose gel electrophoresis, Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE), Immuno electrophoresis, Capillary or tube gel electrophoresis, isoelectric focusing (IF), Two-dimensional (2D) electrophoresis. Western blotting technique.
Unit-3 Chromatographic Techniques: Principle, application, affinity, mobile phase and stationary phase, types of columns, etc. Types of chromatography: Paper Chromatography, Gel filtration Chromatography, ion-exchange chromatography, affinity chromatography, High Performance Liquid Chromatography (Normal phase and reverse phase).
Text and Reference Books 1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, 2nd Edition, W.H. Freeman & Company, San Francisco, 1982. 2. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, 5th Edition, Cambridge University Press, 2000. 3. D. Holme & H. Peck, Analytical Biochemistry, 3rd Edition, Longman, 1998. 4. R. Scopes, Protein Purification - Principles & Practices, 3rd Edition, Springer Verlag, 1994. 5. Selected readings from Methods in Enzymology, Academic Press.

Course Outcomes:

After completing the course, students will be able to:

1. To state the principle and working of various types of Microscopic Techniques i.e. Simple, compound, inverted, stereo, fluorescence, dark field and bright field microscope.
2. To understand the concept of phase contrast microscopy.

3. To explain the principle and working mechanism of TEM and SEM.
4. To analyze and distinguish between different types of electrophoretic techniques.
5. To evaluate and outline the concept of western blotting.
6. To explain the principle, application, affinity, mobile phase and stationary phase, types of columns, used in various chromatographic techniques.
7. To explain the concept of Paper Chromatography, Gel filtration Chromatography, ion-exchange chromatography, affinity chromatography, High Performance Liquid Chromatography (Normal phase and reverse phase).

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Recombinant DNA Technology	BST 502	B.Sc. Biotechnology	NA	NA	YES	2013

Detailed Syllabus

<p>Unit-1 Introduction of RDT, Restriction enzyme, DNA manipulative enzymes and DNA modifying enzymes, concept of cloning, properties of cloning vehicle, plasmid as cloning vectors, viruses (phage, lambda and mu) as cloning vectors, insertion of a DNA molecule in cloning vector, expression of cloned genes, recombinant selection and screening , genomic and cDNA libraries.</p>
<p>Unit-2 Gene transfer mechanisms in bacteria: principles and applications of transformation, conjugation, transduction, particle gun, liposome mediated and microinjection. Applications of microbial genetic engineering in biotechnology.</p>
<p>Unit-3 Gene transfer mechanism in plants: agrobacterium mediated. Applications of transgenic plants, edible vaccines from plants. Gene transfer mechanism in animals: transfection of animal cell lines, HAT selection. Selectable markers and transplantation of cultured cells. Expression of cloned proteins in animal cells – expression vectors.</p>
<p>Text and Reference Books 1. OLD, R.W AND PRIMROSE S.B 1994. Principles of gene manipulation – An introduction to genetic engineering. Fifth edition. Blackwell Scientific Publication. 2. T.A BROWN. Gene cloning and DNA analysis. Sixth Introduction. Wiley and Blackwell. 3. Recombinant DNA 2nd edition. Watson, James D. and Gilman, M. (2001) W.H Freeman Company, New York. 4. An introduction to genetic Engineering 2nd edition Desmond Nicholl S.T (2002) Cambridge University Press. 5. Sambrook. Fritsch E.F and Maniatis. 1989. Molecular Cloning – A laboratory.</p>

Course Outcomes:

After completing the course, students will be able to:

1. To remember Restriction enzymes their types and properties, properties of a Cloning vehicles , plasmids as cloning vectors , viruses (phage lambda and mu) as a cloning vectors.
2. To understand the concept of Concept of cloning and HAT selection.

3 To apply the techniques of recombinant DNA technology for the production of transgenic plants.
4. To analyze Gene transfer mechanisms in bacteria, plants and animals i.e. transformation, conjugation, transduction, particle gun, liposome mediated and microinjection.
5. To evaluate the procedure of forming cDNA and genomic library.
6. To create edible vaccines from plants using recombinant DNA technology.
7. To explain and analyze various applications of microbial genetic engineering in biotechnology.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Bioprocess Technology	BST 504	B.Sc. Biotechnology	YES	NA	NA	2013

Detailed Syllabus

<p>Unit-1 Bioreactor designs; Types of fermentation and fermenters; Concepts of basic modes of fermentation - Batch, fed batch and continuous; Conventional fermentation v/s biotransformation; Solid substrate, surface and submerged fermentation; Fermentation economics; Fermentation media; Fermenter design- mechanically agitated; Pneumatic and hydrodynamic fermenters; Large scale animal and plant cell cultivation and air sterilization; Upstream processing: Media formulation; Sterilization; Aeration and agitation in bioprocess; Measurement and control of bioprocess parameters; Scale up and scale down process.</p>
<p>Unit-2 Bioseparation - filtration, centrifugation, sedimentation, flocculation; Cell disruption; Liquid-liquid extraction; Purification by chromatographic techniques; Reverse osmosis and ultra filtration; Drying; Crystallization; Storage and packaging; Treatment of effluent and its disposal.</p>
<p>Unit-3 Fermented foods and beverages; Food ingredients and additives prepared by fermentation and their purification; fermentation as a method of preparing and preserving foods; Microbes and their use in pickling, producing colours and flavours, alcoholic beverages and other products; Process wastes- whey, molasses, starch substrates and other food wastes for bioconversion to useful products; Bacteriocins from lactic acid bacteria – Production and applications in food preservation.</p>
<p>Text and Reference Books</p> <ol style="list-style-type: none"> 1. Voet D, Voet JG & Pratt CW, Fundamentals of Biochemistry, 2nd Edition. Wiley Jackson AT., Bioprocess Engineering in Biotechnology, Prentice Hall, Englewood Cliffs, 1991. 1. Shuler ML and Kargi F., Bioprocess Engineering: Basic concepts, 2nd Edition, Prentice Hall, Englewood Cliffs, 2002. 2. Stanbury RF and Whitaker A., Principles of Fermentation Technology, Pergamon press, Oxford, 1997. 3. Baily JE and Ollis DF., Biochemical Engineering fundamentals, 2nd Edition, McGraw-Hill Book Co., New York, 1986. 4. Aiba S, Humphrey AE and Millis NF, Biochemical Engineering, 2nd Edition, University of Tokyo press Tokyo, 1973. 5. Comprehensive Biotechnology: The Principles, Applications and Regulations of Biotechnology in Industry.

1. To define the basic concept of fermentation and types of fermentors and bioreactors used in fermentation industry: their working mechanism.

2. To understand various types of fermentation like Batch, fed batch and continuous; Conventional

fermentation v/s biotransformation; Solid substrate, surface and submerged fermentation
3 To determine the mechanisms sterilization and their types.
4. To analyze different techniques of upstream and downstream processing in detail: Bioseparation - filtration, centrifugation, sedimentation, flocculation; Cell disruption; Liquid-liquid extraction; Purification by chromatographic techniques; Reverse osmosis and ultra filtration; Drying; Crystallization; Storage and packaging; Treatment of effluent and its disposal.
5. To evaluate the processing of major fermented foods and beverages; Food ingredients and additives prepared by fermentation and their purification.
6. To explain the use of microbes and their use in pickling, producing colours and flavours, alcoholic beverages and other products; Process wastes-whey, molasses, starch substrates and other food wastes for bioconversion to useful products;
7. To explain role of preservatives in food industry: Bacteriocins from lactic acid bacteria – Production and applications in food preservation.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Industrial Biotechnology	BST 601	B.Sc. Biotechnology	YES	NA	NA	2013

Detailed Syllabus

Unit-1 Introduction to industrial bioprocess: Fermentation- Bacterial, Fungal and Yeast, Biochemistry of fermentation. Traditional and Modern Biotechnology- A brief survey of organisms, processes, products. Basic concepts of Upstream and Downstream processing in Bioprocess, Process flow sheeting – block diagrams, pictorial representation.
Unit-2 Production of primary metabolites: Primary Metabolites- Production of commercially important primary metabolites like organic acids, amino acids and alcohols. Production of secondary metabolites: Secondary Metabolites- Production processes for various classes of secondary metabolites: Antibiotics, Vitamins and Steroids.
Unit-3 Production of enzymes and other bio-products: Production of Industrial Enzymes, Bio-pesticides, Bio-fertilizers, Bio-preservatives, Biopolymers Biodiesel. Cheese, Beer, SCP & Mushroom culture, Bioremediation. Production modern biotechnology products: Production of recombinant proteins having therapeutic and diagnostic applications, vaccines. Bioprocess strategies in Plant Cell and Animal Cell culture.
Text and Reference Books 1. Satyanarayana, U. “Biotechnology” Books & Allied (P) Ltd., 2005. 2. Kumar, H.D. “A Textbook on Biotechnology” 2 nd Edition. Affiliated East West Press Pvt. Ltd., 1998. 3. Balasubramanian, D. et al., “Concepts in Biotechnology” Universities Press Pvt.Ltd., 2004. 4. Ratledge, Colin and Bjorn Kristiansen “Basic Biotechnology” 2 nd Edition Cambridge University Press, 2001. 5. Dubey, R.C. “A Textbook of Biotechnology” S.Chand& Co. Ltd., 2006.

Course Outcomes:

After completing the course, students will be able to:

1. To define the basics of fermentation technology.
2. To understand the traditional as well as modern methods of fermentation technology.
3 To determine the basic concepts of Upstream and Downstream processing.
4. To analyze Fermentative productions like Enzymes, antibiotics, vitamin, beverages.
5. To evaluate the production of primary and secondary metabolites.
6. To explain and learn the concept of producing industrial Enzymes, Bio-pesticides, Bio-fertilizers, Bio-preservatives, Biopolymers Biodiesel.
7. To create recombinant proteins having therapeutic and diagnostic applications, vaccines. Bioprocess strategies in Plant Cell and Animal Cell culture.enzymology.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Analytical Techniques II	BST 602	B.Sc. Biotechnology	YES	NA	NA	2013

Detailed Syllabus

<p>Unit-1 Centrifugation techniques: Centrifugal force, sedimentation and basic principles of sedimentation. Types of centrifuge: refrigerated high-speed preparative centrifuges, analytical ultracentrifuges, preparative ultracentrifuges, micro centrifuge, refrigerated centrifuge, differential centrifugation, density gradient centrifugation, analytical centrifugation, etc. Safety aspects of centrifugation, types of rotors and nomograph.</p>
<p>Unit-2 SPECTROSCOPY: Behavior and nature of light, The Electromagnetic Spectrum, Classes of spectra (continuous & discrete). UV and visible spectroscopy, Infrared and Atomic absorption spectroscopy, fluorescence spectroscopy. MASS SPECTROMETRY: Ionization techniques; Electron impact ionization, Chemical ionization, Electrospray ionization. Mass Analyzers; Quadrupole Mass Spectrometry, Ion trap mass spectrometry, Nanospray and on-line tandem mass spectrometry, Magnetic sector analyser, MALDI-TOF DETECTORS; Electron multipliers, conversion dynode, Mass precision, mass measurement accuracy, mass resolution, ionization energy and appearance energy. Nuclear Magnetic Resonance.</p>
<p>Unit-3 X-ray diffraction and X-ray Crystallography and their application, Types of Elastic scattering, Small-angle X-ray scattering (SAXS), Wide-angle X-ray scattering (WAXS), Resonant inelastic X-ray scattering (RIXS).</p>
<p>Text and Reference Books 1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, 2nd Edition, W.H. Freeman & Company, San Francisco, 1982. 2. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, 5th Edition, Cambridge University Press, 2000. 3. D. Holme & H. Peck, Analytical Biochemistry, 3rd Edition, Longman, 1998. 4. R. Scopes, Protein Purification - Principles & Practices, 3rd Edition, Springer Verlag, 1994.</p>

Course Outcomes:

After completing the course, students will be able to:

1. To state the principle of various analytical instruments used in life sciences for analysis of different biological samples.
2. To understand the basic concept of Centrifugal force, sedimentation and basic principles of sedimentation.
3. To determine and demonstrate various types of rotors as well as various types of centrifuges used.
4. To analyze and predict the principle of different spectroscopic techniques such as UV and visible spectroscopy, Infrared and Atomic absorption spectroscopy, fluorescence spectroscopy.
5. To evaluate and monitor the working of mass spectrometer and different mass analyzers.

6. To explain the working mechanism of nuclear magnetic resonance.
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7. To explain the concept of X-ray diffraction and X-ray Crystallography and their applications.
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Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Bioinformatics	BST 603	B.Sc. Biotechnology	NA	YES	NA	2013

Detailed Syllabus

Unit-1 Introduction of Bioinformatics and its role in biotechnology, NCBI, EBI, PDB, Searching and retrieval of DNA and protein, protein structure (PDB), DNA sequencing (chemical chain termination, Dideoxy chain termination method, Automatic sequencer), Generation and analysis of biological data and their submission. Protein sequencing (Edmand degradation method).
Unit-2 BLAST, ClustalX, MEGA, Sequence alignment (pairwise and multiple, global and local), Phylogenetic analysis. Extraction of phylogenetic data set. Tree building methods and treeevaluation. Comparative genome analysis. Reconstruction of metabolic pathways. Computationaltools for expression analysis. Prediction and designing of primers & probes for diagnosis and analysis, Prediction of RNA secondary structure, codon optimization, computer Aided drug designing, ORF prediction, Gene prediction and analysis.
Unit-3 Identification of target protein for disease, identification and analysis of epitope, identification of promoter, transcription factor, gene designing, prediction and analysis of protein structure (primary, secondary and tertiary), Homology modeling, protein threading, <i>In silico</i> protein validation, protein folding and activity, Basic of molecular docking, Structure visualization methods (Pymol, RASMOL, CHIME etc.), protein-protein interaction, construction of metabolic gene network, drug target, vaccine designing.
Text and Reference Books 1. Bioinformatics: Principles and applications by Ghosh and Mallick (oxford) university press) 2. Bioinformatics by Andreas D Boxevanis (Wiley Interscience) 3. Fundamental concept of bioinformatics by Dan e. krane 4. Introduction to bioinformatics by Attwood and Parry Smith (Pierson educationPublication) 5. Instant notes in Bioinformatics by Westhead, parish and Tweman (Bios scientific publishers)

Course Outcomes:

After completing the course, students will be able to:

1. To give practical and hands-on experience with common bioinformatics tools and databases like as BLAST, ClustalX, MEGA, Pymol, RASMOL, CHIME.
2. To understand basic theory and application of programs used for database searching, protein and DNA sequence analysis, prediction of protein function, and building phylogenetic trees.
3. To determine and execute basic competences in the use of bioinformatics tools.
4. To analyze and compare different bioinformatics tools.
5. To evaluate information networks and bioinformatics tools on the internet.

6. To explain and the knowledge of bioinformatics tools for computer Aided drug designing, ORF prediction, Gene prediction and analysis.

7. To explain the concept of homology modeling, molecular docking and protein-protein interaction.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Food Technology	BST 604	B.Sc. Biotechnology	NA	YES	NA	2013

Detailed Syllabus

<p>Unit-1 Food Biotechnology; Introduction; History; Importance; Applications of biotechnology in food processing; Significant advances; Recent developments; Risk factors; Safety regulations etc. Microbial enzymes in food processing; Industrial production of enzymes - proteases and cellulases; Food and beverage fermentation- alcoholic and non alcoholic beverages; Food additives and supplements –probiotics, health care products, vitamins and antibiotics; Fuels and industrial chemicals- Alkanes, industrial ethanol etc.</p>
<p>Unit-2 Modification of microbes/enzymes–Strain improvement, enzyme/ cofactor engineering; Technologies for microbial inactivation; Applications in product development/improvement. Microbes exploited commercially- <i>Saccharomyces</i>, <i>Lactobacillus</i>, <i>Penicillium</i>, <i>Acetobacter</i>, <i>Bifidobacterium</i>, <i>Lactococcus</i>, <i>Streptococcus</i> etc; Product development; Dairy fermentation and fermented products. Nutritional boosts and flavor enhancers: Emerging processing and preservation technologies for milk and dairy products, Enumeration and Detection of Food-borne Organisms. Bioassay and related Methods.</p>
<p>Unit-3 Food Preservation Using Irradiation, Characteristics of Radiations, Principles Underlying the Destruction of Microorganisms by Irradiation, Radappertization, Radicidation, and Radurization of Foods Legal Status of Food Irradiation, Effect of Irradiation of Food constituents. Storage Stability, Food Preservation with Low and high Temperatures, Preservation of Foods by Drying, Indicator and Food-borne Pathogens, Other Proven and Suspected Food-borne Pathogens.</p>
<p>Text and Reference Books 1. Frazier, W.S. and Weshoff, D.C., 1988. Food Microbiology, 4th Edn., McGraw Hill Book Co., New York. 2. Mann & Trusswell, 2007. Essentials of human nutrition. 3rd edition. Oxford University Press. 3. Jay, J.M., 1987. Modern Food Microbiology, CBS Publications, New Delhi. 4. Lindsay, 1988. Applied Science Biotechnology. Challenges for the flavour and Food Industry. Willis Elsevier. 5. Roger, A., Gordon, B. and John, T., 1989. Food Biotechnology</p>

1. To state the brief introduction, history, importance and applications of biotechnology in food processing.
2. To understand the role of Food additives, flavor enhancers and supplements –probiotics, health care products, vitamins and antibiotics; Fuels and industrial chemicals- Alkanes, industrial ethanol etc.
3 To determine Microbial enzymes in food processing; Industrial production of enzymes - proteases and cellulases; Food and beverage fermentation- alcoholic and non alcoholic beverages.
4. To analyze the Microbial production of fermented food viz. cheese, bread etc.

5. To evaluate the techniques for modification of microbes/enzymes–Strain improvement, enzyme/ cofactor engineering and microbial inactivation.

6. To explain various aspects of Dairy Technology and Dairy Industry.

7. To explain and classify various types of Food Preservation techniques such as Using Irradiation, Radappertization, Radicidation, and Radurization, Low and high Temperatures, Drying.
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Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
FOOD BIOTECHNOLOGY	BBT-301	B. Tech-BIOTECHNOLOGY	NA	YES	NA	2011

Detailed Syllabus:

MODULE-I	
History of Microorganisms History of Microorganisms in food, Historical Developments. Role and significance of microorganisms in foods. Intrinsic and Extrinsic. Parameters of Foods that affect microbial growth. Basic principles, unit operations, and equipment involved in the commercially important food processing methods and unit operations Microorganisms Microorganisms in fresh meats and poultry, processed meats, seafood's, fermented and fermented dairy products and miscellaneous food products. Starter cultures, cheeses, beer, wine and distilled spirits, SCP, medical foods, probiotics and health benefits of fermented milk and foods products. Brewing, malting, mashing, hops, primary & secondary fermentation: Biotechnological improvements: catabolic repression, High gravity brewing, B-glucan problem, getting rid of diacetyl. Beer, wine and distilled spirits.	
MODULE-II	
Nutritional boosts and flavor enhancers: Emerging processing and preservation technologies for milk and dairy products. Microbiological Examination of surfaces, Air Sampling, Metabolically Injured Organisms. Enumeration and Detection of Food-borne Organisms. Bioassay and related Methods Food Preservation Food Preservation, Food Preservation Using Irradiation, Characteristics of Radiations of Interest in Food Preservation. Principles Underlying the Destruction of Microorganisms by Irradiation, Processing of Foods for Irradiation, Application of Radiation, Radappertization, Radicidation, and Radurization of Foods Legal Status of Food Irradiation, Effect of Irradiation of Food constituents.	
MODULE -III	
Storage Stability Food Preservation with Low Temperatures, Food Preservation with High Temperatures, Preservation of Foods by Drying, Indicator and Food-borne Pathogens, Other Proven and Suspected Food-borne Pathogens. Rheology of Food Production.	
Reference Books:	
1. Frazier, W.S. and Weshoff, D.C., 1988. Food Microbiology, 4th Edn., McGraw Hill Book Co., New York.	
2. Mann & Trusswell, 2007. Essentials of human nutrition. 3rd edition .oxford university press.	
3. Jay, J.M., 1987. Modern Food Microbiology, CBS Publications, New Delhi.	
4 Lindsay, 1988. Applied Science Biotechnology. Challenges for the flavour and Food Industry. Willis Elsevier.	
5. Roger, A., Gordon, B. and John, T., 1989. Food Biotechnology.	

Course outcome:

1.	Identify the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods
2.	Understand the principles involving food preservation via fermentation processes.
3.	Understand the principles that make a food product safe for consumption.

4. Understand the principles and current practices of processing techniques and the effects of processing parameters on product quality

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
BIostatistics	BBT-302	B. Tech-BIOTECHNOLOGY	NA	NA	YES	2011

Detailed Syllabus:

MODULE-I

Basics of Statistics: Data types, classification and summarization of data, graphs and charts, Mean Median, Mode, Standard deviation, dispersion movements and moment generating function, skewness, kurtosis.

Permutations & Combinations: Fundamental principle of counting. Factorial, Permutations and combinations, derivation of formulae and their connections, simple applications.

MODULE-II

Probability: Algebra of probabilities, Random experiments: outcomes, sample spaces (set representation). Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events Axiomatic (set theoretic) probability, connections with the theories of earlier classes. Probability of an event, probability of 'not', 'and' & 'or' events. Multiplication theorem on probability. Conditional probability, independent events, total probability, Bayes theorem Binomial distribution, Poisson distribution, Normal distribution and Gaussian distribution.

MODULE-III

Correlation and Regression: Positive and negative correlation, Pearson and rank correlation coefficients, Non Parametric tests, curve fitting of various curves by method of least square, Linear, non-linear and multiple regression.

Testing: Hypothesis testing, Chi square test and F-tests, Variant, One way and two way analysis of variants, ANOVA, Principles of experimental design and analysis.

Reference Books:

1. N.T.J. Bailey; *Statistical Methods in Biology*; English University Press
2. R. Rangaswami; *A text Book of Agricultural Statistics*, New Age Int. Pub.
3. Zar J; *Biostatistics*; Prentice Hall London
4. P.S.S. Sunder Rao; *An Introduction to Biostatistics*; Prentice Hall
5. George W. and William G; *Statistical Methods*, IBH Publication
6. B Ipsen Jetal; *Introduction to Biostatistics*, Harper & Row Publication
7. KR Sundaram, SN Dwivedi, V Sreenivas. *Medical Biostatistics. Principle and Methods*. BI Publisher. 12 Daryaganj. Delhi

Course outcomes:

1. classify various types of data and apply basic statistical concepts such as measures of central
2. tendencies, measures of dispersion and sampling.

3. use concepts of probability, probability laws, probability distributions and apply them in solving
4. biological problems and statistical analysis.
5. perform statistical hypothesis testing using tools such as t-test, ANOVA, Tukey test and Chisquare test

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
METHODS AND INSTRUMENTATION IN BIOTECHNOLOGY I	BBT-306	B. Tech-BIOTECHNOLOGY	NA	NA	YES	2011

Detailed Syllabus:

<p align="center">MODULE – I</p> <p>Microscopic Techniques: History, basic types of light microscopy and their applications in brief; Simple, compound, inverted, stereo, fluorescence, dark field and bright field microscope. Phase contrast microscopy: Amplitude and phase objects, wave terminology, positive or dark phase contrast and negative or bright phase contrast microscopy. Electron microscopy: Transmission Electron Microscope and Scanning Electron Microscope, sample preparation for EM, basic concept of confocal microscope.</p>
<p align="center">MODULE - II</p> <p>Electrophoresis: Principle and types of electrophoresis. Gel electrophoresis: Agarose gel electrophoresis, Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE), Immuno electrophoresis, Capillary or tube gel electrophoresis, isoelectric focusing (IF), Two-dimensional (2D) electrophoresis. Western blotting technique.</p>
<p align="center">MODULE – III</p> <p>Chromatographic Techniques: Principle, application, affinity, mobile phase and stationary phase, types of columns, etc. Types of chromatography: Paper Chromatography, Gel filtration Chromatography, ion-exchange chromatography, affinity chromatography, High Performance Liquid Chromatography (Normal phase and reverse phase).</p>
<p>Texts/References</p> <ol style="list-style-type: none"> 1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, 2nd Edition, W.H. Freeman & Company, San Fransisco, 1982. 2. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, 5th Edition, Cambridge University Press, 2000. 3. D. Holme & H. Peck, Analytical Biochemistry, 3rd Edition, Longman, 1998. 4. R. Scopes, Protein Purification - Principles & Practices, 3rd Edition, Springer Verlag, 1994. 5. Selected readings from Methods in Enzymology, Academic Press.

Course outcomes:

1. Apply basic principles of different analytical techniques in analytical work.
2. Use spectroscopy and radioactivity in biotechnological applications
3. Use microscopy, centrifugation and electrophoretic techniques.
4. Demonstrate principle and working of various instruments.
5. Use various techniques for solving industrial and research problems.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
ENZYME TECHNOLOGY	BBT-402	B. Tech-BIOTECHNOLOGY	YES	NA	NA	2011

Detailed Syllabus:

<p align="center">MODULE- I</p> <p>Enzyme commission (E.C.) nomenclature, a brief introduction; Mechanisms of Enzyme Action: General Acid Base Catalysis; Covalent catalysis, Metal ion Catalysis. Mechanism of Chymotrypsin catalysis (Serine Proteases), Specificity of enzyme action: Active Site, Stereospecificity, Lock and Key and Induced Fit Models. Arrhenius Law; Transition State Theory; Kinetics of single substrate reactions; turnover number; Importance of KM, estimation of Michaelis-Menton parameters. Lineweaver Burk plot; Multi-substrate reaction mechanisms and kinetics: Random Sequential Bi Bi mechanism; Ordered Sequential Bi Bi mechanism, and Ping Pong Bi Bi mechanism.</p>
<p align="center">MODULE- II</p> <p>Types of Inhibition- kinetic models: Competitive, Uncompetitive and Non-Competitive. Regulation of enzymes activity: Allosteric Modification-Sigmoidal kinetics, Feed Back Inhibition and Covalent Modification. Factors affecting the kinetics Enzyme catalysed reactions; Physical and Chemical techniques for enzyme Immobilization – adsorption, matrix entrapment, encapsulation, cross-linking, covalent binding - examples; Advantages and disadvantages of different Immobilization techniques; Overview of applications of immobilized enzyme systems, Biosensor; Glucose Biosensor</p>
<p align="center">MODULE- III</p> <p>Enzyme Purification and their methods of characterization of enzymes; development of enzymatic assays- ONPG Assay (colorimetric assay), Coupled kinetic Assay and RIA of enzymes</p> <p>Text books and Reference books:</p> <ol style="list-style-type: none"> 1. Fundamentals of enzymology by Nicolas C. price and Lewis Stevens Oxford University Press 2. Enzymes by Trevor palmer, East west Press 3. Enzyme Technology by Messing 4. Enzymes: Dixon and Webb (IRL Press) 5. Enzyme technology by Chaplin and Bucke. Cambridge Univerity Press 6. Biochemical engineering fundamentals, second edition. James E Bailey, David F., Ollis, 7. McGraw Hill Intl. Edition Biochemistry and Molecular Biology of Antimicrobial Drug Action by Franklin, T. J. & Snow, J. A.

Course outcomes:

1. Discuss factors that affect enzymatic activity
2. Isolate and purify crude
3. Forms of some enzyme extracts from living tissues
4. Demonstrate how a given inhibitor affects the kinetics of an enzymatic reaction 5. discuss industrial applications of enzymes, and
5. Describe the mode of action of allosteric enzymes.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
BIOINFORMATICS	BBT-405	B. Tech-BIOTECHNOLOGY	NA	YES	NA	2011

Detailed Syllabus:

MODULE- I
Primary and secondary databases. Specialized sequence databases of EST, TFB Sites, SNP's, gene expression. Pfam, PROSITE, BLOCK (Secondary databases). Data retrieval with ENTREZ, SRS, DBGET
Principles of DNA sequencing (chemical chain termination, Dideoxy chain termination method, Automatic sequencer). RNA sequencing . Protein sequencing (Edmand degradation method)
MODULE- II
Sequence alignment (pairwise and multiple, global and local). Sequence alignment algorithm (FAST , BLAST, Needleman and Wunsch, Smith Waterman). Database similarity searches (BLAST, FASTA and PSI BLAST). Amino acid substitution matrices (PAM BLOSUM)
MODULE- III
Protein structure prediction (Chou Fasman method) : Secondary and tertiary structures. Homology Modelling, ORF prediction, Gene prediction, Micro array data analysis. Profiles and motifs.
Structure visualization methods (RASMOL, CHIME etc.). Protein Structure alignment and analysis. Application of Bioinformatics in drug discovery and drug designing.
Reference books & Text books:
1. <i>Bioinformatics : Principles and applications by Ghosh and Mallick (oxford) university press)</i>
2. <i>Bioinformatics by Andreas D Boxevanis (Wiley Interscience)</i>
3. <i>Fundamental concept of bioinformatics by Dan e. krane</i>
4. <i>Introduction to bioinformatics by Attwood and Parry Smith (Pierson education Publication)</i>
5. <i>instant notes in Bioinformatics by Westhead, parish and Tweman (Bios scientific publishers)</i>
6. <i>Advance Genetics by G.S. Miglani, Narosa Publishing House.</i>

Course outcomes:

1. implement solutions to basic bioinformatics problems
2. discuss the use of bioinformatics in addressing a range of biological questions
3. describe how bioinformatics methods can be used to relate sequence, structure and function discuss the technologies for modern high-throughput DNA sequencing and their applications
4. use and describe some central bioinformatics data and information resources

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
METHODS AND INSTRUMENTATION IN BIOTECHNOLOGY - II	BBT-406	B. Tech-BIOTECHNOLOGY	NA	NA	YES	2011

Detailed Syllabus:

MODULE – I
Centrifugation techniques: Centrifugal force, sedimentation and basic principles of sedimentation. Types of centrifuge: refrigerated high-speed preparative centrifuges, analytical ultracentrifuges, preparative ultracentrifuges, micro centrifuge, refrigerated centrifuge, differential centrifugation, density gradient centrifugation, analytical centrifugation, etc. Safety aspects of centrifugation, types of rotors and nomograph.
MODULE – II
SPECTROSCOPY: Behavior and nature of light, The Electromagnetic Spectrum, Classes of spectra (continuous & discrete). UV and visible spectroscopy, Infrared and Atomic absorption spectroscopy, fluorescence spectroscopy. MASS SPECTROMETRY: Ionization techniques; Electron impact ionisation, Chemical ionisation, Electrospray ionisation. Mass Analyzers; Quadrupole Mass Spectrometry, Ion trap mass spectrometry, Nanospray and on-line tandem mass spectrometry, Magnetic sector analyser, MALDITOF. DETECTORS; Electron multipliers, conversion dynode, Mass precision, mass measurement accuracy, mass resolution, ionization energy and appearance energy. Nuclear Magnetic Resonance.
MODULE – III
X-ray diffraction and X-ray Crystallography and their application, Types of Elastic scattering, Small-angle X-ray scattering (SAXS), Wide-angle X-ray scattering (WAXS), Resonant inelastic X-ray scattering (RIXS). Circular Dichroism: Circular polarization of light, Interaction of matter, Instrument and application.
Texts/References
1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, 2nd Edition, W.H. Freeman & Company, San Francisco, 1982.
2. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, 5th Edition, Cambridge University Press, 2000.
3. D. Holme & H. Peck, Analytical Biochemistry, 3rd Edition, Longman, 1998.
4. R. Scopes, Protein Purification - Principles & Practices, 3rd Edition, Springer Verlag, 1994.

1. Course outcomes: Apprehend the functioning, maintenance and safety aspects of the basic apparatus used in a Biotechnology lab.
2. Assimilate the principles and applications of centrifuge, electrophoresis and chromatography in research and related experiments.
3. Employ the knowledge for the separation of proteins/peptides by selecting appropriate separation techniques
4. Characterize certain functionalities of biomolecules by using spectroscopic techniques.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Environmental Biotechnology	BBT501	B.TECH BIOTECH	YES	NA	NA	2011

Detailed Syllabus

Module-1

Introduction to Environment: Concept of ecology and ecosystem, environmental pollution (Water, soil and air) noise and thermal pollution, their sources and effects. Environmental laws and policies.

Bioremediation and Bio restoration: Reforestation through micropropagation, development of stress tolerant plants, use of mycorrhizae in reforestation, use of microbes for improving soil fertility, reforestation of soils contaminated with heavy metals.

Module-2

Sewage and waste water treatments anaerobic and aerobic treatment, conventional and advanced treatment technology, methanogenesis, methanogenic, acetogenic, and fermentative bacteriatechnical process and conditions, emerging biotechnological processes in waste – water treatment.

Solid waste management: Landfills, composting, earthworm treatment, recycling and processing of organic residues. Biodegradation of xenobiotic compounds, organisms involved in degradation of chlorinated hydrocarbons, substituted simple aromatic compounds, polyaromatic hydrocarbons, pesticides, surfactants and microbial treatment of oil pollution.

Module-3

Environmental Biotechnology in Agriculture: Biofertilizers and microbial inoculants, biopesticide, bioinsecticides, bioherbicides Biofuel: Plant derived fuels, Energy crops, Biogas, Bioethanol, biohydrogen Environmental genetics: degradative plasmids, release of genetically engineered microbes in environment.

Text and Reference Books

1. Environmental Biotechnology by Alan Scragg (1999); Longman.
2. An Introduction to Environmental Biotechnology by Milton Wainwright (1999): Kluwer Press.

Course Outcomes:

After completing the course, students will be able to:

1. Understand various types of pollutions along with its sources and effects.
2. Analyze different laws and policies enforced to regulate pollution.
3. Identify various techniques for reforestation as a source of bioremediation.
4. Understand the concept of waste water treatment and solid waste treatment along with biotechnological approach for the same.
5. Evaluate the role of organism in biodegradation of various organic and inorganic compounds.
6. Understand the concept of biofertilizers, biopesticides and bioinsecticides.
7. Analyze the importance of biofuels in generating energy.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Bioprocess Engineering	BBT504	B.TECH BIOTECH	YES	NA	NA	2011

Detailed Syllabus

Module-1

Microbial growth, Mass balance, Principle of microbial nutrition, formulation of culture media, selective media. Maintenance coefficient and yield concept, Kinetics of Batch, Continuous and Fed-batch fermentation processes, Simple structured models, isolation, preservation and maintenance of Industrial important microorganism.

Module-2

Components of Bioreactor, Parameters and factors affecting yield: antifoam agents, importance of pH, etc. Fluid rheology, Sterilization of process fluids, recovering and purifying products, integration of reaction and separation.

Module-3

Upstream processing: Fermentative production, Baker's yeast, Distiller's yeast, Organic solvents: acetone, ethanol, butanol, Organic acids: lactic acid, citric acid and acetic acid, Enzymes (Proteases, Lipases and alphaamylase), Amino acids (Lglutamic acid, phenylalanine and L-lysine), Antibiotics: Penicillin, Streptomycine, Tetracycline.

Text and Reference Books

1. Biochemical Engineering: J.M. Lee, Prentice Hall.
2. Bioprocess Engineering: M. Shuler and F. Kargi, Pretice Hall.
3. Comprehensive Biotechnology: M. MooYoung, Editor.
4. Biotechnology: H.J. Rehm and G. Reed, VCH.

Course Outcomes:

After completing the course, students will be able to:

1. Understand principle of fermentation in industries.
2. Analyze the kinetics of batch and fed batch fermentation process.
3. Identify parameters affecting yield of fermentative process.
4. Understand the mechanism of sterilization of process fluids, recovering and purifying products.
5. Analyze the mechanism of upstream processing in fermentation technology.
6. Understand the production of acetone, ethanol, butanol, lactic acid, citric acid and acetic acid.
7. Analyze the production and purification of antibiotics and enzymes from fermentative technique.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Plant Biotechnology	BBT601	B.TECH BIOTECH	YES	NA	NA	2011

Detailed Syllabus

Module-1

Terminology used in cell & tissue culture. Basic techniques of cell and tissue culture, surface sterilization, aseptic tissue transfer, concept of totipotency. Nutritional requirement of cell *in vitro*, various types of nutrient media. Basic aseptic techniques.

Physical Environment: Surface, P_H and Temperature. Chemical Environment: Properties of media, balanced salt solutions, Natural media, synthetic Media (with Serum & Serum free media), complex media. Primary Cell Culture: Disaggregation Techniques, Isolation, Propagation, Immortalization of cell lines, Routine maintenance.

Module-2

Somatic embryogenesis and organogenesis in plants. Variability in tissue cultures, somaclonal and other variations. Isolation of cells, single cell cultures and cloning. Zygotic embryo culture, Micropropagation and cloning of plants, applications of micro propagation in agriculture, horticulture & forestry.

Protoplast Isolation and culture, fusion of protoplast. Haploid Production: Introduction, Techniques, factors affecting embryogenesis, plant regeneration from poller embryo, gynogenesis diploidization to raise homozygous diploids applications, limitation.

Module-3

Contamination and cytotoxicity: Sources and types of microbial contamination, Monitoring: Viability assay, Survival assay and transformation assay. Preservation of cell lines: cryopreservation, cell banks, transporting cells. Somatic Hybridization: somatic hybridization technology. Cell culture Parameters, Suspension culture.

Text and Reference Books

- *Plant tissue culture: SS Bhojwani and M.K. Razdan, Elsevier Science, The Netherlands.*
 - *Cell culture methods and cell biology procedure: A. Doyle.*
 - *Plant Tissue Culture – A practical Approach: R.A. Dixon, IRL press.*
 - *Cell and Tissue Culture: Lab procedures in biotechnology, Alan Doyal (ed) J.Bryan Griffith*
 - *Doods. J.H. & Roberts L.W. (1985). Experiments in plant tissue culture Cambridge Univ.*
 - *Animal Cell Culture by John R.W. Masters.*
 - *Cell & Tissue Culture: Lab procedure in biotechnology alan Doxal(ed) J. Bryan scritith*
- Animal or Animal cell & tissue culture techniques 5th freshness.*

Course Outcomes:

After completing the course, students will be able to:

1. Understand the basic techniques used in cell and tissue culture
2. Understand the concept of totipotency
3. Identify basic aseptic techniques

4. Understand the process of somatic embryogenesis in plants
5. Evaluate the applications of cloning in plants
6. Understand the assay used to check cell viability
7. Analyze the importance of somatic hybridization in plants

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Intellectual Property Right, Bioethics and Biosafety	BBT602	B.TECH BIOTECH	YES	NA	NA	2011

Detailed Syllabus

Module-1

General Patent Information: US patent laws, patentable subject matter. Requirements for patentability: Utility, Novelty, Nonobviousness, Sufficiency of disclosure. Rights of a patent, infringement of a patent. Procedures for obtaining patent protection. Types of patent applications: Provisional & regular Parts of patent applications. Applying for international patent. **WTO:** As an international agency controlling trade among nations. WTO with reference to biotechnological affairs, TRIPs

Special issues in Biotechnology Patents Disclosure requirements, Collaborative research, Competitive research, Indian patents and foreign patents, Plant variety protection act, The strategy of protecting plants. Patent Litigation Sub-statitutive aspects of patent litigation, Procedural aspects of patent litigation, different Doctrines.

Module-2

Bioethics: Legality, morality and ethics, the principles of bioethics: autonomy, human rights, beneficence, privacy, justice, equity etc., The expanding scope of ethics from biomedical practice to biotechnology, ethical conflicts in biotechnology - interference with nature, fear of unknown, unequal distribution of risks and benefits of biotechnology, bioethics vs. business ethics, ethical dimensions of IPR, technology transfer and other global biotech issues.

Module-3

Biosafety concepts and issues: Rational vs. subjective perceptions of risks and benefits, relationship between risk, hazard, exposure and safeguards, biotechnology and biosafety concerns at the level of individuals, institutions, society, region, country and the world. Role of patent in pharmaceutical industry, computer related Innovations, Case studies Rice, Haldi, neem, etc. and challenges ahead.

Text and Reference Books

1. *The law and strategy of Biotechnological patents* by Sibley. Butterworth publications.
2. *Intellectula property rights* – Ganguli – Tata McGrawhill
3. *Intellectual property right* – Wattal – Oxford Publishing House.

Course Outcomes:

After completing the course, students will be able to:

1. Understand various laws and rights concerning to patent.
2. Analyze the role of WTO with reference to biotechnological affairs
3Identify role f TRIPs.
4. Differentiate between Indian patents and foreign patents.
5. Understand the plant variety protection act.
6. Understand the ethical dimensions of IPR.
7. Analyze the role of patents in pharmaceutical industry

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Bioreactor: Design and Analysis	BBT603	B.TECH BIOTECH	NA	NA	YES	2011

Detailed Syllabus

Module-1

Bioreactor: Types of reactor: Batch culture bioreactor, plug flow reactor (PFR), continuous stirred tank reactor (CSTR), Fixed and Fluidized bed, bubble column, air lift fermenter.

Module-2

Mechanical design of bioreactors. instrumentation and control of process parameters, different types of valves and pumps, Dimensionless numbers, Aeration and Agitation, Volumetric mass transfer coefficient and its measurement, Mass transfer in bioreactor, Scale-up criteria.

Module-3

Plug flow reactor: For microbial processes; Multiphase bioreactors: Packed bed with immobilized enzymes or microbial cells

Unconventional bioreactors: Gas liquid reactors, hollow fiber reactor, membrane reactor and perfusion reactor for animal and plant cell culture

High Performance Bio Reactors: Sterile and non sterile operations - Reactors in series with and without recycle. Design of Reactors. Reactors for Solid state fermentation.

Text and Reference Books

1. Landfill Bioreactor Design & Operation. Reinhart Debra R, Townsend Timothy G. and Townsend Tim(1997) Lewis Publishers, Inc.
2. Multiphase Bioreactor Design. Edited by: Joaquim M.S. Cabral, Manuel Mota, Johannes Tramper (2001) CRC Press.
3. Bioreactor & Ex Situ Biological Treatment Technologies – Allerman Bruce, Allerman Bruce C, Leeson Andrea, (1999). Battelle publisher.
4. Bioreaction Engineering: Modeling & Control. vol. I&II. Schugerl K, and Bellgardt K.H, (2000), Springer Verlag pub.

Course Outcomes:

After completing the course, students will be able to:

1. Understand various types of bioreactor.
2. Differentiate CSTR and PFR
3. Identify different types of valves and pumps employed in a reactor
4. Understand scale up criteria for a bioreactor
5. Evaluate mechanics of a bioreactor
6. Understand the types of conventional and high performance bioreactor.
7. Analyze working of bioreactor

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Downstream Processing	BBT604	B.TECH BIOTECH	NA	NA	YES	2011

Detailed Syllabus

Module-1

Requirement of purification. Overview of a bioprocess including upstream and Downstream processing. Characteristics of biotechnology products, classes of bioproducts, physicochemical basis of bioseparation.

Cell disintegration: Separation of particulate by filtration, centrifugation, settling, sedimentation, decanting and micro filtration. Primary isolation methods including solvent extraction, sorption, precipitation, ultra filtration and reverse osmosis.

Module-2

Purification methods: Fractional precipitation, electrophoresis, electro dialysis and various kinds of chromatography.

Emerging separation techniques: Dynamic immobilization, reverse osmosis, super critical fluid extraction evaporation, super liquid extraction and foam based separation. Separation of intracellular, extracellular, heat and photosensitive materials.

Finishing operations: Crystallization, Drying and formulation.

Module-3

Downstream processes and effluent treatment: applications of Unit Operations in Downstream with special reference to membrane separations & extractive fermentation, anaerobic and aerobic treatment of effluents. Typical examples for downstream Processing and effluent disposal in process industries.

Text and Reference Books

1. Landfill Bioreactor Design & Operation. Reinhart Debra R, Townsend Timothy G. and Townsend Tim (1997) Lewis Publishers, Inc.
2. Multiphase Bioreactor Design. Edited by: Joaquim M.S. Cabral, Manuel Mota, Johannes Tramper (2001) CRC Press.
3. Bioreactor & Ex Situ Biological Treatment Technologies – Allerman Bruce, Allerman Bruce C, Leeson Andrea, (1999). Battelle publisher.
4. Bioreaction Engineering: Modeling & Control. vol. I&II. Schugerl K, and Bellgardt K.H, (2000), Springer Verlag pub.

Course Outcomes:

After completing the course, students will be able to:

1. Understand various classes of bioproducts
2. Analyze different purification methods in downstream process
3. Identify separation techniques and finishing operations
4. Differentiate chromatographic techniques used in downstream process
5. Evaluate the purity of finishing products in downstream process.
6. Differentiate between upstream and downstream processing
7. Analyze & Solve the problem of effluent arise by downstream process

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Bioenterpreneurship	BBT-702	B.Tech Biotechnology	NA	YES	NA	2011

Detailed Syllabus

Unit-1

Accounting and Finance Taking decision on starting a venture; Assessment of feasibility of a given venture/new venture; Approach a bank for a loan; Sources of financial assistance; Making a business proposal/Plan for seeking loans from financial institution and Banks; Funds from bank for capital expenditure and for working; Statutory and legal requirements for starting a company/venture; Budget planning and cash flow management; Basics in accounting practices: concepts of balance sheet, P&L account, and double entry bookkeeping; Estimation of income, expenditure, profit, income tax etc.

Marketing Assessment of market demand for potential product(s) of interest; Market conditions, segments; Prediction of market changes; Identifying needs of customers including gaps in the market, packaging the product; Market linkages, branding issues; Developing distribution channels; Pricing/Policies/Competition; Promotion/ Advertising; Services Marketing

Unit-2

Negotiations/Strategy With financiers, bankers etc.; With government/law enforcement authorities; With companies/Institutions for technology transfer; Dispute resolution skills; External environment/changes; Crisis/ Avoiding/Managing; Broader vision–Global thinking.

Information Technology How to use IT for business administration; Use of IT in improving business performance; Available software for better financial management; E-business setup, management. **Human Resource Development (HRD)** Leadership skills; Managerial skills; Organization structure, pros & cons of different structures; Team building, teamwork; Appraisal; Rewards in small scale set up.

Fundamentals of Entrepreneurship Support mechanism for entrepreneurship in India

Role of knowledge centre and R&D Knowledge centres like universities and research institutions; Role of technology and upgradation; Assessment of scale of development of Technology; Managing Technology Transfer; Regulations for transfer of foreign technologies; Technology transfer agencies.

Unit-3

Case Study

1. Candidates should be made to start a 'mock paper company', systematically following all the procedures.

- The market analysis developed by them will be used to choose the product or services.
- A product or service is created in paper and positioned in the market. As a product or services available only in paper to be sold in the market through the existing links. At this juncture, the pricing of the product or the service needs to be finalized, linking the distribution system until the product or services reaches the end consumer.
- Candidates who have developed such product or service could present the same as a project work to the Panel of Experts, including representatives from industry sector. If the presented product or service is found to have real potential, the candidates would be exposed to the next level of actual implementation of the project.

2. Go to any venture capital website (like sequoiacap.com) and prepare a proposal for funding from venture capital.

Course Outcomes:

After completing the course, students will be able to:

1. Explore entrepreneurial leadership and management style.
2. To explore different biotech business models and to acquire the fundamentals of biotech business management.
3. To understand the requirements of a biotech business plan in particular from the perspective of prospective funders.
4. To be able to manage issues in intellectual property and licensing as they pertain to biotech
5. To understand the nature of business incubation and its place in the biotech value chain.
6. To develop fundamental notions with regard to marketing in the biotech space and to understand the complexity of the interface between stakeholders.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Biosensors	BBT-704	B.Tech Biotechnology	NA	YES	NA	2011

Detailed Syllabus

Unit-1

Biosensors: Definition, History, Principle and types of biosensors. Properties of biosensors, Design features of Biosensors, The Biological Component, Signal Transduction: Amperometric Biosensors, Potentiometric Biosensors, Detection of H⁺ cation, Detections of NH₄⁺ cation, Detection of CN⁻ anion, Calorimetric biosensors, Optical Biosensors, Measuring the change in light reflectance, Measuring luminescence, Pizo-electric biosensors, Immunosensors.

Unit-2

Commercial examples of biosensors. Biosensors markets- Opportunities and obstacles. Introduction to MEMS (Micro-Electro-Mechanical Systems). Applications of MEMS in Biotechnology and medicine. Fabricating MEMS and Nanotechnology.

Unit-3

Biomedical sensors Sensors and transducers: an overview, measurement systems, Classification of Biomedical sensors and transducers, who do we need Biomedical sensors and Transducers? Important Design considerations and system calibration, the future of Biosensors and Transducers, Sensing Layer: The importance of computers in sensors and Transducer technology. Biosensors and Transducers in modern health care solutions.

Text / Reference Books

1. Affinity Biosensors: Techniques and Protocols, K.R. Rogers and A. Mulchandani, Humana Press.
2. Biosensors and their Applicatrions, V.C. Yang and T.T. Ngo, Plenum Publishing Corporation.
3. Chemical Sensors and Biosensors, B.R. Eggins, John Wiley and Sons Inc.
4. Sensors and Sensing in Biology and Engineering, F.G. Barth, wt al, Springer Verlag.

Course Outcomes:

After completing the course, students will be able to:

1. With limited guidance, deploy established techniques of analysis and enquiry within the biosciences.
2. Explain basic concepts of transducers.
3. Elucidate different types of electrodes used in bio-potential recording.
4. Differentiate biosensors, optical and ultrasonic sensors
5. Analyze, formulate and select suitable sensor/biosensor.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
Vaccine Technology	BBT-705	B.Tech Biotechnology	YES	NA	NA	2011

Detailed Syllabus

Unit-1

Introduction to vaccines and immunity

Fundamental concepts in vaccination and traditional methods of vaccine production

production of DPT and Rabies vaccine

Production of Modern Vaccines - production of Hepatitis vaccine

Unit-2

Applications of immunological methods in diagnosis;

B-cell epitope prediction methods

T-cell epitope prediction methods

Resources to study antibodies, antigen-antibody interactions

Unit -3

Reverse vaccinology and immunoinformatics

Databases in Immunology

Structure Activity Relationship – QSARs and QSPRs, QSAR Methodology

Various Descriptors used in QSARs: Electronics; Topology; Quantum Chemical based Descriptors.

Neural Networks and Principle Components Analysis in the QSAR equations

Text / Reference Books 1. Kuby Immunology 4e by Richard A. Goldsby, Thomas J. Kindt and Barbara A. Osborne 2. Immunoinformatics: Predicting Immunogenicity in Silico By Darren R Flower Publisher: Humana Press 3. Immunoinformatics (Immunomics Reviews:) By Shoba Ranganathan ,Vladimir Brusic, Christian Schonbach. Publisher: Springer

Course Outcomes:

After completing the course, students will be able to:

1. Define and use, or recognize definitions and applications of, each of the terms in bold in the course
2. Use examples from the history of vaccination to illustrate the conduct and outcomes of vaccine strategies to control infectious diseases
3. Will know the techniques and instruments used to design conventional and innovative biomedical equipment, image processing techniques, advanced methods for the design and use of prostheses
4. Discuss the principle strategies available for developing a vaccine and explain the significance of critical antigens, immunogens and adjuvants in developing effective vaccines
5. Identify examples of infectious diseases for which effective vaccines are available and some for which they are not. Explain why it has been scientifically difficult or commercially unprofitable to develop vaccines against certain infectious diseases, and why others have been amenable to control by vaccination.
6. Discuss the prospects for developing a vaccine against a named infectious disease, given information on its biology and epidemiology, and on the immune response in human hosts.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
MOLECULAR BIOLOGY	MST-103	M.Sc. - BIOTECHNOLOGY	NA	NA	YES	2013

Unit I

Genome organization Organization of bacterial genome; Structure of eukaryotic chromosomes; Role of nuclear matrix in chromosome organization and function; Matrix binding proteins; Heterochromatin and Euchromatin; DNA reassociation kinetics (Cot curve analysis); Repetitive and unique sequences; Satellite DNA; DNA melting and buoyant density; Nucleosome phasing; DNase I hypersensitive regions; DNA methylation & Imprinting.

Unit II

DNA Structure; Replication; Repair & Recombination Structure of DNA - A-,B-, Z- and triplex DNA; Measurement of properties-Spectrophotometric, CD, AFM and Electron microscope analysis of DNA structure; Replication initiation, elongation and termination in prokaryotes and eukaryotes; Enzymes and accessory proteins; Fidelity; Replication of single stranded circular DNA; Gene stability and DNA repair- enzymes; Photoreactivation; Nucleotide excision repair; Mismatch correction; SOS repair; Recombination: Homologous and non-homologous; Site specific recombination; Chi sequences in prokaryotes; Gene targeting; Gene disruption; FLP/FRT and Cre/Lox recombination.

Unit III

Prokaryotic & Eukaryotic Transcription Prokaryotic Transcription; Transcription unit; Promoters- Constitutive and Inducible; Operators; Regulatory elements; Initiation; Attenuation; Termination- Rho-dependent and independent; Anti-termination; Transcriptional regulation-Positive and negative; Operon concept-lac, trp, ara, his, and gal operons; Transcriptional control in lambda phage; Transcript processing; Processing of tRNA and rRNA Eukaryotic transcription and regulation; RNA polymerase structure and assembly; RNA polymerase I, II, III; Eukaryotic promoters and enhancers; General Transcription factors; TATA binding proteins (TBP) and TBP associated factors (TAF); Activators and repressors; Transcriptional and post-transcriptional gene silencing.

Unit IV

Post Transcriptional Modifications Processing of hnRNA, tRNA, rRNA; 5'-Cap formation; 3'-end processing and polyadenylation; Splicing; RNA editing; Nuclear export of mRNA; mRNA stability; Catalytic RNA. **Translation & Transport** Translation machinery; Ribosomes; Composition and assembly; Universal genetic code; Degeneracy of codons; Termination codons; Isoaccepting tRNA; Wobble hypothesis; Mechanism of initiation, elongation and termination; Co- and post-translational modifications; Genetic code in mitochondria; Transport of proteins and molecular chaperones; Protein stability; Protein turnover and degradation

Unit V

Mutations; Oncogenes and Tumor suppressor genes Nonsense, missense and point mutations; Intragenic and Intergenic suppression; Frameshift mutations; Physical, chemical and biological mutagens; Transposition - Transposable genetic elements in prokaryotes and eukaryotes; Mechanisms of transposition; Role of transposons in mutation; Viral and cellular oncogenes; Tumor suppressor genes from humans; Structure, function and mechanism of action of pRB and p53 tumor suppressor proteins; Activation of oncogenes and dominant negative effect; Suppression of tumor suppressor genes; Oncogenes as transcriptional activators.

Text/References

1. Benjamin Lewin, Gene IX, 9th Edition, Jones and Barlett Publishers, 2007.
2. J.D. Watson, N.H. Hopkins, J.W Roberts, J. A. Seitz & A.M. Weiner; Molecular Biology of the

Gene, 6th Edition,
Benjamin Cummings Publishing Company Inc, 2007.
3. Alberts et al; Molecular Biology of the Cell, 4th edition, Garland, 2002.

Course outcomes

1. Students will learn DNA replication, recombination and repair, transcription and translation.
2. Students will be aware of the modern tools and techniques of genomics and isolation and identification of genes.
3. Understand Genomic organization
4. Learn Transposable genetic elements in prokaryotes and eukaryotes
5. Learn Transport of proteins and molecular chaperones
6. Students will understand the biology and application of antisense technologies and biology of cancer.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
IMMUNOLOGY	MST-104	M.Sc. - BIOTECHNOLOGY	NA	NA	YES	2013

UNIT I

Immune response: Innate and adaptive immune system: Inflammation and that Stimulates Immune Responses,

Toll-like receptor-component of innate immune system; Antigen presenting cells, Antigens, Heptanes: factor effecting immunogenicity. Adaptive Immunity: Antigenic specificity, Diversity, Immunologic memory, Self / nonself recognition. B lymphocytes and T lymphocytes; Antigenicity and immunogenicity. Immune dysfunction and Its Consequences.

UNIT II

Cells and organs of the immune system: Hematopoiesis and its control, Clonal selection theory. Programmed Cell Death; Lymphoid Cells: lymphocytes and their subsets, natural killer cell, Mononuclear Phagocytes. Antimicrobial and cytotoxic activities. Lymphoid Organs: Primary (thymus, bone marrow) and secondary lymphoid organs (Lymph nodes, spleen).

UNIT III

Antigens and epitopes: immunogenicity, antigenicity and haptens; factors affecting immunogenicity. lipids as antigens. adjuvants, epitopes, or antigenic determinants, ag recognition by t cells and b cells, properties of b-cell epitopes and t-cell epitopes, blood group antigens. Structure, functions and characteristics of different classes of antibodies, Antigenic Determinants on Immunoglobulins.

UNIT IV

Antigen-Antibody Interactions: Strength of Antigen-Antibody Interactions, Cross-Reactivity, Precipitation Reactions, Agglutination Reactions, Radioimmunoassay, Enzyme-Linked Immunosorbent Assay, Western, Blotting, Immunoprecipitation. Production and application of monoclonal antibody: hybridoma technology.

Major histocompatibility systems: Structure of MHC I and II molecule, Association of MHC with disease. Recognition of antigens by T and B Cells: Antigen processing, role of MHC molecules in antigen presentation. T-cell receptor complex, B-cell receptor complex.

UNIT V

Compliment system, components, Activation pathway and regulation of activation pathway, complement deficiency, role of complement system in immune responses opsonization (opsonin). Hypersensitivity: Definition, IgE mediated Hypersensitivity, mechanism of mart cell degranulation, mediators of type I reactions and consequences type II reaction, immune complex mediated Hypersensitivity and delayed type Hypersensitivity. Autoimmunity and Cancer.

TEXT / REFERENCE BOOKS:

1. Immunology by Kuby J et al. W. H. Freeman & Company.
2. Immunology, L.M. Roitt, J. Brestoff and D.K. Male, 1996.
3. Immuno-biology, Janeway CA and Paul Travers 1994.
4. Immunological techniques, D.M. Weir, 1992.
5. Current Protocols in Immunology 3 Volumes, Wiley Publications 1994.
6. Monoclonal Antibodies: Principles and Practice, J. W. Goding, 1983. Academic Press

Course Outcomes: Students should be able to –

1. Evaluate the usefulness of immunology in different pharmaceutical companies.
2. Students will understand the basic concept of innate and acquired immunity.
3. Understand Hypersensitivity reactions
4. Students will gain knowledge about immunoglobulin structures and diversity of antibodies, morphology and functions of various immune cells such as dendritic cells, macrophages, neutrophils and their association with MHC molecules will be studied.
5. This study will make the students to understand the basic mechanisms of hypersensitivity responses and their associations with different diseases.
6. The main goal of the course is to provide basic understanding of immunology and immune responses in response to various infectious and non infectious diseases.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
COMPUTER APPLICATIONS & BIOSTATISTICS	MST-105	M.Sc. - BIOTECHNOLOGY	NA	NA	YES	2013

Unit-I

Definition of selected terms Scale of measurements Related to statistic, Methods of collecting data, Presentation of data, statistical Tables, Calculation of basic statistical parameters (mean, median, mode, standard deviation, standard error etc.). Correlation concept and applications; Regression concept and application;

Concepts of statistical population and sample need for sampling studies; Simple procedures of random sampling; Methods of sampling, Estimation of sample size for clinical experiments Basic concepts of Probability, Basic theorems of probability addition and multiplication theorems; Conditional probability of Bayes Theorems; Probability distribution definition & applications;

Unit –II

Critical region and level of significance, Test of a simple hypothesis against simple alternative, composite hypothesis, Neyman 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, , Test based on t and f, Multiple comparisons.

Unit-III

Non-parametric tests-Wilcoxon Mann Whitney, Kolmogorov Smirnov tests (two sample tests)Planning of experiments, Basic principles of experimental design, uniformity trials, analysis of variance, one-way, two-way and three-way classification models, completely randomized design (CRD), randomized block design (RBD) latin square design (LSD) and Graeco-latin square designs, Analysis of covariance (ANCOVA), ANCOVA with one concomitant variable in CRD and RBD.

Unit-IV

Introduction to MS Excel, creating a data file, data manipulations, simple statistical analysis using Excel, making graphs and charts.MS PowerPoint, different types of statistical software for analysis (introduction) MINITAB, MATLAB, R, SAS.

Unit-V

Introduction of Statistical package (SPSS), Data view and variable view, importing a file, Data transformations (compute, recode, count, If,). Sort cases, merging and appending data, Frequencies, descriptive statistics, cross tabulations. Statistical analysis: independent samples, „t“ test, paired „t“ test, ANOVA, chi square, Fisher’s exact test, McNemar chi-square test, correlation and regression, Multiple Linear Regression, Principal Component Analysis (PCA). Non-parametric methods: Mann Whitney U test, Wilcoxon Signed rank test, Spearman’s correlation.

TEXT / REFERENCE BOOKS:

- 1.Principles of Biostatistics- M. Pagano, Cengage Learning Publishers, 2ndEdition, 2008.
2. Kempthorne, O(1966): The Design and Analysis of Experiments, John Wiley and Sons.
- 3.Introduction to Biostatistics. Glover T. and Mitchell K. (2002). McGraw Hill, New York.
- 4.Fundamentals of Biostatistics. Rosner Bernard (1999), Duxbury Press.
- 5.R Cookbook. Paul Teetor (2011), United States of America.

Course Outcomes: Students should be able to –

1. Evaluate the usefulness of computer applications in life sciences.
2. Students will understand the basic concept of Biostats.
3. Understand Correlation concept and applications
4. Students will gain knowledge about 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.
5. This study will make the students to understand the basic of MINITAB, MATLAB, R, SAS.
6. The main goal of the course is to provide basic understanding of Statistical analysis: independent samples, t test, paired t test, ANOVA, chi square, Fisher's exact test, McNemar chi-square test, correlation and regression, Multiple Linear Regression, Principal Component Analysis (PCA). Non-parametric methods: Mann Whitney U test, Wilcoxon Signed rank test, Spearman's correlation

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
ANALYTICAL TECHNIQUES	MST-201	M.Sc. - BIOTECHNOLOGY	NA	NA	YES	2013

Unit I

Basic Techniques Buffers; Methods of cell disintegration; Enzyme assays and controls; Detergents and membrane proteins; Dialysis, Ultrafiltration and other membrane techniques

Spectroscopy Techniques UV, Visible and Raman Spectroscopy; Theory and application of Circular Dichroism; Fluorescence; MS, NMR, PMR, ESR and Plasma Emission spectroscopy

Unit II

Chromatography Techniques TLC and Paper chromatography; Chromatographic methods for macromolecule separation - Gel permeation, Ion exchange, Hydrophobic, Reverse-phase and Affinity chromatography; HPLC and FPLC; Criteria of protein purity

Electrophoretic techniques Theory and application of Polyacrylamide and Agarose gel electrophoresis; Capillary electrophoresis; 2D Electrophoresis; Disc gel electrophoresis; Gradient electrophoresis; Pulsed field gel electrophoresis

Unit III

Centrifugation Basic principles; Mathematics & theory (RCF, Sedimentation coefficient etc); Types of centrifuge - Microcentrifuge, High speed & Ultracentrifuges; Preparative centrifugation; Differential & density gradient centrifugation; Applications (Isolation of cell components); Analytical centrifugation; Determination of molecular weight by sedimentation velocity & sedimentation equilibrium methods.

Unit IV

Microscopic Techniques: History, basic types of light microscopy and their applications in brief; Simple, compound, inverted, stereo, fluorescence, dark field and bright field microscope. Phase contrast microscopy: Amplitude and phase objects, wave terminology, positive or dark phase contrast and negative or bright phase contrast microscopy. Electron microscopy: Transmission Electron Microscope and Scanning Electron Microscope, sample preparation for EM, basic concept of confocal microscope.

Unit V

Advanced Techniques: Protein crystallization- X-ray diffraction and X-ray crystallography and their application. **Mass Spectrometry:** Theory and methods; Different components of a mass spectrometer, types of ionization techniques and types of mass analyzers. MALDI-TOF. Mass precision, mass measurement accuracy, mass resolution, ionization energy and appearance energy.

Texts/References

1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, 2nd Edition, W.H. Freeman & Company, San Francisco, 1982.
2. Keith Wilson and John Walker, Principles and Techniques of Practical Biochemistry, 5th Edition, Cambridge University Press, 2000.
3. D. Holme & H. Peck, Analytical Biochemistry, 3rd Edition, Longman, 1998.
4. R. Scopes, Protein Purification - Principles & Practices, 3rd Edition, Springer Verlag, 1994.
5. Selected readings from Methods in Enzymology, Academic Press.

Course Outcomes: Students should be able to –

1. To elaborate concepts of biochemistry with easy to run experiments.
2. To familiarize with basic laboratory instruments and understand the principle of measurements using those instruments with experiments in biochemistry.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
BIOPROCESS ENGINEERING	MST-301	M.Sc. - BIOTECHNOLOGY	YES	NA	NA	2013

Detailed Syllabus

Unit-1

An introduction to fermentation processes- Range of fermentation process, microbial biomass, Microbial metabolites, Microbial growth kinetics- Batch culture, continuous culture, comparison of batch and continuous culture in industrial applications, fed-batch culture, variable and fixed volume fed batch culture.

Unit-2

Isolation, preservation and improvement of industrially important microorganisms, Screening methods, Isolation methods, enrichment liquid culture, enriched culture, Industrial fermentation typical media, media formulation, water, energy and carbon sources, nitrogen sources, minerals, vitamin sources, nutrient recycle, buffers, precursors and metabolic regulators, oxygen requirement.

Unit-3

Media sterilization, sterilization of fermenter, sterilization of the feed. Inocula for industrial fermentation- development of inocula for yeast, bacteria, fungi and actinomycetes, the inoculation of fermenters, the use of spore inoculums, inoculation from a laboratory and plant fermenter .

Unit-4

Downstream processing: Bioseparation - filtration, centrifugation, sedimentation, flocculation; Cell disruption; Liquid-liquid extraction; Purification by chromatographic techniques; Reverse osmosis and ultra filtration; Drying; Crystallization; Storage and packaging; Treatment of effluent and its disposal, anaerobic and aerobic treatment of effluents.

Unit-5

Bioreactor: Types of reactor: Batch culture bioreactor, plug flow reactor (PFR), continuous stirred tank reactor (CSTR), Fixed and Fluidized bed, bubble column, air lift fermenter. Design of fermenter, basic functions, construction, aeration and agitation, oxygen requirements of industrial fermentation, Instrumentation and control of process parameters, Scale up and scale down process.

Text and Reference Books

1. Jackson AT., Bioprocess Engineering in Biotechnology, Prentice Hall, Engelwood Cliffs, 1991.
2. Shuler ML and Kargi F., Bioprocess Engineering: Basic concepts, 2nd Edition, Prentice Hall, Engel wood Cliffs, 2002.
3. Stanbury RF and Whitaker A., Principles of Fermentation Technology, Pergamon press, Oxford, 1997
4. Baily JE and Ollis DF., Biochemical Engineering fundamentals, 2nd Edition, McGraw-Hill Book Co., New York, 1986.

5. Aiba S, Humphrey AE and Millis NF, Biochemical Engineering, 2nd Edition, University of Tokyo press, Tokyo, 1973.

6. Comprehensive Biotechnology: The Principles, Applications and Regulations of Biotechnology in Industry, Agriculture and Medicine, Vol 1, 2, 3 and 4. Young M.M., Reed Elsevier India Private Ltd, India, 2004.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Understand various types of fermentation mode of operation and their kinetics. |
| 2. Analyze the effect of various fermentation and downstream processes involved in the synthesis of products. |
| 3. Understand the enzyme production and their application involved in modern world. |
| 4. Understand the instrumentation involved in the downstream processing of products produced by different pharmaceutical and biotechnological industries. |
| 5. Evaluate performance of different fermentation processes i.e., whose work in batch and continuous mode of operation. |
| 6. Will understand the production and application of some enzymes used in food and biotechnological industries. |

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
TISSUE CULTURE	MST-304	M.Sc. - BIOTECHNOLOGY	NA	YES	NA	2013

Unit-1

Animal tissue culture: Introduction- advantages and disadvantages of tissue culture; equipment for a tissue culture laboratory; aseptic techniques- sterile handling, standard procedures, sterilization; Culture vessels- substrates ; Media- properties, natural media, artificial media- serum containing media, serum free media , chemically defined media.

Unit-2

Primary culture- isolation of tissue by enzymatic methods, mechanical methods; Cell line- sub culture, routine maintenance, suspension culture, adherent culture, Cell quantitation- cell counting, Cytotoxicity- Viability assay using dye, cell proliferation assay, metabolic assay; Cryopreservation- need, methods and stages of cryopreservation. Contamination- source, monitoring for contamination.

Unit-3

Organ culture; Tumor cells & transformation; Scale up- batch culture, continuous culture, Scale up in monolayer; scale up in – suspension culture, Animal tissue culture products & application- vaccines, monoclonal antibodies, enzymes, hormones, factors.

Unit-4

Plant tissue culture- Introduction ; Methods- media preparation, aseptic techniques, sterilization, pretreatment to explant tissue; Callus culture, Meristem culture, Organ culture, Cryopreservation. Somatic hybridization- isolation of protoplast, viability testing of protoplast ,protoplast fusion, regeneration of plant, selection of fusion hybrid.

Unit-5

Cloning, Large scale culture, Somatic embryogenesis- development & application; Micropropagation – advantages, methods, application; Biochemical production, Somaclonal variation.

Text and Reference Books

1. Freshney, *Culture of Animal Cells*, 5th Edition, Wiley-Liss, 2005
2. Ed. Martin Clynes, *Animal Cell Culture Techniques.*, Springer, 1998.
3. B.Hafez, E.S.E Hafez, *Reproduction in Farm Animals*, 7th Edition, Wiley- Blackwell, 2000.
4. *Plant tissue culture: SS Bhojwani and M.K. Razdan*, Elsevier Science, The Netherlands.
5. *Cell culture methods and cell biology procedure: A. Doyle.*
6. *Plant Tissue Culture – A practical Approach: R.A. Dixon*, IRL press.
7. *Cell and Tissue Culture: Lab procedures in biotechnology*, Alan Doyal (ed) J.Bryan Griffth
8. Doods. J.H. & Roberts L.W. (1985). *Experiments in plant tissue culture* Cambridge Univ.
9. *Animal or Animal cell & tissue culture techniques 5th freshness.*

Course Outcomes:

After completing the course, students will be able to:

1. Understand basics of tissue culture.
2. learn the methods involved for the isolation and preservation of animal and plant tissues.
3. Understand the concept to do the experimentation in aseptic condition and analyze the outcome of it.
4. Understand the principle and media used for culture of different cell lines.
5. Will learn the application of tissue culture methods adopted in the animal and plant cell lines.
6. Will analyze and learn the methods associated with the large scale production different tissue cultures.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
BIOENTREPRENEURSHIP	MST-305	M.Sc. - BIOTECHNOLOGY	NA	YES	NA	2013

Unit-1

Accounting and Finance Taking decision on starting a venture; Assessment of feasibility of a given venture/new venture; Approach a bank for a loan; Sources of financial assistance; Making a business proposal/Plan for seeking loans from financial institution and Banks; Funds from bank for capital expenditure and for working; Statutory and legal requirements for starting a company/venture; Budget planning and cash flow management; Basics in accounting practices: concepts of balance sheet, P&L account, and double entry bookkeeping; Estimation of income, expenditure, profit, income tax etc.

Unit-2

Marketing Assessment of market demand for potential product(s) of interest; Market conditions, segments; Prediction of market changes; Identifying needs of customers including gaps in the market, packaging the product; Market linkages, branding issues; Developing distribution channels; Pricing/Policies/Competition; Promotion/ Advertising; Services Marketing

Fundamentals of Entrepreneurship Support mechanism for entrepreneurship in India.

Unit-3

Negotiations/Strategy With financiers, bankers etc.; With government/law enforcement authorities; With companies/Institutions for technology transfer; Dispute resolution skills; External environment/changes; Crisis/Avoiding/Managing; Broader vision–Global thinking.

Information Technology How to use IT for business administration; Use of IT in improving business performance; Available software for better financial management; E-business setup, management.

Unit-4

Human Resource Development (HRD) Leadership skills; Managerial skills; Organization structure, pros & cons of different structures; Team building, teamwork; Appraisal; Rewards in small scale set up.

Role of knowledge centre and R&D Knowledge centres like universities and research institutions; Role of technology and upgradation; Assessment of scale of development of Technology; Managing Technology Transfer; Regulations for transfer of foreign technologies; Technology transfer agencies.

Unit-5

Case Study

1. Candidates should be made to start a 'mock paper company', systematically following all the procedures.

- The market analysis developed by them will be used to choose the product or services.
- A product or service is created in paper and positioned in the market. As a product or services available only in paper to be sold in the market through the existing links. At this juncture, the pricing of the product or the service needs to be finalized, linking the distribution system until the product or services reaches the end consumer.
- Candidates who have developed such product or service could present the same as a project work to the Panel of Experts, including representatives from industry sector. If the presented product or service is found to have real potential, the candidates would be exposed to the next level of actual implementation of the project.

2. Go to any venture capital website (like sequoiacap.com) and prepare a proposal for funding from venture capital.

Text and Reference Books

1. *Human Resource Management (14th Edition)* By Gary Dessler.
2. *Digital Business and E-Commerce Management*, Pearson, 6th Edition by Dave Chaffey
3. *Fundamentals of Entrepreneurship*. Author, H. Nandan. Publisher, PHI Learning Pvt. Ltd., 2011.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Understand basics of entrepreneurship. |
| 2. Analyze the marketing strategies of the product. |
| 3. Understand the problems associated with the negotiation and their strategies. |
| 4. Understand the Human resource structure of an organization and its regulation as required. |
| 5. Will learn how research and development is important for the knowing the strategies. |
| 6. Will analysis and learn how a particular industry works in terms of service, manufacturing etc. |

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
MOLECULAR BIOLOGY	MMB-103	M.Sc. - MICROBIOLOGY	NA	NA	YES	2017

Unit I

Genome organization Organization of bacterial genome; Structure of eukaryotic chromosomes; Role of nuclear matrix in chromosome organization and function; Matrix binding proteins; Heterochromatin and Euchromatin; DNA reassociation kinetics (Cot curve analysis); Repetitive and unique sequences; Satellite DNA; DNA melting and buoyant density; Nucleosome phasing; DNase I hypersensitive regions; DNA methylation & Imprinting.

Unit II

DNA Structure; Replication; Repair & Recombination Structure of DNA - A-,B-, Z- and triplex DNA; Measurement of properties-Spectrophotometric, CD, AFM and Electron microscope analysis of DNA structure; Replication initiation, elongation and termination in prokaryotes and eukaryotes; Enzymes and accessory proteins; Fidelity; Replication of single stranded circular DNA; Gene stability and DNA repair- enzymes; Photoreactivation; Nucleotide excision repair; Mismatch correction; SOS repair; Recombination: Homologous and non-homologous; Site specific recombination; Chi sequences in prokaryotes; Gene targeting; Gene disruption; FLP/FRT and Cre/Lox recombination.

Unit III

Prokaryotic & Eukaryotic Transcription Prokaryotic Transcription; Transcription unit; Promoters- Constitutive and Inducible; Operators; Regulatory elements; Initiation; Attenuation; Termination- Rho-dependent and independent; Anti-termination; Transcriptional regulation-Positive and negative; Operon concept-lac, trp, ara, his, and gal operons; Transcriptional control in lambda phage; Transcript processing; Processing of tRNA and rRNA Eukaryotic transcription and regulation; RNA polymerase structure and assembly; RNA polymerase I, II, III; Eukaryotic promoters and enhancers; General Transcription factors; TATA binding proteins (TBP) and TBP associated factors (TAF); Activators and repressors; Transcriptional and post-transcriptional gene silencing.

Unit IV

Post Transcriptional Modifications Processing of hnRNA, tRNA, rRNA; 5'-Cap formation; 3'-end processing and polyadenylation; Splicing; RNA editing; Nuclear export of mRNA; mRNA stability; Catalytic RNA. **Translation & Transport** Translation machinery; Ribosomes; Composition and assembly; Universal genetic code; Degeneracy of codons; Termination codons; Isoaccepting tRNA; Wobble hypothesis; Mechanism of initiation, elongation and termination; Co- and post-translational modifications; Genetic code in mitochondria; Transport of proteins and molecular chaperones; Protein stability; Protein turnover and degradation

Unit V

Mutations; Oncogenes and Tumor suppressor genes Nonsense, missense and point mutations; Intragenic and Intergenic suppression; Frameshift mutations; Physical, chemical and biological mutagens; Transposition - Transposable genetic elements in prokaryotes and eukaryotes; Mechanisms of transposition; Role of transposons in mutation; Viral and cellular oncogenes; Tumor suppressor genes from humans; Structure, function and mechanism of action of pRB and p53 tumor suppressor proteins; Activation of oncogenes and dominant negative effect; Suppression of tumor suppressor genes; Oncogenes as transcriptional activators.

Text/References

1. Benjamin Lewin, Gene IX, 9th Edition, Jones and Barlett Publishers, 2007.
2. J.D. Watson, N.H. Hopkins, J.W Roberts, J. A. Seitz & A.M. Weiner; Molecular Biology of the

Gene, 6th Edition,
Benjamin Cummings Publishing Company Inc, 2007.
3. Alberts et al; Molecular Biology of the Cell, 4th edition, Garland, 2002.

Course outcomes

1. Students will learn DNA replication, recombination and repair, transcription and translation.
2. Students will be aware of the modern tools and techniques of genomics and isolation and identification of genes.
3. Understand Genomic organization
4. Learn Transposable genetic elements in prokaryotes and eukaryotes
5. Learn Transport of proteins and molecular chaperones
6. Students will understand the biology and application of antisense technologies and biology of cancer.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
IMMUNOLOGY	MMB-104	M.Sc. - MICROBIOLOGY	NA	NA	YES	2017

UNIT I

Immune response: Innate and adaptive immune system: Inflammation and that Stimulates Immune Responses,

Toll-like receptor-component of innate immune system; Antigen presenting cells, Antigens, Heptanes: factor effecting immunogenicity. Adaptive Immunity: Antigenic specificity, Diversity, Immunologic memory, Self / nonself recognition. B lymphocytes and T lymphocytes; Antigenicity and immunogenicity. Immune dysfunction and Its Consequences.

UNIT II

Cells and organs of the immune system: Hematopoiesis and its control, Clonal selection theory. Programmed Cell Death; Lymphoid Cells: lymphocytes and their subsets, natural killer cell, Mononuclear Phagocytes. Antimicrobial and cytotoxic activities. Lymphoid Organs: Primary (thymus, bone marrow) and secondary lymphoid organs (Lymph nodes, spleen).

UNIT III

Antigens and epitopes: immunogenicity, antigenicity and haptens; factors affecting immunogenicity. lipids as antigens. adjuvants, epitopes, or antigenic determinants, ag recognition by t cells and b cells, properties of b-cell epitopes and t-cell epitopes, blood group antigens. Structure, functions and characteristics of different classes of antibodies, Antigenic Determinants on Immunoglobulins.

UNIT IV

Antigen-Antibody Interactions: Strength of Antigen-Antibody Interactions, Cross-Reactivity, Precipitation Reactions, Agglutination Reactions, Radioimmunoassay, Enzyme-Linked Immunosorbent Assay, Western, Blotting, Immunoprecipitation. Production and application of monoclonal antibody: hybridoma technology.

Major histocompatibility systems: Structure of MHC I and II molecule, Association of MHC with disease. Recognition of antigens by T and B Cells: Antigen processing, role of MHC molecules in antigen presentation. T-cell receptor complex, B-cell receptor complex.

UNIT V

Compliment system, components, Activation pathway and regulation of activation pathway, complement deficiency, role of complement system in immune responses opsonization (opsonin). Hypersensitivity: Definition, IgE mediated Hypersensitivity, mechanism of mast cell degranulation, mediators of type I reactions and consequences type II reaction, immune complex mediated Hypersensitivity and delayed type Hypersensitivity. Autoimmunity and Cancer.

TEXT / REFERENCE BOOKS:

1. Immunology by Kuby J et al. W. H. Freeman & Company.
2. Immunology, L.M. Roitt, J. Brestoff and D.K. Male, 1996.
3. Immuno-biology, Janeway CA and Paul Travers 1994.
4. Immunological techniques, D.M. Weir, 1992.
5. Current Protocols in Immunology 3 Volumes, Wiley Publications 1994.
6. Monoclonal Antibodies: Principles and Practice, J. W. Goding, 1983. Academic Press

Course Outcomes: Students should be able to –

1. Evaluate the usefulness of immunology in different pharmaceutical companies.
2. Students will understand the basic concept of innate and acquired immunity.
3. Understand Hypersensitivity reactions
4. Students will gain knowledge about immunoglobulin structures and diversity of antibodies, morphology and functions of various immune cells such as dendritic cells, macrophages, neutrophils and their association with MHC molecules will be studied.
5. This study will make the students to understand the basic mechanisms of hypersensitivity responses and their associations with different diseases.
6. The main goal of the course is to provide basic understanding of immunology and immune responses in response to various infectious and non infectious diseases.

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
COMPUTER APPLICATIONS & BIOSTATISTICS	MMB-105	M.Sc. - MICROBIOLOGY	NA	NA	YES	2017

Unit-I

Definition of selected terms Scale of measurements Related to statistic, Methods of collecting data, Presentation of data, statistical Tables, Calculation of basic statistical parameters (mean, median, mode, standard deviation, standard error etc.). Correlation concept and applications; Regression concept and application;

Concepts of statistical population and sample need for sampling studies; Simple procedures of random sampling; Methods of sampling, Estimation of sample size for clinical experiments Basic concepts of Probability , Basic theorems of probability addition and multiplication theorems; Conditional probability of Bayes Theorems; Probability distribution definition & applications;

Unit –II

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, , Test based on t and f, Multiple comparisons.

Unit-III

Non-parametric tests-Wilcoxon Mann Whitney, Kolmogorov Smirnov tests (two sample tests)Planning of experiments, Basic principles of experimental design, uniformity trials, analysis of variance, one-way, two-way and three-way classification models, completely randomized design (CRD), randomized block design (RBD) latin square design (LSD) and Graeco-latin square designs, Analysis of covariance (ANCOVA), ANCOVA with one concomitant variable in CRD and RBD.

Unit-IV

Introduction to MS Excel, creating a data file, data manipulations, simple statistical analysis using Excel, making graphs and charts.MS PowerPoint, different types of statistical software for analysis (introduction) MINITAB, MATLAB, R, SAS.

Unit-V

Introduction of Statistical package (SPSS), Data view and variable view, importing a file, Data transformations (compute, recode, count, If,). Sort cases, merging and appending data, Frequencies, descriptive statistics, cross tabulations. Statistical analysis: independent samples, „t“ test, paired „t“ test, ANOVA, chi square, Fisher’s exact test, McNemar chi-square test, correlation and regression, Multiple Linear Regression, Principal Component Analysis (PCA). Non-parametric methods: Mann Whitney U test, Wilcoxon Signed rank test, Spearman’s correlation.

TEXT / REFERENCE BOOKS:

- 1.Principles of Biostatistics- M. Pagano, Cengage Learning Publishers, 2ndEdition, 2008.
2. Kempthorne, O(1966): The Design and Analysis of Experiments, John Wiley and Sons.
- 3.Introduction to Biostatistics. Glover T. and Mitchell K. (2002). McGraw Hill, New York.
- 4.Fundamentals of Biostatistics. Rosner Bernard (1999), Duxbury Press.
- 5.R Cookbook. Paul Teetor (2011), United States of America.

Course Outcomes: Students should be able to –

1. Evaluate the usefulness of computer applications in life sciences.
2. Students will understand the basic concept of Biostats.
3. Understand Correlation concept and applications
4. Students will gain knowledge about 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.
5. This study will make the students to understand the basic of MINITAB, MATLAB, R, SAS.
6. The main goal of the course is to provide basic understanding of Statistical analysis: independent samples, t test, paired t test, ANOVA, chi square, Fisher's exact test, McNemar chi-square test, correlation and regression, Multiple Linear Regression, Principal Component Analysis (PCA). Non-parametric methods: Mann Whitney U test, Wilcoxon Signed rank test, Spearman's correlation

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
ENZYME AND TECHNIQUES IN BIOCHEMISTRY	MMB-201	M.Sc. - MICROBIOLOGY	NA	NA	YES	2017

Detailed syllabus

UNIT I

Enzymology: Introduction, General characteristics of enzymes, Activation energy, Coupled reactions, active site and its importance, Factors influencing catalytic efficiency. **Enzyme kinetics:** Rapid Equilibrium, Henry-Nucgaekkus-Menten's equations, Steady State approach, significance of K_m , Haldane equation, Velocity vital Substrate concentration curves. **Methods of plotting enzyme kinetics data:** Lineweaver-Burk, Hanes-Woolf, Woolf-Augustinsson-Hofstee, Eadsie-Scatchard; Advantages and disadvantages of the methods, Comparisons and applications; Integrated form of the Henry-Michaelis-Menten equation.

UNIT II

Equilibrium dialysis, Scatchard plot for equilibrium binding, Effect of pH on enzyme stability and activity, Effect of temperature on enzyme stability, Arrhenius equation. Formation of E.S covalent intermediates, transient kinetics, flow techniques (continuous, stopped, quenched), Temp-Jump. **General mechanistic principles:** Role of proximity effect, bound distortion, multistep catalysis, bi-functional catalysis and solvent effects.

UNIT III

Enzyme Inhibition: Models and types of inhibition. **Regulation of enzyme activity:** Feedback inhibition, reversible covalent modification, irreversible covalent modification, allosteric concept, Aspartate transcarbamylase, ligand-protein interaction, scatchard plot, Hill plot, cooperativity index, Models for allostery (MWC, KNF), Half site reactivity.

UNIT IV

Applied enzymology: Application of enzymes in analytical labs (clinical and industrial), enzymes as industrial catalysts, Immobilized enzymes, enzyme electrodes, assay of enzyme activities for diagnostic purposes, abzymes, recent developments.

UNIT V

Techniques: X-ray Crystallography. Chemiluminescence & Phosphorescence. Hydrodynamic methods, Centrifugation Sedimentation, partial specific volume and diffusion co-efficient, Viscosity. Protein purification & Chromatography: Gel filtration, ion-exchange, hydrophobic interaction chromatography, hydroxyapatite and affinity chromatography, FPLC HPLC. Molecular spectroscopy, IR, ESR, FRET, Biomolecular fluorescence complementation assay. Mass spectrometry. Radioisotope and their use in biology, autoradiography, radioactive labeling of biological macromolecules.

Texts/References

1. *Enzyme Kinetics and Mechanism* by P. F. Cook, W.W. Cleland. Garland Science Publishing, London, England and New York, USA, 2007.
2. *Biocatalysts and Enzyme Technology* by K. Buchholz, V. Kasche, U.T. Bornscheuer., Wiley-VCH, Weinheim, Germany, 2005.
3. *Enzymes: Biochemistry, Biotechnology, Clinical Chemistry* by Trevor Palmer Horwood Publishing House, Chichester, England, 2001.
4. *Biochemical Calculations* by Irwin Segel., John Wiley and Sons, California, USA, 2004.
5. *Biocatalysis – Fundamentals and Applications* by A.S. Bommarius, B.R. Riebel, Wiley-VCH, Weinheim, Germany, 2004.

Course Outcomes:

After completing the course, students will be able to understand:

1. Basic Enzymology
2. Enzyme kinetics and inhibitions
3. Catalytic mechanisms and regulation,
4. Industrial applications of enzymes and extremozymes
5. Applications of enzymes in health care
6. Techniques used in biochemistry

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
IPR & BIOSAFETY	MMB-204	M.Sc. - MICROBIOLOGY	YES	NA	NA	2017

Detailed syllabus

Unit I <i>Introduction to Intellectual Property</i> Types of IP: Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications, Protection of New GMOs; International framework for the protection of IP as a factor in R&D; IPs of relevance to Biotechnology and few Case Studies; Introduction to History of GATT, WTO, WIPO and TRIPS
Unit II <i>Concept of ‘prior art’</i> Invention in context of “prior art”; Patent databases; Searching International Databases; Country-wise patent searches (USPTO, EPO, India etc.); Analysis and report formation
Unit III <i>Basics of Patents</i> Types of patents; Indian Patent Act 1970; Recent Amendments; Filing of a patent application; Precautions before patenting-disclosure/non-disclosure; WIPO Treaties; Budapest Treaty; PCT and Implications; Role of a Country Patent Office; Procedure for filing a PCT application
Unit IV <i>Patent filing and Infringement</i> Patent application- forms and guidelines, fee structure, time frames; Types of patent applications: provisional and complete specifications; PCT and convention patent applications; International patenting-requirement, procedures and costs; Financial assistance for patenting-introduction to existing schemes; Publication of patents-gazette of India, status in Europe and US Patenting by research students, lecturers and scientists-University/organizational rules in India and abroad, credit sharing by workers, financial incentives Patent infringement- meaning, scope, litigation, case studies and examples
Unit V <i>Biosafety</i> Introduction; Historical Background; Introduction to Biological Safety Cabinets; Primary Containment for Biohazards; Biosafety Levels; Biosafety Levels of Specific Microorganisms; Recommended Biosafety Levels for Infectious Agents and Infected Animals; Biosafety guidelines - Government of India; Definition of GMOs & LMOs; Roles of Institutional Biosafety Committee, RCGM, GEAC etc. for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication; Overview of National Regulations and relevant International Agreements including Cartagena Protocol.

Important Links for reference:

<http://www.w3.org/IPR/>

<http://www.wipo.int/portal/index.html.en>

http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html www.patentoffice.nic.in

www.iprlawindia.org/ - 31k - Cached - Similar page

<http://www.cbd.int/biosafety/background.shtml>

<http://www.cdc.gov/OD/ohs/symp5/jyrtext.htm>

<http://web.princeton.edu/sites/ehs/biosafety/biosafetypage/section3.html>

Text/References

1. The law and strategy of Biotechnological patents by Sibley. Butterworth publications.
2. Intellectual property rights – Ganguli – Tata McGrawhill
3. Intellectual property right – Wattal – Oxford Publishing House.

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. Students will gain knowledge about the basics of the four primary forms of intellectual property rights, the right of ownership, scope of protection as well as the ways to create and to extract value from IP. Students will be able to compare and contrast the different forms of intellectual property protection in terms of their key differences and similarities. |
| 2. Students will gain knowledge to analyze the effects of intellectual property rights on society as a whole. |
| 3. This course will provide complete package to the students to identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautionary steps to be taken to prevent infringement of proprietary rights in products and technology development |

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
MICROBIAL GENETICS	MMB-303	M.Sc. - MICROBIOLOGY	YES	NA	NA	2017

Unit-1

Bacterial mutants and mutations Isolation; Useful phenotypes (auxotrophic, conditional, lethal, resistant); Mutation rate; Types of mutations(base pair changes; frameshift; insertions; deletions; tandem duplication); Reversion vs. suppression; Mutagenic agents; Mechanisms of mutagenesis; Assay of mutagenic agents (Ames test) Gene transfer in bacteria History; Transduction – generalized and specialized; Conjugation – F, F', Hfr; F transfer; Hfr-mediated chromosome transfer; Transformation – natural and artificial transformation; Merodiploid generation; Gene mapping; Transposable genetic elements; Insertion sequences; Composite and Complex transposons; Replicative and non-replicative transposition; Genetic analysis using transposons.

Unit-2

Bacteriophages and Plasmids Bacteriophage–structure; Assay; Lambda phage – genetic map, lysogenic and lytic cycles; Gene regulation; Filamentous phages such as M13; Plasmids – natural plasmids; their properties and phenotypes; Plasmid biology - copy number and its control; Incompatibility; Plasmid survival strategies; Antibiotic resistance markers on plasmids (mechanism of action and resistance); Genetic analysis using phage and plasmid **Restriction-modification systems** History; Types of systems and their characteristics; Methylation-dependent restriction systems; applications.

Unit-3

Mendelian Genetics Introduction to human genetics; Background and history; Types of genetic diseases; Role of genetics in medicine; Human pedigrees; Patterns of single gene inheritance-autosomal recessive; Autosomal dominant; X linked inheritance; Complicating factors - incomplete penetrance; variable expression; Multiple alleles; Co dominance; Sex influenced expression; Hemoglobinopathies - Genetic disorders of hemoglobin and their diseases. **Non Mendelian inheritance patterns** Mitochondrial inheritance; Genomic imprinting; Lyon hypothesis; isodisomy; Complex inheritance-genetic. Heritability; Twin studies; Behavioral traits; Analysis of quantitative and qualitative traits

Unit-4

Cytogenetics Cell division and errors in cell division; Non disjunction; Structural and numerical chromosomal abnormalities – deletion; duplication; translocation; Sex determination; Role of Y chromosome; Genetic recombination; Disorders of sex chromosomes and autosomes; Molecular cytogenetics – Fluorescence In Situ Hybridization (FISH); Comparative Genomic Hybridization (CGH). **Developmental genetics** Genes in early development; Maternal effect genes; Pattern formation genes; Homeotic genes; Signaling and adhesion molecules. **Immunogenetics** Major histocompatibility complex; Immunoglobulin genes - tissue antigen and organ transplantation; Single gene disorders of immune system.

Unit-5

Genetic variation Mutations; kinds of mutation; agents of mutation; genome polymorphism; uses of polymorphism. **Gene mapping and human genome project** Physical mapping; linkage and association **Population genetics and evolution** Phenotype; Genotype; Gene frequency; Hardy Weinberg law; Factors distinguishing Hardy Weinberg equilibrium; Mutation selection; Migration; Gene flow; Genetic drift; Human genetic diversity; Origin of major human groups.

Text and Reference Books

1. S.R. Maloy, J.E. Cronan, D. Friefelder, Microbial Genetics, 2nd Edition, Jones and Bartlett Publishers, 1994.
2. N. Trun and J. Trempey, Fundamental Bacterial Genetics, Blackwell publishing, 2004.

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| 3. Strachan T and Read A P, Human molecular genetics, 3rd Edition Wiley Bios, 2006. |
| 4. Mange E J and Mange A. P., Human genetics, 2nd Edition, Sinauer Associates publications, 1999. |

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. Understand basics of genetics by experiencing the experimentation used by Mendel. |
| 2. Analyze the bacterial transformation and gene transfer. |
| 3. Understand the importance of mutation and how the mutation can be fruitful for the human kind. |
| 4. Understand the principle of cytogenetics and learn different kind of genetic disorders. |
| 5. Will learn how gene function can be judged, importance of human genome project. |
| 6. Will analyze and learn to determine the changes in genes in population genetics. |

Name of the Course	Course Code	Name of the Program	Focus on Employability	Focus on Entrepreneurship	Focus on Skill development	Year of introduction
BIOINFORMATICS	MMB-304	M.Sc. - MICROBIOLOGY	NA	YES	NA	2017

Detailed Syllabus

Unit-1

Introduction to computers and bioinformatics- Types of operating systems, concepts of networking and remote login, basic fundamentals of working with unix. **Biological databases-** Introduction to NCBI, NCBI data bases, BLAST, BLASTn, BLASTp, PSI-BLAST, modes of database search, mode of data storage (Flat file format, db-tables), flatfile formats of GenBank, EMBL, DDBJ, PDB. Sequence alignment –Concept of local and global sequence alignment, Pairwise sequence alignment, scoring alignment, substitution matrices, multiple sequence alignment, Primer designing.

Unit-2

Phylogenetic analysis- Basic concepts of phylogenetic analysis, rooted/uprooted trees, approach for phylogenetic tree construction (UPGMA, Neighbor joining, Maximum parsimony, Maximum likelihood). Cluster analysis; Phylogenetic clustering by simple matching coefficients; Sequence Comparison; Sequence pattern; Regular expression based pattern; Theory of profiles and their use in sequence analysis; Markov models; Concept of HMMS; Baum-Welch algorithm; Use of profile HMM for protein family classification; Pattern recognition methods.

Unit-3

Generation and analysis of high throughput sequence data- Assembly pipeline for clustering of HTGS data, format of “.ace” file, quality assessment of genomic assemblies, International norms for sequence data quality, Clustering of EST sequences, concept of Unigene.

Annotation procedures for high through-put sequence data- Identification of various genomic elements (protein coding genes, repeat elements, strategies for annotation of whole genome, functional annotation of EST clusters, gene ontology (GO) consortium

Unit-4

Structure predictions for nucleic acids and proteins- Approaches for the prediction of RNA secondary and tertiary predictions, energy minimization and base covariance models, Basic approaches for protein structure predictions, comparative modeling, fold recognition/threading and ab-initio prediction.

Text and Reference Books

1. *Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins* by Baxevanis A.D. and Ouellette, Third Edition. John Wiley and Son Inc., 2005.
2. *Bioinformatics Sequence and Genome Analysis* by Mount D.W., CSHL Press, 2004.
3. *Introduction to Bioinformatics* by Tramontano A., Chapman & Hall/CRC, 2007.
4. *Understanding Bioinformatics* by Zvelebil, M. and Baum, Chapman & Hall/CRC, 2008.

Course Outcomes:

After completing the course, students will be able to:

1. Understand the importance of bioinformatics and the computational techniques.
2. Analyze the sequencing data generated and available in the databases and to interpret these Results.
3. Identify the important mathematical models and techniques for biological data analysis
4. Understand importance of techniques for structure and function prediction of proteins and genes.
5. Understand the nucleic acid and protein structure prediction tools
6. Understand the genome annotation methods and some of the techniques.

CSH 101: Computer Fundamentals

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-requisites: Fundamentals of IT and Computer Language

Course Objectives:

1. Define the computer, generations ,classification and basic concepts of computer
2. To discussed and solve the binary number and codes like BCD EBDIC
3. Describe the important computer system resources and the role of operating system in their management policies and algorithms
4. Introduction to MS words and various functions and how to work
5. Introduction to MS excel and various elementary functions using tools
6. To add basic objects and design elements to presentations

Detailed Syllabus

Unit-1

Introduction to Computer Fundamentals: Introduction to Computer , Block Diagram of Computer, Generation of Computers, Classifications of computers, Computer Memory, Input and Output Devices. Computer Virus, Types of Viruses, Computer languages: Machine, Assembly and High level language, Assembler, Compiler and interpreter, Algorithms and flow chart.

Unit-2

Number System: Number System: Binary, Octal, Decimal, and Hexadecimal representation of Characters: ASCII and EBDIC codes.

Unit-3

Basics of Operating System: Definition of Operating System, Functions of Operating Systems Working with Windows Operating System: Introduction, The Desktop, Structure of Windows, Windows Explorer, File and Folder Operations, The Search, The Recycle Bin, Configuring the Screen, Adding or Removing New Programs using Control Panel, Applications in windows (Paint, Notepad, WordPad, Calculator), Comparison of DOS and Windows, Basic DOS Commands..

Unit-4

MS-Office: Introduction to MS-Office and its integrated nature-MS-Word: Starting Word, new documents, entering text, changing text, aligning, underlining, and justifying text. Tables – creation, adding rows and columns, splitting, and combining cells, Borders. Saving, closing, and operating documents, Adding headers and footers.

Unit-5

MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and Its Components, Elementary Working with MS-Excel.

Unit-6

MS-Power Point: Introduction, Starting MS-PowerPoint, Basic concept of presentation software. Standard toolbar, formatting toolbar, and drawing toolbars in Power Point and their use. Creating and opening a presentation. Use of slide sorter, adding header/footer. Use of animation features. Inserting pictures, resizing pictures. Inserting organization chart. Use of auto content wizard.

Text and Reference Books

1. Computer Fundamentals, P.K. Sinha, BPB Publication, November, 2004.
2. Computer Fundamental and Concepts, V. Raja Raman, PHI, 4 th Edition, January 2010.
3. Go! With Microsoft Office 2010, Shelly Gaskin et.al., Volume 1, 2nd Edition

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Bridge the fundamental concepts of computers with the present level of knowledge of the students |
| 2. To understand binary, Octal, Hexadecimal and their Arithmetic |
| 3. To understand the main components of an OS & their functions |
| 4. Students will create documents that demonstrate proficiency in the use of word processing, |
| 5. Students will create documents that demonstrate proficiency in the use of Spreadsheets, |
| 6. Students will create documents that demonstrate proficiency in the use of presentation applications. |

CSH102: Programming Using C

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Boolean Algebra, Number System and basic mathematical formulas

Course Objectives:

1. To develop the programming skills of students
2. To know the principles of designing structured programs
3. To write basic C programs using
 - i) Selection statements
 - ii) Repetitive statements
 - iii) Functions
 - iv) Pointers
 - v) Arrays
 - vi) String
 - vii) File handling

Detailed Syllabus

UNIT I (8 Hours)

Introduction & Basic Concepts of 'C' Programming Language: History of 'C' Programming, Assembly language, Machine Language, Editors, Translators (Compiler, Interpreter, Assembler), Programming Rules, Algorithm, Flowcharts, Structure of C program, Executing the C program. C Character Set, C Keywords/Reserve words, Identifiers, Rules to form an Identifier, Variables, Constants, Types of Constant(Numeric, Character, String, Symbolic), Comments in C, Data types in C, Operators- Types of operators(Arithmetic, Relational, Logical, Unary, Assignment, Compound Assignment, sizeof(), Conditional/Ternary, Bitwise) , Precedence and Associativity, Comments, Concept of header files, Types of problems(Sequential, Selective & Repetitive).

UNIT II (10 Hours)

Introductions to Control structures: Control statements- if, if-else, if-else ladder, Nesting of if, break, continue, Switch statement, use of break and default with switch, goto, exit. Program Loops and Iteration: Loops/Iteration, types of loops, for, Nesting of for, while, do-while. Difference b/w while & do-while, break & exit, break & continue.

UNIT III (10 Hours)

Array, Structure and Union: Introductions to Arrays, Structures and Union: Array (Definition, Declaration, Initialization, characteristics), How to store values in an array, How to display values stored in an array, Sorting (Selection, Bubble, Insertion), Searching (Linear, Binary), Multidimensional arrays (Definition, Declaration, and Initialization), Pointers and arrays, Pointer and 2-d arrays, Pointer to an array, Array of Pointers, Dynamic memory allocation. Structure, Structure declaration, Declaration & Initialization of structure variable how to store values in a structure, how to access values of structure elements, Nesting of structures, Array of structure, Differentiate between array & structure, passing structure to function, passing array of structure to function, Structure pointer, Union

UNIT IV (10 Hours)

Functions and Macros: Function (Declaration, Definition, Calling), Function Prototype, types of function, return statement, function calling methods (Call by value, call by Reference), Storage Classes, Recursion. Macro, Macro Declaration, nesting of macros, Macros with argument, Diff between macro & function.

UNIT V (8 Hours)

Strings:Strings-Definition, declaration and initialization of strings, standard library functions: strlen(), strcpy(), strcat(), strcmp(), etc. Pointer and Strings, Two Dimensional array of characters, Array of Pointers to String.

UNIT VI (10 Hours)

File Handling: File, File operations, Opening and Closing Files, File opening modes, Reading and Writing a data file, Text files Vs Binary files, Command Line Arguments(argc,argv), sprintf() & sscanf(), gets() & puts(), fgetc() & fputc(), fseek() & ftell().

Text and Reference Books

1. Rajaraman V. Fundamental of Computers
2. Ram B. Computer Fundamentals, New Age International
3. Kerninghan B.W. & Ritchie D.M. - The C Programming Language
4. Gottfried - Programming with C Schaum
5. Kanetkar Y. - Let us C
6. Balaguruswamy - Programming in C

Course Outcomes:

1. Understanding the concept and recognize the basic terminology used in computer programming.
2. Write, Compile and Debug programs in C language and use different data types for writing the programs.
3. Design programs connecting decision structures, loops and functions.
4. Understand normal and abnormal combustion phenomena in SI and CI engines
5. Understand the dynamic behavior of memory by the use of pointers
6. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

CSH 103 Digital Electronics and Applications

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Basic knowledge of Physics of 10+2 standard.

Course Objectives:

1. To describe various types of Number System, basic electronic components and hardware components of computer system.
2. To understand the concept of Boolean algebra, types of digital circuits, memories, addressing modes and I/O interface.
3. To solve problems related to number system conversions and calculation of binary codes.
4. To implement basic Boolean expressions using different Digital Electronic device.
5. To distinguish between types of digital circuit.
6. To design digital circuits for a particular functions using basic electronic components.

Detailed Syllabus

UNIT 1

Introduction- Digital versus Analog Signals, Electrical versus Electronics.

Number System and Codes - Concept of number system bases – binary, octal, decimal and hexadecimal number systems and conversion between each, BCD, Excess-3, Gray Code, and Weighted Codes.

UNIT- II

Binary Arithmetic- Binary Addition and Subtraction. Complements and Subtraction using complements, Multiplication.

Boolean Algebra- Truth table, Boolean operators and precedence, Boolean laws, De-Morgan's Theorem, Principle of Duality, SOP and POS, Conversion from SOP to POS and vice versa, Canonical and standard forms. Reduction of expressions using Boolean laws and K-Map.

UNIT- III

Logic Gates- Primary and Secondary Logic Gates, Designing of circuits using gates, Universal Gates, Implementation of circuits using NAND and NOR.

UNIT- IV

Combinational Circuits- Half and Full Adder/Subtractor, Look-Ahead Carry Adder, Multiplexer, Demultiplexer, Encoder, Decoder and code-converter. Implementation using MUX and decoder.

UNIT- V

Sequential Circuits- Latch, Flip-flop, Edge triggered flip-flop, RS flip-flop, J-K flip-flop D-type flip-flop, T flip-flop Excitation table and characteristic equation of flip-flops, Counters.

UNIT- VI

Memory- General Memory Operation, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM.

Text and Reference Books

1. Digital Logic & computer Design, M. Morris Mano, PHI, 2004.
2. Computer System Architecture, M. Morris Mano, PHI, 2004.
3. Computer Organization, Hamachar, Vranesic, McGrawHill, 5th Edition.
4. Computer Organization & Architecture, W. Stallings, PHI, 6th Edition.

Course Outcomes:

1. Differentiate between analog and digital circuits as well as electrical and electronics.
2. Perform number system conversion.
3. Find solution of binary arithmetic problem and understand Boolean algebra.
4. Implement any given Boolean expression using MUX, Decoder as well as Logic Gates.
5. Discrimination among various kind of memory devices with their need.

BPC 101: Professional Communication I

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Presentation – 15 Marks Viva-Voce- 15 Marks Unit test-20 Marks End Semester Exam – 50 marks
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Prerequisite: - English Grammar of 10+2 standard.

Course Objectives:

1. To understand the concepts, process and importance of communication.
2. To equip students with Oral and written communication skills.
3. To enhance their communication skills in real life situations.
4. To develop awareness regarding appropriate communication strategies.
5. To encourage students by developing their critical thinking through activities.
6. To assist students with employability and job search skills.

Detailed Syllabus

Unit-1 Learning English: Subject Verb Agreement and Tenses: One-word substitution: Jumbled Sentences. Activities: Framing of Sentences, Greetings, Introducing oneself, Invitation, Making Request, Expressing Gratitude, Complimenting and Congratulating.
Unit-2 Learning Through Literature: Sultana's Dream by Rokeya Sakhawat Hussain, The Eyes are not here by Ruskin bond, The Renunciation By Rabindranath Tagore, The Capital of the World by Ernest Hemingway. Poetry: Where the mind is without fear by Rabindranath Tagore; Road not Taken by Robert frost. Activities: Framing of Sentences, Reading, Narration, Dialogue writing, Reading Comprehension, Role play.
Unit-3 Introduction to Communication: Types of communication, Barriers to Communication, and Principles of effective communication. Activities: Role Play, Extempore, Presentation.
Unit-4 Writing skills: Comprehension Chapters 1-4 from Oxford Remedial English Book 1. Activities: Application regarding attendance, Fee extension, Fine-remit, leave application, Requisitions. Writing paragraph on current topics.
Unit-5 Listening skills and speaking skills: Communication Lab activities: Situations based role play, Debate, Profile of famous personalities. Activities: Role Play, Essay writing, one animation Movie and one documentary.
Unit-6 Presentations

Text and Reference Books

1. Business Communication, Bovee & Thill, McGraw Hill, fifth edition, 2007.
2. Business Communication, Raymond V. Lesikar, McGraw Hill, 7th edition, 2009.
3. Business Communication Strategies, Matthukutty Monippally, Tata McGraw Hill.
4. An Anthology of English Essays, edited by R.P Singh, Oxford University Press.
5. An Anthology of English short Stories, edited by R.P Singh.
6. A Remedial Course in English for colleges, Central Institute of English and Foreign Languages, Book 1, Book 2, Book 3.
7. Soft Skills, Dr.K.Alex, S.Chand 8. Basic English Usage, Michael Swan, Oxford Indian Edition.

Course Outcomes:

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|---|
| 1. Understand the process of communication and its effect on giving and receiving information. |
| 2. Demonstrate his/her ability to speak or write error free while making an optimum use of correct business vocabulary and grammar. |
| 3. Apply effective communication skills in a variety of public and interpersonal settings. |
| 4. To draft effective correspondence with brevity and clarity. |
| 5. Demonstrate his verbal and nonverbal communication ability through presentations. |
| 6. Become aware the numerous carrier opportunities within the fields of communication. |

CSH202: Operating System using UNIX

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - DOS, Microprocessor peripherals and interfacing

Course Objectives:

1. Define and list the functions of an operating system.
2. list resources involved in process creation and management.
3. Explain the use of paging and segmentation
4. Explain the function and structure of the I/O system.
5. Describe path names and directory structure visible to end users
6. To familiarize the students with the Operating System.
7. To demonstrate the process, memory, file and directory management issues under the UNIX operating system.
8. To introduce UNIX basic commands.
9. To make students how to make simple programs in UNIX and administrative task of UNIX.

Detailed Syllabus

UNIT I (8 Hours)

Introduction: Operating System, Operating System Services & Functions. Simple Batch Systems, Multiprogrammed Batched Systems, Time Sharing Systems, Real-Time Systems. **Process:** Process Concept, Process Scheduling, CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms with examples.

UNIT II (8 Hours)

Process Communication and Synchronization: Co-operating Process, Inter-process communication, Threads (Thread Concept, Single and Multiple Threads, Benefits). Introduction to process synchronization, Critical Section Problem.

UNIT III (8 Hours)

Deadlock: Deadlocks: Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT IV (16 Hours)

Introduction to UNIX: features of UNIX, Shell Vs Kernel, types of shell, System Calls, System calls Vs Library functions, UNIX file System, The Parent-Child Relationship, Orphan, Zombie, UNIX Architecture, **UNIX Commands**. The first faltering step(Login), Password, Password Ageing, files related commands, Symbolic links, Listing Files & directories, Hidden files, Shell Meta characters, **Masking file permission, Changing file permission(Absolute & Symbolic mode), Sticky bit, Directory related commands**, Best calculator.

UNIT V (10 Hours)

The UNIX file system **INODE Table, Disk related commands, File related commands, Filters, I/O redirection & Piping, Command substitution**. **Process** basic, process status, Mechanism of process creation, **Job Control, background processes, Killing a process, Daemon, Changing process priorities, Scheduling a process.**

UNIT VI (6 Hours)

System Administration in UNIX- the System administrator's login, the administrator's privileges, Adding & Removing groups, user's management, Booting & Shutdown, Making a file system, Mounting & Unmounting File system.

Text and Reference Books

1. Operating System concepts, A. Silberschatz, Peter B. Galvin, Addison Wesley publishing Company, 6th Edition
2. UNIX shell programming By Yashvant Kanetkar ---BPB Publications
3. UNIX Concepts and Application By Sumitabha Das--- Tata McGraw-Hill publication
4. The C Odyssey UNIX the open boundless C By Meeta Gandhi--- BPB Publications

Course Outcomes:

- | |
|--|
| 1. Differentiate between multiprocessing, multiprogramming, and multitasking. |
| 2. Differentiate between programs, processes and threads. |
| 3. Knowledge about working environment in UNIX. |
| 4. Knowledge about the UNIX commands to perform different tasks. |
| 5. Difference between DOS and UNIX environment. |
| 6. Create or design different scripts using shell programming. |
| 7. Implement process, thread, semaphore concept of operating system |
| 8. Responsibilities and duties of a system administrator along with the knowledge how to grant permission to users, create user account etc. |

CSH 204: Data Structure Using C

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the fundamentals of C or other programming language
2. A solid background in mathematics, including probability, set theory

Course Objectives:

1. To learn the basics of abstract data types.
2. To learn the principles of linear and nonlinear data structures.
3. To build an application using sorting and searching.

Detailed Syllabus

UNIT I (10 Hours)

Introduction Data Structure: Introduction to Data Structure, Classification of data Structure, Operation on data structure, Top down and Bottom-up approaches to algorithm, Analysis of algorithm, Frequency count, Complexity measures in terms of time and space.

UNIT II (10 Hours)

Arrays: Representation of array (single & multi dimensional arrays), Traversing, insertion and deletion operations. Merging, matrix addition, subtraction, multiplication, transpose, sparse matrix

UNIT III (10 Hours)

Stacks: Introduction to stack, primitive operation on stack, Stacks application: Infix, post fix, Prefix and Recursion.

Queues: Introduction to queues, Primitive Operations on the Queues, Circular queue, Dequeue, Priority queue, Applications of queue.

UNIT IV (10 Hours)

Linked List: Introduction to the Linked List, Basic operations on linked list, Header nodes, Doubly Linked List, Circular Linked List, and Application of Linked List.

UNIT V (6 Hours)

Trees: Basic Terminology, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Application of Binary tree, Threaded binary tree, Heap Tree, B-tree & Height balanced tree.

UNIT VI (10 Hours)

Searching and Sorting: Sequential search & binary search, Hashing, sorting method (Insertion sort, Selection sort, Bubble sort, Quick sort, Merge sort, Heap sort).

Text and Reference Books

1. Data Structures and Program Design in C, R.L. Kruse, B.P. Leung and C. L. Tondo, PHI, 2008.
2. Data Structures, Seymour Lipschutz, McGraw Hill Publication, 2009
3. Data structures using C, Aaron M.Tenanbaum, Pearson education, 2004.
4. Data structure through C, Yashvant Kanetkar, BPB Publication, 2006.

Course Outcomes:

1. Solving problems and simulate the insertion and deletion by using DS methods.
2. Understanding the concept and recognize the basic terminology used in computer programming.
3. Write, Compile and Debug programs in C language and use different data types for writing the programs.
4. Design programs connecting decision structures, loops and functions.
5. Understand the dynamic behavior of memory by the use of pointers
6. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

CSH 301: Relational Database Management Systems

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Computer Organization, Operating System, Data Structure, Mathematics

Course Objectives:

1. Understand values of Data.
2. Understand significant role of DBMS.
3. Understand need for normalizing a Database.
4. Understand problems with unnecessary duplication of data.
5. Understand concepts of transaction
6. Understand concepts of concurrent transactions

Detailed Syllabus:

Unit-1

Introduction to Database System: DBMS Definition, Characteristics of DBMS, Application and advantages of DBMS, Instances, Schemas and Database States, Three Levels of Architecture, Data Independence, DBMS languages, Data Dictionary, Database Users, Data Administrators.

Unit-2

Data Models: Data Models, types and their comparison, Entity Relationship Model, Entity Types, Entity Sets, Attributes and its types, Keys, E-R Diagram, Data Integrity, RDBMS: Concept, Components and Codd's rules.

Unit-3

Relational Databases: Introduction to Relational Databases and Terminology-Relation, Tuple, Attribute, Cardinality, Degree, Domain. Keys, Super Key, Candidate Key, Primary Key, Foreign Key, Relational Algebra. Operations, Select, Project, Union, Difference, Intersection Cartesian product, Join, Natural Join.

Unit-4

Structured Query Language (SQL): Introduction to SQL, History of SQL, Basic Structure, DDL Commands, DML Commands, TCL Commands, Simple Queries, Nested Queries, Join queries, semi-join queries, self-join. Aggregate Functions and Clauses.

Unit-5

Relational Database Design: Introduction to Relational Database Design, DBMS vs RDBMS.

Unit-6

Normalization: Anomalies of un-normalized database, Need of Normalization, Normal Forms-1NF, 2NF, 3NF, BCNF and functional dependency.

Text and Reference Books

1. Database System Concepts, Henry Korth, A. Silberschatz, 5th Edition, 2005.
2. An Introduction to Database System, Bipin Desai, Galgotia Publications, 1991.
3. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB Publications, 4th Edition.
4. Schaum's Outline of "Fundamental of Relational Databases", Ramon A. Mata, Pauline K. Cushman, McGraw Hill, December, 2006.

Course Outcomes:

After completing the course, students will be able to:

1. Differentiate between multiprocessing, multiprogramming, and multitasking.
2. Differentiate between programs, processes and threads.
3. Apply segmentation and paging techniques.
4. Compare file naming in Linux and Windows.
5. Awareness of various Operating System

CSH302: OOPs using C++

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Unit Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Basics of c language

Course Objectives:

1. Understand fundamentals of object-oriented programming in C++.
2. Have the ability to write a computer program to solve specified problems.
3. Be able to explain the difference between object oriented programming and procedural programming.
4. Be able to program using more advanced C++ features
5. Be able to build C++ classes using appropriate encapsulation and design principles.
6. Improve problem solving skills

Detailed Syllabus

UNIT I

Introduction to OOP: Basic concepts of OOPs, Advantages of OOP, Need of object-oriented programming, characteristics of object-oriented languages, Object oriented approach vs procedure oriented approach, Object, Classes, Encapsulation, Data Abstraction, Inheritance, Polymorphism, Dynamic binding, Message Passing, Application of OOPs.

UNIT II

C++ Programming Basics: Language Fundamentals-Character set, Keywords, Identifiers, Variables, Constant, Data Types, and Comments. Operators in C++, Operator Precedence - Types of operators, Precedence and Associativity. Type Conversion, Statement and types of statements. Difference between C++ and C. Basic program construction, input/output using cin/count; manipulators

UNIT III

Control Statements: Conditional expressions, loop statements, breaking and control statements. Arrays-Notation, Declaration, Initialization, Processing.

UNIT IV

Functions: Simple functions, Function Prototyping, Call by reference, Return by Reference, Default Arguments, Constant Arguments, Inline Function, functions overloading, static function.

UNIT V

Classes and Objects: Introduction, structure and classes, declaration of class, defining the object of a class, accessing a member of class, arrays of class objects, Constructors, Destructors, friend function, Dynamic memory allocation. Constructors and Destructors, objects as function arguments, static class member.

UNIT VI

Inheritance: Introduction, defining derived classes, overriding member functions, Single Inheritance, multilevel Inheritance, multiple Inheritance, Hierarchical Inheritance, Virtual Base Class. Operator Overloading: Overloading Unary & Binary operators, Data conversion.

Text and Reference Books

1. Object Oriented Programming with C++, E. Balaguruswamy, 4th Edition.
2. Object Oriented Programming in C++, Robert Lafore, Sams, Dec., 2001.
3. C++ Programming, D. Ravichandran, TMH, 2nd Edition, Dec. 2002.
4. Mastering C++, Venugopal, TMH, September, 1997.
5. Object Oriented Programming using C++ , Joyce Farrell, Cengage Learning India Pvt. Ltd., 6th Edition.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. |
| 2. Understand dynamic memory management techniques using pointers, constructors, destructors, etc |
| 3. Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. |
| 4. Implement abstraction level programming using inheritance |
| 5. Design modular programs. |
| 6. Apply good programming style and understand the impact of style on developing and maintaining programs. |
| 7. Design object oriented solutions for small systems involving multiple objects. |

CSH 303: Computer Networking

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite :-

1. Familiarity with the fundamentals of Digital Electronics.
2. A network simulation method

Course Objectives:

1. To learn the basics of topology.
2. To learn the principles of Inter Networking.
3. To build an application using Network Simulator.

Detailed Syllabus

UNIT-I (10 Hours)

Introduction to Computer Networks: Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.

UNIT-II (6 Hours)

Physical Layer: Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise,. Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching methods, integrated services digital networks.

UNIT-III (10 Hours)

Medium Access sub layer: Channel Allocations, LAN protocols -ALOHA protocols, Collision free Protocols-Token Passing, IEEE standards, Ethernet and Token Ring. Data Link Layer: Framing, Error detection and correction codes: checksum, CRC, hamming code, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ,

UNIT-IV (10 Hours)

Network Layer: Point-to Point networks, Routing algorithms, Congestion control algorithms, Internetworking Devices, IP protocol, IP addresses: IPv4 classful and classless addressing, Introduction to IPv6.

UNIT-V (10 Hours)

Transport Layer: Connection management: Three-way Handshaking. Introduction of User Datagram Protocol (UDP), Basics of Transmission Control Protocol. (TCP).

UNIT- VI (10 Hours)

Application Layer: File Transfer Protocol, Domain Name System, Electronic mail, Intro of Client server model, Hyper Text Transfer Protocol, WWW, Example Networks - Internet and Public Networks

Text and Reference Books

1. Computer Networks, A. S Tanenbaum, Pearson education, 4th Edition.
2. Data and Computer Communication, W. Stallings, Macmillan Press, 7th Edition
3. Data Communication & Networking, 4th Edition, Tata McGraw Hill. By Behrouz A. Forouzan.
4. Computer Networking, 3rd Edition, Pearson Education by James F. Kurose and Keith W. Ross

Course Outcomes:

- | |
|---|
| 1.Explain and demonstrate the mechanics associated with IP addressing, device interface, association between physical and logical addressing, subnetting and supernetting |
| 2.Understand the techniques and protocols used (DSL, SONET, ATM). |
| 3.Know the principles of congestion control and trade-offs in fairness and efficiency |
| 4.Distinguish between analog and digital signals and understand their characteristics (Fourier representation, signal corruption). |

CSH 304 System Analysis And Design

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - Innovative Thinking, Enthusiasm to learn Management concepts.

Course Objectives:

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, processes are conducted in a software project.
4. To gain knowledge on Implementation, Testing and Maintenance processes are conducted in a software project.
5. To understand how to build a system.

Detailed Syllabus:

Unit-1 System definition, Characteristics and Types, System Development Life Cycle: Problem Identification, Feasibility Analysis, Design, Implementation, Post Implementation and maintenance. Role of system analyst, Case Study.
Unit-2 Traditional Methods for Determining Requirement: Information Gathering Tools: Review of literature, Interviews and Questionnaires, Types of Interviews and Questionnaires. Modern Methods for Determining Requirement: Joint Application design.
Unit-3 Feasibility Study: Steps in Feasibility Analysis, Feasibility Report. Structured Analysis, Data Flow Diagram , Process Modeling, DFD Rules, Decomposition of DFD, Balancing DFD. Data Dictionary, Logical Modeling: Decision Tree , Structures English, Decision Table . Case study for use of DFD .
Unit-4 Introduction of Cost/ Benefit Analysis: Cost and Benefit categories. Entity Relationship Diagrams: Entities, Attributes, Candidate Key, Cardinalities. The Process of Design: Logical and physical design, Structured Walkthrough, Input, Output and Form design.
Unit-5 Introduction of System Testing, Test data, Test Plan: Activity network for system testing, Types of System Test, Quality Assurance: Quality Factors Specifications, Levels of Quality Assurance.
Unit-6 System Implementation, User Training. Installation: Direct, parallel, Single Location, Phased. Post Implementation: Maintenance or Enhancement, Primary Activities of Maintenance Procedure. Introduction to System Security.

Text and Reference Books

1. System Analysis and Design - E.M.Awad 2001, Galgotia Publication Ltd.
2. Modern System Analysis and Design, Jeffrey A. Hoffer, 2001, Pearson Education.
3. System Analysis and Design Methods, Whitten, Bentley and Barlow, Galgotia Publication.
4. System Analysis and Design, Silver and Silver, Addison Wesley, Last Edition

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Identify the theoretical and methodological issues involved in modern software engineering project management |
| 2. Develop the transferable skills in logical analysis, communication and project management necessary for working within a team |
| 3. Translate a specification to a design, and identify the components to build the architecture for a given problem, using an appropriate software engineering methodology. |
| 4. Select and use project management frameworks that ensure successful outcomes. |
| 5. Develop software projects based on current technologies, by managing resources economically and keeping ethical values.. |

CSH402: Computer Graphics

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test – 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 Marks

Prerequisite: Linear Algebra, Matrix, and C-Programming.

Course Objectives:

Students will try to learn:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Detailed Syllabus:

Unit-1

Introduction to computer graphics: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Color CRT, Flat panel displays, Frame buffer and video controller, interactive input and output devices

Unit-2

Line drawing algorithms: DDA, Bresenham. **Circle generating algorithms:** Mid point circle generating algorithm, Bresenham circle generating algorithm.

Unit-3

2D Transformations: Definition of transformation, geometric and coordinate transformation, translation, rotation about origin, scaling, reflection transformations, Matrix representations and homogenous coordinates, Composite transformations.

Unit-4

Polygon Filling: Convex and concave polygons, scan line algorithm, boundary fill algorithm, flood fill algorithm. Two Dimensional Viewing: Viewing pipeline, Viewing transformations

Unit-5

Clipping: Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit-6

Three Dimensional: 3-D geometric primitives, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects.

Suggested Readings:

1. Computer Graphics-C Version, Donald Hearn, M. Pauline Baker, Pearson Education, 2007
2. Computer graphics, Schaum's outline, TMH, 2006.
3. Computer Graphics: A Programming Approach, Steven Harrington, TMH, 1984.
4. Computer Graphics Principles and Practice, James D Foley, Pearson education 2004.

Course Outcomes:

After completing the course, students will be able to:

1. Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
2. Have a knowledge and understanding of geometrical transformations and 3D viewing.
3. Have a knowledge and understanding of techniques for representing 3D geometrical objects.
4. Have a knowledge and understanding of interaction techniques.
5. Create interactive graphics applications.
6. Use C builds functions or equivalent graphics tools.
7. Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

CSH 403: E-Commerce

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Knowledge of computers.

Course Objectives:

1. To Identify and apply relevant problem solving methodologies.
2. To Design components, systems and/or processes to meet required specifications for a web presence.
3. To Demonstrate research skills.
4. To Communicate effectively in ways appropriate to the discipline, audience and purpose.
5. To Work as an effective member or leader of diverse teams within a multi-level, multi-disciplinary and multi-cultural setting for the Group Website Research Project.
6. To Appreciate ethical implications of professional practice.

Detailed Syllabus

Unit-1

Introduction of E-Commerce : Definition of E- Commerce, Advantages and Disadvantages, Traditional Commerce, Basic Requirements of E-Commerce, Architectural framework, Impact of E-commerce on business, Technology and Prospects, Electronic Commerce framework, Economic potential of Electronic Commerce, Concepts b2b, b2c, c2c, b2g, g2h, g2c.

Unit-2

Electronic Commerce: Network infrastructure: Local area networks, Ethernet LAN, Wide area networks, Internet, TCP/IP reference model, Domain Name Systems, Internet Industry structure.

Unit-3

Mobile Commerce: Introduction, Mobile computing Framework, Wireless Application Protocol, WAP Technology, Mobile Information access device, Mobile Computing Applications, Bluetooth, Personal Communication Service [PCS]. **Case Studies of leading E-Commerce Companies: FLIPKART, AMAZON, EBAY.**

Unit-4

Electronic Payments: E-Payment System, Digital Tokens, Smart card, credit card, E-Checks, Credit/Debit card based EPS, online Banking. Payment Gateway, the SET Protocol, Certificate. EDI Application in Business, EDI S/W Implement, E- Commerce Law, Forms of Agreement, **Govt. policies and Agenda.**

Unit-5

Web Security: Security Issues on Web, Importance of Firewall, Components of Firewall, and Transaction security, **Client Server Network Security, Firewall and Network Security**, Limitation of Firewalls.

Unit-6

Applications in Governance: EDI in governance; E-government; E-governance applications of the internet; Concept of government-to- business, business-to-government and citizen-to-government; E-governance models; Private sector interface in e-governance.

Course Outcomes:

After completing the course, students will be able to:

1. Faster buying/selling procedure, as well as easy to find products.
2. Buying/selling 24/7.
3. More reach to customers, there is no theoretical geographic limitations.
4. Low operational costs and better quality of services.
5. No need of physical company set-ups.
6. Easy to start and manage a business.

CSH 405: Human Values & Ethics

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Basic **requirement** for fulfillment of human aspiration.

Course Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.
2. To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life.

Detailed Syllabus

Unit-1

Need for values education, Self Exploration, Happiness and Prosperity, Basic Features of a good human, life management.

Unit-2

Understanding Harmony in Human Being, Social Health and Concept of Dharma.

Unit-3

Understanding harmony in family and relations, Value of trust and relationship management, Role of religion in human life.

Unit-4

Understanding Harmony in environment, Role of individuals in nation building, Conscious Business.

Unit-5

Comparison of Indian and western view of ethics and values.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Understand the significance of value inputs in a classroom and start applying them in their life and profession. |
| 2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc. |
| 3. Understand the value of harmonious relationship based on trust and respect in their life and profession. |
| 4. Understand the role of a human being in ensuring harmony in society and nature. |
| 5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |

CSH 501: Introduction to Java Programming

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test – 12 Marks Teachers Assessment – 6 Marks Attendance – 12 Marks End Semester Exam – 70 Marks
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Prerequisite: C Programming, and OOPs Concepts.

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6. To understand Java Swings for designing GUI applications based on MVC architecture.

Detailed Syllabus:

Unit-1

Core Java: Introduction: Features of Java Language, JVM, Byte-code, Operator, Data type, Variable
Array: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array. Control Statements, Methods & classes, inheritance, Types of Inheritance, Inheriting Data Members and Methods.

Unit-2

Package, Interface and Exception Handling: Exceptions & Errors, Types of Exception, Control Flow in Exceptions, Use of try, catch, finally, throw, throws in Exception Handling. In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.

Unit-3

I/O, String Handling and File Handling: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer. **I/O:** Buffered Reader class, Input Stream Reader class, Scanner class. **File Handling:** Creating File, Finding File Reading and Writing File (Doc File, Html File, Text File).

Unit-4

Multi-Threading: Understanding Threads, Needs of Multi-Threaded Programming, Solution of Producer consumer problem by Multi Thread, Thread Life-Cycle, Thread Priorities, Synchronization of Thread.

Unit-5

GUI Application Development: Introduction to AWT, AWT controls Java Applet, Layout Managers, Menus, Images, Graphics, Event Handling, Swing, Containers, Panes, Frames, Dialogue boxes, working with image controls.

Unit-6

JDBC: The connectivity Model, JDBC/ODBC Bridge, Java, SQL package, connectivity to remote database, navigating through multiple rows retrieved from a table/ multiple tables of a database.

Suggested Readings:

1. The Complete Reference Internet, Margaret Levine Young, TMH, 1999.
2. The Complete Reference JAVA 2, Naughton Schildt, TMH, 5th Edition.
3. Programming in JAVA, E. Balagurusamy E, TMH, 3rd Edition, 2006.
4. Java Black book, Steven Helzner, Dreamtech , 2002.

Course Outcomes:

After completing the course, students will be able to:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.

CSH 502: Internet and Information Technologies

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: -

1. Familiarity with the cryptography and network security.
2. Knowledge of MIS and networking.

Course Objectives:

1. The Information Technology (IT) program will educate students to analyze, design, integrate, and manage information systems using information technology.
2. Developed a product or process by applying knowledge of programming, web, database, human computer interaction, networking and security tools.
3. Made decisions related to work that demonstrate understanding of the importance of being an ethical computing professional
4. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

Detailed Syllabus

UNIT I (10 Hours) The Internet And www : Evolution of the Internet, Intranet, Extranet, Application areas: E-commerce, Education, Entertainment, ISPs, Growth of the World Wide Web , protocols governing the web, Internet accessing tools, Access methods: dialup, ISDN, ADSL/2+, cable, LAN, WIFI, Mobile & Satellite, Proxy servers. Mechanism of accessing internet on different devices, Search engines and their Searching techniques, Article on searching techniques used by various search engines: GOOGLE, YAHOO, BING.
UNIT II (10 Hours) Process, Standards And Protocols : TCP/IP model ,TCP/IP fixed and dynamic IP addressing, IPv4 and IPv6, DNS and URLs. Servers and gateways. Remote login: telnet, HTTP and HTTPS, Internet governing bodies: Role of W3C, ISO .
UNIT III (10 Hours) Security And Performance: Security policies/ Identification/ Authentication /Access control. Threats and attack methods such as Viruses, Spam, “phishing”, Firewalls. Performance: speed, reliability, downtime, and bandwidth. Transmission Security: Encryption Techniques, Symmetric Encryption- Keys and Data Encryption Standards, triple encryption, Asymmetric encryption- Secret key encryption, public and private pair key encryption, Virtual Private Network.
UNIT IV (10 Hours) Website Development: Web development strategies, Web applications. Client-Server model, applications running over the internet and their types ,HTML Formatting Tags, Images, Links, Lists, Tables, Frames, Forms, Comments in HTML, DIV and SPAN, CSS. Introduction to web development IDE: Dreamweaver -its working.

UNIT V (6 Hours)

Client-side scripting: DHTML, JavaScript Introduction, Statements, Loops, Arrays, Functions, Objects in JavaScript, Events and Event Handling, Validation, DOM model, Introduction to AJAX.

Server Side Programming: Introduction to server side scripting, Introduction to Active Server Pages (ASP) and Java Server Pages (JSP)

UNIT VI (10 Hours)

PHP (Hypertext Preprocessor): Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, GET and POST Methods, Cookies, Sessions.

Database action: Connectivity using Register, Signup, Login facilities.

Text and Reference Books

1. Pankaj Sharma, Introduction to Web Technology, S.K. Kataria and Sons, 3rd Edition
2. Web Technology and Design, Xavier, C, New Age International, 1st Edition 2010
3. HTML, DHTML, Java Script, Perl & CGI, Ivan Bayross, BPB Publication, 2008
4. Internet and Web Design, Ramesh Bangia, New Age International, 2nd Edition, 2007
5. Data Communication and Networking, Behrouz A Frouzan, TMH, 4th Edition 2004.
6. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education

Course Outcomes:

After completing the course, students will be able to:

1. Be able to apply knowledge of computing and mathematics appropriate to the discipline.
2. Be able to analyze a problem, and identify and define the computing requirements appropriate to its solution
3. Be able to function effectively on teams to accomplish a common goal
4. Understand professional, ethical, legal, security and social issues and responsibilities
5. Be able to analyze the local and global impact of computing on individuals, organizations, and society
6. Recognize the need for and an ability to engage in continuing professional development

CSH 503: Theory of Computation

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: Sets, Relations, Trees, Graphs, Boolean Algebra etc.

Course Objectives:

1. Introduce concepts in automata theory and theory of computation.
2. Identify different formal language classes and their relationships.
3. Design grammars and recognizers for different formal languages.
4. Prove or disprove theorems in automata theory using its properties.
5. Determine the decidability and intractability of computational problems.

Detailed Syllabus

UNIT I

Introduction: Basic Concepts: Formal proofs, Additional form of Proofs, Inductive proof, Sets, Relation, Kleen Closures, Graphs, Trees, Symbol, Alphabets, strings and languages, automata and grammar, Applications of automata theory.

UNIT – II

Finite Automata: Basic Machine and Finite State Machine. Finite Automata: Definition And Types of Automata- DFA, NFA, Construction of DFA and NFA, NFA with epsilon-Moves, Minimization Of FA, Equivalence of NFA and DFA, Conversion of NFA with epsilon moves to DFA, Conversion of NFA With epsilon moves to DFA, Moore and Mealy Machines, Inter-conversion between Moore and Mealy Machines.

UNIT – III

Regular Expressions, Regular Grammar And Languages: Definition and Identities of Regular Expressions, regular and non regular language, operations on RE and their precedence, Algebraic laws for RE, Regular Expression and Finite Automata, Conversion from RE to FA and DFA to RE, Ardens theorem, Pumping Lemma for RL.

UNIT – IV

Context Free Grammar And Languages: Definition and Construction of CFG, Definition and Generation of CFL from CFG, Derivation, derivation trees, Ambiguous Grammar and Removal of Ambiguity. Simplification of CFGs. Normal Forms of Grammar: CNF and GNF.

UNIT - V

Pushdown Automata: Definition of push down automata, The language of PDA, Definition and Construction of DPDA and NPDA. **Equivalence of PDAs and CFGs**, Closure Properties Of CFLs.

UNIT – VI

Turing Machines: Definition and Construction of Turing Machines. Languages of TM. Types of TM. Comparison And **Applications of DFA, PDA and TM.**

Text and Reference Books

1. John C. martin, "Introduction to Language and Theory of Computation", TMH, Third Edition.
2. Michel Sipser "Introduction to Theory of Computation" Thomson Course Technology, Second Edition .
3. Kavi Mahesh, "Theory of Computation" Wiley-India.

Course Outcomes:

After completing the course, students will be able to:

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|--|
| 1. Acquire a fundamental understanding of the core concepts in automata theory and formal languages. |
| 2. An ability to design grammars and automata (recognizers) for different language classes. |
| 3. An ability to identify formal language classes and prove language membership properties. |
| 4. An ability to prove and disprove theorems establishing key properties of formal languages and automata. |
| 5. Acquire a fundamental understanding of core concepts relating to the theory of computation and computational models including (but not limited to) decidability and intractability. |

CSH 511:Artificial Intelligence

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - CSH101 C Programming, CSH201 Discrete Mathematics.

Course Objectives:

1. To understand how these algorithms works so the main objective of this course is and how to analyse the data to make a proper decision.
2. To know the application areas and building blocks of AI as presented in terms of intelligent agents.
3. To initiate the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems in different fields.
4. To evaluate the different stages of development of the AI field from human like behavior to Intelligent Agents.
5. To build intelligent machine which can perform and act like humans.

Detailed Syllabus

Unit-1

Introduction: Overview of Artificial Intelligence- Problems of AI, AI and related fields. **Problem Solving:** Problems, Problem Space & Search: Defining the Problem as State Space Search, Production System, Problem Characteristics, issues in the design of Search Programs.

Unit-2

Search Techniques: Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Comparing Uniform Search Strategies, Greedy Best-First Search, A* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search.

Unit-3

Knowledge representation: Knowledge Representation Issues, Representation and Mapping, Approaches to Knowledge Representation, Issues in Knowledge Representation, Knowledge manipulation, Knowledge acquisition.

Unit-4

Using Predicate Logic: Representing Simple Fact in Logic, Representing Instant & ISA Relationship, Computable Functions & Predicates, Resolution, natural deduction.

Representing Knowledge Using Rules: Procedural Verses Declarative Knowledge, Logic Programming, Forward Verses Backward Reasoning, Matching, Control Knowledge.

Unit-5

Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing.

Unit-6

Expert System: Rule based system architecture, Non production system architecture, knowledge organization and validation, Existing Systems (DENDRAL, MYCIN).

Text and Reference Books

1. "Artificial Intelligence", Ritch & Knight, TMH, 2006.
2. "Introduction to Artificial Intelligence & Expert Systems", Patterson, PHI, 2007.
3. "Artificial Intelligence: A Modern Approach", Russell, S., Norvig, P, Pearson Education, 2006.
4. "Introduction to A.I.", Charnick, Addison Wesley, 1999.

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. How to solve a particular problem by using different algorithms which is impossible for humans. |
| 2. How to make proper decisions by gathering information and analyzing them. |
| 3. How expert system works and perform tasks. |
| 4. How to convert a particular sentence into logical statement. |
| 5. Analyze the problem as a state space, graph, design heuristics and select amongst different search based techniques to solve them. |
| 6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing. |

CSH 512: Artificial Neural Networks

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite : - Machine Learning

Course Objectives:

1. Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
2. Introduce students to artificial neural networks and fuzzy theory from an engineering perspective
3. To give design methodologies for artificial neural networks
4. To provide knowledge for network tuning and overfitting avoidance
5. To offer neural network implementations.
6. To demonstrate neural network applications on real-world tasks

Detailed Syllabus

Unit-1

Fundamental of Neural Networks: Introduction, Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN Systems, Single Layer NN System, Applications.

Unit-2

Multilayer NN System and Backpropagation Networks: Background, Backpropagation Learning, Backpropagation Algorithm, Learning in Multilayer NN Systems. Applications of Backpropagation Algorithm.

Unit-3

Associative Memory: Introduction, Auto-associative Memory, Bi-directional Hetro-associative memory. Applications of Associative Memory.

Unit-4

Self Organizing Maps (SOMs): Introduction to supervised and unsupervised learning. Competitive Learning, SOMs and their working principles, applications.

Unit-5

Adaptive Resonance Theory: Stability-Plasticity Dilemma, ART Networks, Iterative Clustering, Unsupervised Learning, ART Networks and their working principles, applications.

Unit-6

Introduction to Soft Computing: Basics of Soft Computing, Components of Soft Computing. Introduction to Fuzzy Logic, Genetic Algorithms.

Text and Reference Books

1. Neural Networks, Fuzzy Logic and Genetics Algorithms- Synthesis and Applications by
2. Rajasekaran and G.A. Vijayalakshmi Pai, Prentice Hall.
3. Neural Networks: A Comprehensive Foundation by Simon S. Hakin, Prentice Hall.
4. Fundamental of Neural networks: Architecture, Algorithms and Applications by Laurene V. Fausett, Prentice Hall.

Course Outcomes:

After completing the course, students will be able to:

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
4. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
5. Reveal different applications of these models to solve engineering and other problems.

CSH513:Data Mining

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - CSH301 RDBMS

Course Objectives:

1. To understand Data Mining, its origin and applications.
2. To understand types of data and to improve the quality of data and efficiency and the ease of the mining process.
3. Differentiate OnLine Transaction Processing and OnLine Analytical processing
4. Learn Multidimensional schemas suitable for data warehousing along with OLAP operations.
5. To understand how to identify associations among objects and to learn various algorithms to find them.
6. To understand applications and algorithms for Clustering along with methodologies of data mining.

Detailed Syllabus

UNIT 1- Data Mining:

Definition, Data Mining as the Evolution of Information Technology, Knowledge Discovery Process (KDP), Classification of Mining systems, Techniques involved.

UNIT 2- Data Preprocessing:

Needs, Pre-processing data, Data Cleaning, Data integration and transformation, data reduction, discretization, Concept of hierarchy generation.

UNIT 3- Data Warehouse:

Definition, Differences between Operational Database Systems and Data Warehouses, OLTP vs. OLAP, 3 Tier Architecture of Data Warehouse, **Concept of ETL.**

UNIT 4- Data Warehouse Modeling:

Data Cube- A Multidimensional Data Model, Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional Data Models, OLAP operation

UNIT 5- Data Mining Techniques:

Introduction to Association Rule and **Association Rule Mining, Classification: Decision Tree Induction, K-nearest neighbor, Clustering: Cluster Analysis.**

UNIT 6- Data Mining Trends:

Mining Complex Data Types, Methodologies of Data Mining, Data Mining Applications, Web Mining.

Text and Reference Books

1. Data Mining -Concepts and Techniques, Han, Kamber, Harcourt India, 2006.
2. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson, 2002.
3. Data Mining Techniques, Arjun K. Pujari, University Press, 2001.

Course Outcomes:

After completing the course, students will be able to

1. Understand the concept of data mining and its applications.
2. Understand pre-processing steps to improve the quality of data to ease data mining process.
3. Understand OLTP and OLAP as well as 3 tier architecture of data warehouse.
4. Understand various Multidimensional schemas and to apply OLAP operations.
5. Establish associations among objects by applying various algorithms.
6. Perform cluster analysis and understand the methodologies of data mining.

CSH 601: GUI using .Net Framework

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test – 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 Marks

Prerequisite: HTML and CSS.

Course Objectives:

1. Learn about MS.NET framework developed by Microsoft.
2. You will be able to using XML in C#.NET specifically ADO.NET and SQL server
3. Be able to understand use of C# basics, Objects and Types, Inheritance
4. To develop, implement and creating Applications with C#.
5. To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web
6. To understand and be able to explain Security in the .NET framework and Deployment in the .NET.
7. To develop Assemblies and Deployment in .NET, Mobile Application Development.

Detailed Syllabus:

Unit-1 The .Net framework: An Overview of .NET Framework, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In –Time Compilation.
Unit-2 C # Language Syntax: Why Datatype, Reference Type and Value Type, Datatypes & Variables Declaration, Boxing and Unboxing, Operators, Control Statements, creating Object and Classes, The Main method specification, IF statements, CASE (switch) statements, Looping in C#, Arrays
Unit-3 OOPs Concept: Class, Object, Encapsulation, Inheritance, Polymorphism etc. Controlling program execution: Method Overloading and method overriding, Operator Overloading, Abstract Class, Inner Class, Interface. Delegates, Partial Classes. Exception Handling.
Unit-4 GUI –Controls and Event Handling: Text Box, Label, Link Label, Radio Button, Check Box, List Box, Combo Box, Date Time Picker Control, Calendar Control.
Unit-5 Containers and its Event Handling: Group Box, Panel, Tab Control. Dialog Boxes and its Event Handling: Message Dialog Boxes, Folder Browser Dialog, Open File Dialog, Save File Dialog.
Unit-6 Data Controls: Data Source, Data Set, and Data Grid View displaying Record in the Grid View Controls. ADO.Net: Connected and Disconnected Architecture, Displaying Record from the Database, Inserting Record into Database, Creating Login using Database, Deleting Record from the Database, Fetching Record from the Database, Update Record in the Database.
Suggested Readings: <ol style="list-style-type: none">1. Programming with C#, E. Balagurusamy, TMH, 1st Edition.2. Beginning Visual C# 2008, John Wiley, Wrox, May 2008.3. Microsoft .Net for Programmers, Fergal Grimes, SPI, 2002.

Course Outcomes:

After completing the course, students will be able to:

1. Learn to develop applications using C# and VB.NET.
2. Learn to apply these languages to develop server-side applications which make use of ADO.NET, ASP.NET, Web Services etc.
3. Understand use of C# basics, Objects and Types, Inheritance
4. Develop, implement and creating Applications with C#.
5. Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web.
6. Understand and be able to explain Security in the .NET framework and Deployment in the .NET.

CSH 602 Digital Image Processing

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite : - Basic Logical operations, Computer Graphics.

Course Objectives:

1. To describe and explain basic principles of digital image processing.
2. To study basic image operations.
3. To understand the algorithms that perform basic image processing (e.g. noise removal and image enhancement).
4. To design and implement algorithms for advanced image analysis (e.g. image morphing, image segmentation).
5. To expose students to current applications in the field of DIP.

Detailed Syllabus

UNIT I Introduction to digital image processing, applications, steps of digital image processing, Components of Image Processing system, Image sampling and Quantization.
UNIT II Image Enhancement in Spatial Domain: Meaning of spatial domain, image negatives, log transformation, power law transformation, Introduction to histogram Processing, histogram equalization, histogram specification, Enhancement using logical AND and logical OR operator, Image subtraction, Image Averaging.
UNIT III Image Enhancement in Frequency Domain: meaning of frequency domain, one dimensional Fourier frequency domain and its inverse, Two dimensional Fourier frequency domain and its inverse, filtering in frequency domain, Smoothing Frequency-Domain Filters- Ideal Low pass Filters, Butterworth Low pass Filters, Gaussian Low pass Filters, Sharpening Frequency Domain Filters- Ideal High pass Filters, Butterworth High pass Filters, Gaussian High pass Filters.
UNIT IV Image Restoration: Introduction to image restoration. Model of the Image Degradation/Restoration Process, Restoration in the Presence of Noise- arithmetic mean filter, geometric mean filter, harmonic mean filter, contra harmonic mean filter, Minimum Mean Square Error (Wiener) Filter, Geometric Mean Filter.
UNIT V Morphological Image Processing: Basic Concepts from Set Theory, Logic Operations Involving Binary Images, Dilation and Erosion, Opening and Closing, Hit or Miss Transformation, Extensions to Gray-Scale Images- Dilation, Erosion, Opening and Closing.
UNIT VI Image Segmentation: Detection of Discontinuities- Point Detection, Line Detection, Edge Detection, Global Processing via Graph-Theoretic Techniques, Thresholding- Foundation, Basic Global Thresholding, Basic Adaptive Threshold, Region-Based Segmentation- Basic Formulation, Region Growing, Region Splitting and Merging.

Text and Reference Books

1. Fundamentals of Digital Image Processing, Anil K. Jain, Pearson, IIIrd, 2004.
2. Digital Image Processing, Rafael C. Gonzalez & Richard E. Woods, PHI, 10th, 2005.
3. Digital Image Processing using MATLAB, Rafael, Richard & Steven, Pearson, IInd, 2007.
4. Digital Image Processing, Jayaraman S, Veerakumar T, Esakkirajan S, TMH, Ist, 2009.

Course Outcomes:

After completing the course, students will be able to:

1. Understand general terminology of digital image processing.
2. Examine various types of images, intensity transformations and spatial filtering.
3. Develop Fourier transform for image processing in frequency domain.
4. Evaluate the methodologies for image segmentation, restoration etc.
5. Implement image process and analysis algorithms.
6. Apply image processing algorithms in practical applications.

CSH612: Modeling and Simulation Techniques

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite: -

1. Basic knowledge of numerical mathematics,
2. probability and statistics, and Programming skills

Course Objectives:

1. The main objective of this subject is to gain the knowledge about system and its behavior so that a person can transform the physical behavior of a system into a mathematical model that can in turn transform into a efficient algorithm for simulation purpose.
2. The area of experimentation and results analysis for simulation models is briefly introduced here. By the end of this module you will learn the verification and validation techniques to compare the defined model with real system's data.

Unit –I (10 Hours)

Introduction of System Models & system simulation:Advantages and disadvantages of simulation,difficulties of simulationwhen to use simulation?modeling concepts(model classification)

Unit-II (6 Hours)

VERIFICATION AND VALIDATION OF MODEL:Introduction of validation and verification,comparing model data with real system data,validating exiting systems,validating first time model

Unit-III(10 Hours)

Discrete system simulation,time graph representation,discrete simulation,the single-server queue queue parameters,the multi-server queue,basic queuing relationships,SINGLE-SERVER QUEUES,MULTISERVER QUEUES,performance measures for queuing systems,the simulation of time sharing systems.

Unit-IV(10 Hours)

Continuous simulation:Introduction of Continuous Simulation,Examples related to continuous simulation,Why do we use Continuous Simulation?The Uses of Simulation.

Unit-V(10 Hours)

Simulation Language:Continuous Simulation Language,Classification of Continuous Simulation Languages,Discrete Simulation Language,Classification of Discrete Simulation Languages,Other Simulation Languages,Introduction of SIMULA.

Unit-VI(10 Hours)

Use of DatabaseA.I. in modeling Simulation:Database in Modeling And Simulation,Definition of Simulation Data Model,Data Representation of Simulation Model,Data Representation For Input Files For a Simulation,Data Representation for Output Files for a Simulation ,A.I. in Modeling Simulation

Text and Reference Books

1. Jerry Banks and John Carson, "Discrete Event System Simulation", PHI, 2005
2. Geoffrey Gordon, "System Simulation", Second Edition, PHI, 2006 Frank L. Severance, "System Modeling and Simulation", Wiley, 2001
3. Averill M. Law and W. David Kelton, "Simulation Modeling and Analysis McGraw Hill, 2006.
4. Jerry Banks, "Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice", Wiley, 1998.
5. Sheldon M. Ross: Introduction to Probability Models 7th Edition, Academic Press, 2002
6. Donald E. Knuth: The Art of Computer Programming - Volume 2: Semi Numerical Algorithms, 2nd Edition, PEARSON

Course Outcomes:

1. Have a clear understanding of the need for the development process to initiate the real problem.
2. Have a clear understanding of principle and techniques of simulation methods informed by research direction.
3. Cognitive skills (thinking and analysis) –
4. Be able to describe the components of continuous and discrete systems and simulate them.
5. Be able to model any system from different fields
6. Be able to implement numerical algorithm to meet simple requirements, expressed in English
7. Be able to discuss the simulation methods and select the suitable technique on the problems.

CSH 613 Advanced Algorithms

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - C Programming Concepts, Data Structure Concepts, Discrete Mathematics concepts.

Course Objectives:

1. To analyze the asymptotic performance of algorithms.
2. To analyze of Advanced Data Structure Concepts.
3. To analyze Divide and Conquer and Dynamic Programming Concepts and its application
4. To analyze Branch and Bound and Lower Bound Theory Concepts.
5. To analyze Dynamic Programming and Backtracking Concepts and its applications.
6. To analyze Advanced String Matching Concepts.

Detailed Syllabus

UNIT I

Introduction- Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions, Performance measurements, analyzing recursive algorithms using recurrence relations, Recursion-tree method, Master method.

UNIT II

Sorting and order Statistics - Shell sort, Quick sort, Merge sort, Heap sort, Comparison of sorting algorithms, Sorting in linear time.

UNIT III

Divide and Conquer, and Greedy Algorithm Design Methodologies - Introduction, Strassen's matrix multiplication, Minimum spanning tree (Prim's and Kruskal's algorithms), Single source shortest path problem (Dijkstra's and Bellman Ford algorithms) and their performance analysis.

UNIT IV

Branch-and-Bound, and Lower Bound Theory- Introduction, 0-1 knapsack problem, Traveling salesman problem, Searching.

UNIT V

Dynamic Programming and Backtracking Algorithm- Design Methodologies Introduction, Traveling salesperson problem, Knapsack problem, multistage graphs, Floyd-Warshall algorithm, N-Queens problem, and their performance analysis.

UNIT VI

Advanced String Matching Algorithms- Naïve string matching algorithm, Robin-Karp algorithm, string matching with finite automata, Knuth Morris-Pratt algorithm.

Text and Reference Books

1. Cormen, Leiserson, Rivest and Stein : Introduction to algorithms; Prentice-Hall of INDIA.
2. Horowitz, Sahni and Rajsekar : Fundamentals of Computer Algorithms, Golgotha Publications.
3. Aho, Hopcroft, Ullman : The Design and analysis of algorithms", Pearson Education.

Course Outcomes:

After completing the course, students will be able to:

1. Understand Asymptotic Notation.
2. Understand Advanced Data Structure Concepts and searching concepts.
3. Understand the Concepts of Divide and Conquer and Greedy Methods and solve problem related with its.
4. Understand the concepts of branch and bound and solve problem related with its.
5. Understand the concepts of Backtracking and Dynamic Programming Concepts and solve problem related with its.
6. Understand the Concepts of String Matching and solve string matching problems.

BPC 101: Professional Communication I	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Presentation – 15 Marks Viva-Voce- 15 Marks Unit test-20 Marks End Semester Exam – 50 marks

Prerequisite: - English Grammar of 10+2 standard.

Course Objectives:

The objectives of this course are:

1. To understand the concepts, process and importance of communication.
2. To equip students with Oral and written communication skills.
3. To enhance their communication skills in real life situations.
4. To develop awareness regarding appropriate communication strategies.
5. To encourage students by developing their critical thinking through activities.
6. To assist students with employability and job search skills.

Detailed Syllabus

Unit-1 Learning English: Subject Verb Agreement and Tenses: One-word substitution: Jumbled Sentences. Activities: Framing of Sentences, Greetings, Introducing oneself, Invitation, Making Request, Expressing Gratitude, Complimenting and Congratulating.
Unit-2 Learning Through Literature: Sultana's Dream by Rokeya Sakhawat Hussain, The Eyes are not here by Ruskin bond, The Renunciation By Rabindranath Tagore, The Capital of the World by Ernest Hemingway. Poetry: Where the mind is without fear by Rabindranath Tagore; Road not Taken by Robert frost. Activities: Framing of Sentences, Reading, Narration, Dialogue writing, Reading Comprehension, Role play.
Unit-3 Introduction to Communication: Types of communication, Barriers to Communication, and Principles of effective communication. Activities: Role Play, Extempore, Presentation.
Unit-4 Writing skills: Comprehension Chapters 1-4 from Oxford Remedial English Book 1. Activities: Application regarding attendance, Fee extension, Fine-remit, leave application, Requisitions. Writing paragraph on current topics.

Unit-5

Listening skills and speaking skills: Communication Lab activities: Situations based role play, Debate, Profile of famous personalities.

Activities: Role Play, Essay writing, one animation Movie and one documentary.

Unit-6 Presentations

Text and Reference Books

1. Business Communication, Bovee & Thill, McGraw Hill, fifth edition, 2007.
2. Business Communication, Raymond V. Lesikar, McGraw Hill, 7th edition, 2009.
3. Business Communication Strategies, Matthukutty Monippally, Tata McGraw Hill.
4. An Anthology of English Essays, edited by R.P Singh, Oxford University Press.
5. An Anthology of English short Stories, edited by R.P Singh.
6. A Remedial Course in English for colleges, Central Institute of English and Foreign Languages, Book 1, Book 2, Book 3.
7. Soft Skills, Dr.K.Alex, S.Chand 8. Basic English Usage, Michael Swan, Oxford Indian Edition.

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. Understand the process of communication and its effect on giving and receiving information. |
| 2. Demonstrate his/her ability to speak or write error free while making an optimum use of correct business vocabulary and grammar. |
| 3. Apply effective communication skills in a variety of public and interpersonal settings. |
| 4. To draft effective correspondence with brevity and clarity. |
| 5. Demonstrate his verbal and nonverbal communication ability through presentations |
| 6. Become aware the numerous carrier opportunities within the fields of communication. |

BCA 103: Computer Fundamentals and C Programming Concepts	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite : - Number System and basic Mathematical formulas

Course Objectives:

1. To know the basic components of computer and its working, generations of computer, types.
2. To know the basic input output devices.
3. To gain knowledge about Software and types
4. To develop the programming skills of students
5. To know the principles of designing structured programs
6. To write basic C programs using
 - i) Sequential and Selection statements
 - ii) Repetitive statements
 - iii) Arrays

Detailed Syllabus

UNIT I (10 Hours)

Computer fundamentals: Brief history of development of computers, Computer system concepts, Computer system characteristics, Types of computers, Generations of computers, Basic components of a computer system - Control unit, ALU, Input/Output functions and characteristics, Input /Output devices, Primary and Secondary memories.

UNIT II (10 Hours)

Computer Languages : Computer Programming Languages – Machine Language, Assembly Language, High Level Language, 4 GL, their merits and demerits.

Computer software: Software and its Need, Types of Software - System software, Application software, System Software: Operating System, Utility Program, Assemblers, Compilers and Interpreter.

UNIT III (10 Hours)

Programming Fundamentals: Algorithm development, Techniques of problem solving. Flowcharting, Structured programming concepts; Top down Design, Debugging and testing of Programs.

UNIT IV (10 Hours)

Introduction to C Programming Language : History, Structure of C programming, Language Fundamental- Data Types- integer, character, float, constant and variable, keywords, identifiers, C tokens, comments, Operators, Types of Operators, C-preprocessor, Header Files, Console based I/O [printf(), scanf()].

UNIT V (6 Hours)

Introduction to Control Structures – Decision making structure- if , if –else , if- elseif, Switch, Loop
Control Structure - for, While, do- while, Other Statements- goto, break, continue, exit.

UNIT VI (10 Hours)

Introductions to Arrays, Array (Definition, Declaration, Initialization, characteristics), How to store values in an array, How to display values stored in an array, **Sorting (Selection, Bubble, Insertion), Searching (Linear, Binary)**, Multidimensional arrays (Definition, Declaration, and Initialization).

Text and Reference Books

1. Rajaraman V. Fundamental of Computers..
2. Ram B. Computer Fundamentals, New Age International.
3. Kanetkar Y. - Let us C .
4. Balaguruswamy - Programming in C.
5. Kerninghan B.W. & Ritchie D.M. - The C Programming Language.

Course Outcomes:

After completing the course, students will be able to:

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|--|
| 1. Understanding the concept and recognize the basic terminology used in computer programming. |
| 2. Write, Compile and Debug programs in C language and use different data types for writing the programs. |
| 3. Design programs connecting decision structures, loops and functions. |
| 4. Understand the dynamic behavior of memory by the use of pointers |
| 5. Use different data structures and create / manipulate basic data files and developing applications for real world problems. |

BCA 104: Principles of Management	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - Fundamental of Managerial skills.

Course Objectives:

1. To understand the functions and responsibilities of managers.
2. To provide tools and techniques to be used in the performance of the managerial job.
3. To analyze and understand the environment of the organization.
4. To develop the awareness about the principles of management.
5. To maintain competitive advantages.

Detailed Syllabus

Unit-1 Management: - Concept, Nature, Scope & Importance. Management: Art and Science, As a Profession, Management Vs Administration Management Skills, Managerial Roles & Levels of Management.
Unit-2 Evolution & Development of Management Thought: Contribution of Taylor, Fayol & Weber Social System and Decision Theory Approach.
Unit-3 Planning: Nature, Scope & Objectives; Types of plans; planning process; Business forecasting & Planning Premises; MBO: Concept & Process. Techniques & Process of decision-making.
Unit-4 Organizing: Concept, Importance and Principles, and Process of Organizing. Formal & Informal Organizational Structure, Departmentation Span of Control, Delegation of Authority, Authority & Responsibility , Centralization and Decentralization.
Unit-5 Staffing: Concept, Manpower Planning, Job Analysis, Recruitment & Selection, Training & Development. Directing: Concept, Importance, Direction & Supervision, Role of Supervisor, Techniques of directing. Nature and Scope of Co-ordination, Principles, Techniques and Barriers to Co-ordination.
Unit-6 Leadership: Concept, Importance & Leadership Styles , Controlling: Concept, Process, Principles & Techniques of Controlling , Types of Control, Effective Control System.
Text and Reference Books <ol style="list-style-type: none"> 1. Essentials of Management, Harold Koontz, Heinz Weihrich, Tata McGraw-Hill, 1998. 2. Essentials of Management, Joseph L. Massie, Prentice Hall of India, Pearson, 4th Edition, 2003 3. Management, Stoner, Freeman, Gilbert, Pearsons, 6TH Edition.

Course Outcomes:

1. Understand the concepts related to Business organization.
2. Demonstrate the roles, skills and functions of manager.
3. Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.
4. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
5. Recognize the role of communication in the management function.

BCA 105: Digital Electronics and Computer Organization	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - Basic knowledge of Computers Fundamentals and Physics of Intermediate standard.

Course Objectives:

1. To describe various types of Number System, basic electronic components and hardware components of computer system.
2. To understand the concept of Boolean algebra, types of digital circuits, memories, addressing modes and I/O interface.
3. To solve problems related to number system conversions and calculation of binary codes.
4. To implement basic Boolean expressions using different Digital Electronic device.
5. To distinguish between types of digital circuits, addressing modes, memories and I/O interface.
6. To design digital circuits for a particular functions using basic electronic concept.

Detailed Syllabus

Unit-1 Introduction- Digital versus Analog Signals, Electrical versus Electronics. Number System and Codes - Concept of number system bases – binary, octal, decimal and hexadecimal number systems and conversion between each, BCD, Excess-3, Gray Code, and Weighted Codes.
Unit-2 Binary Arithmetic- Binary Addition and Subtraction. Complements and Subtraction using complements, Multiplication, Division. Boolean Algebra- Truth table, Boolean operators and precedence, Boolean laws, De-Morgan's Theorem, Principle of Duality, SOP and POS, Conversion from SOP to POS and vice versa, Canonical and standard forms. Reduction of expressions using Boolean laws and K-Map.
Unit-3 Logic Gates- Primary and Secondary Logic Gates, Designing of circuits using gates, Universal Gates, Implementation of circuits using NAND and NOR.
Unit-4 Combinational Circuits- Half and Full Adder, Half and Full Subtractor, CLA, Multiplexer, De-multiplexer, Encoder and Decoder. Implementation using MUX and decoder. Sequential Circuits- Latch, Flip-flop, Introduction to RS flip-flop, J-K flip-flop D-type flip-flop, T flip-flop.
Unit-5 Processor Organization- Introduction and types of CPU Organization, Addressing modes, Implied Addressing Mode, Immediate Addressing Mode, Register Addressing Mode, register indirect Addressing Mode, Direct Addressing Mode, Indirect Addressing Mode, Relative Addressing Mode, index Addressing Mode, auto increment/decrement Addressing Modes. I/O Organization - Introduction to I/O organization, I/O interface and its need.

Unit-6

Memory Organization- Memory Hierarchy, RAM and ROM chips, SRAM, DRAM, PROM, EEPROM, Introduction of Cache Memory and Virtual Memory.

Text and Reference Book

1. Digital Logic & computer Design, M. Morris Mano, PHI, 2004.
2. Computer System Architecture, M. Morris Mano, PHI, 2004.
3. Computer Organization & Architecture, W. Stallings, PHI, 6th Edition.

Course Outcomes:

After completing the course, students will be able to:

1. Differentiate between analog and digital circuits as well as electrical and electronics.
2. Perform number system conversion.
3. Find solution of binary arithmetic problem and understand Boolean algebra.
4. Implement any given Boolean expression using MUX, Decoder as well as Logic Gates.
5. Understand the concept of internal CPU architecture and addressing modes.
6. Understand the concept of I/O interface.
7. Discrimination among various kind of memory devices with their need.

BCA 203: C Programming	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite : - Basic mathematical formulas

Course Objectives:

1. To develop the programming skills of students
2. To know the principles of designing structured programs
3. To write basic C programs using
 - i) Selection statements
 - ii) Repetitive statements
 - iii) Functions
 - iv) Pointers
 - v) Arrays
 - vi) String
 - vii) File handling

Detailed Syllabus

UNIT I (8 Hours) Introduction & Basic Concepts of ‘C’ Programming Language: History of ‘C’ Programming, Assembly language, Machine Language, Editors, Translators (Compiler, Interpreter, Assembler), Programming Rules, Algorithm, Flowcharts, Structure of C program, Executing the C program. C Character Set, C Keywords/Reserve words, Identifiers, Rules to form an Identifier, Variables, Constants, Types of Constant(Numeric, Character, String, Symbolic), Comments in C, Data types in C, Operators-Types of operators(Arithmetic, Relational, Logical, Unary, Assignment, Compound Assignment, sizeof(), Conditional/Ternary, Bitwise) , Precedence and Associativity, Comments, Concept of header files, Types of problems(Sequential, Selective & Repetitive).
UNIT II (10 Hours) Introductions to Control structures: Control statements- if, if-else, if-else ladder, Nesting of if, break, continue, Switch statement, use of break and default with switch, goto, exit. Program Loops and Iteration: Loops/Iteration, types of loops, for, Nesting of for, while, do-while. Difference b/w while & do-while, break & exit, break & continue.
UNIT III (10 Hours) Array, Structure and Union: Introductions to Arrays, Structures and Union: Array (Definition, Declaration, Initialization, characteristics), How to store values in an array, How to display values stored in an array, Sorting (Selection, Bubble, Insertion), Searching (Linear, Binary) , Multidimensional arrays (Definition, Declaration, and Initialization), Pointers and arrays, Pointer and 2-d arrays, Pointer to an array, Array of Pointers, Dynamic memory allocation. Structure, Structure declaration, Declaration & Initialization of structure variable how to store values in a structure, how to access values of structure elements, Nesting of structures, Array of structure, Differentiate between array & structure, passing structure to function, passing array of structure to function, Structure pointer, Union

UNIT IV (10 Hours)

Functions and Macros: Function (Declaration, Definition, Calling), Function Prototype, types of function, return statement, function calling methods (Call by value, call by Reference), Storage Classes, Recursion. Macro, Macro Declaration, nesting of macros, Macros with argument, Diff between macro & function.

UNIT V (8 Hours)

Strings: Strings-Definition, declaration and initialization of strings, standard library functions: strlen(), strcpy(), strcat(), strcmp(), etc. Pointer and Strings, Two Dimensional array of characters, Array of Pointers to String.

UNIT VI (10 Hours)

File Handling: File, File operations, Opening and Closing Files, File opening modes, Reading and Writing a data file, Text files Vs Binary files, Command Line Arguments(argc,argv), sprintf() & sscanf(), gets() & puts(), fgetc() & fputc(), fseek() & ftell().

Text and Reference Books

1. Kerninghan B.W. & Ritchie D.M. - The C Programming Language
2. Gottfried - Programming with C Schaum
3. Kanetkar Y. - Let us C
4. Balaguruswamy - Programming in C
5. Rajaraman V. Fundamental of Computers
6. Ram B. Computer Fundamentals, New Age International

Course Outcomes:

After completing the course, students will be able to:

1. Understanding the concept and recognize the basic terminology used in computer programming.
2. Write, Compile and Debug programs in C language and use different data types for writing the programs.
3. Design programs connecting decision structures, loops and functions.
4. Understand the dynamic behavior of memory by the use of pointers
5. Use different data structures and create / manipulate basic data files and developing applications for real world problems.

PCP 201 PC Package	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite : - BCA103 Computer Fundamentals and C Programming Concepts.

Course Objectives:

1. To describe various application software available with Microsoft Office Package with their applications.
2. To understand the importance of Microsoft Word, Microsoft Excel, Microsoft Power Point, Microsoft Access and HTML.
3. To know about various menus and tool box available with software of Microsoft Office Package and their usage to design well formatted documents, worksheets and presentations.
4. To implement and develop static web pages
5. To identify the best office tool available for any particular task and to distinguish the usage of Microsoft Excel and Access.
6. To design well formatted reports, spreadsheets, presentations, database and web pages.

Detailed Syllabus

UNIT-I Introduction Introduction of Ms-Office, Applications of Ms-Word, PowerPoint, Excel and Access, Title Bar, Control Menu, Quick Access Toolbar, Ribbon, Backstage, Status Bar. Creating, Opening and Saving Files, Viewing Files in Different Ways, Header and Footer.
UNIT- II Microsoft Word Formatting Text, Find and Replace, Working with Paragraphs, Inserting Tables, Performing Calculations in Tables, Formatting Tables, Inserting Pictures, Document's Background, Page Layout, Printing Documents, Mail Merge, Watermark, Page border.
UNIT- III Microsoft Excel Creating Workbooks, Moving Data within a Workbook, Finding and Replacing Data, Perform Basic Calculations on Data, Creating Basic Formulas, Finding and Correcting Errors in Calculations, Filters, PivotTables, Creating Charts and Graphics, Printing Parts of Worksheets, Creating and Modifying Macros, Protecting Workbooks and Worksheets.
UNIT- IV Microsoft PowerPoint Creating a Presentation, Changing the Slide Size & Orientation, Adding, Deleting, and Rearranging Slides, Views, Text Formatting, Adding Tables, SmartArt, Charts, and Hyperlinks to Slides, Adding Movies and Sounds to a Presentation, Slide Transitions and Animations, Inserting Charts, Drawing Shapes.
UNIT- V Microsoft Access Working in Access, Database Concepts, Exploring Tables, Forms, Queries, Reports, Creating Databases from Templates, Creating Databases and Tables Manually, Manipulating Table Columns and Rows, Refining Table Structure, Creating Forms, Sorting Information in Tables, Filtering Information in Tables, Filtering Information by Using Forms.

UNIT- VI Internet

Introduction to HTML5 and Web Design, Create a Simple Web Page, Format Your Text, Adding Web Links and Images, Creating Tables, Forms, Borders, Backgrounds, Adding Videos and Graphics.

Text and Reference Books

1. Office 2007 All-in-One Desk Reference For Dummies, Wiley, 2007.
2. Microsoft Office Home and Student 2010, Microsoft Press, 2010.
3. Office 2016 For Seniors For Dummies, John Wiley & Sons, 2016.

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. Design well formatted reports and documents by using Microsoft Word. |
| 2. Apply formulae to design workbook by Microsoft Excel. |
| 3. Create good presentations by using Microsoft Power Point. |
| 4. Create database by using Microsoft Access and applying query to fetch desired results. |
| 5. Create well-formed web-pages. |

BCA 205: Human Values & Business Ethics	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: Basics of morals, values and ethics.

Course Objectives:

1. To understand the concept of Dharma and human values.
2. To help the students to recognize legal and ethical issues while working in an organization.
3. To gain an enhanced understanding in following ethical rules and ethical constraints.
4. To improve analytical problem solving and ethical decision making skills.
5. To be more humble with peers and sub-ordinates.

Detailed Syllabus

Unit-1 Theories and evolution of mankind, Culture and civilization, Basic characteristics of a good human being, Life management, Concept of dharma and human values, Spiritual quotient, Social quotient and emotional- quotient.
Unit-2 Role of human values in the success of individuals and business organizations, Concept of human relations and human face of the management, social health and management of emotions.
Unit-3 Concepts of happiness and prosperity, Sukh, suvidha and swasthya. Basic elements and dimensions of happiness. Teachings of holy books- Geeta, Bible, Kuran, Guru Granth Saheb etc.
Unit-4 Concept of ethical consciousness in business . Need and importance of business ethics in marketing . Consumer protection.
Unit-5 Comparison of Indian and western view of ethics and values. Secular ethics . Cases/ National and International .
Text and Reference Books <ol style="list-style-type: none"> 1. Ethics in Engineering, Mike Martin and Roland Schinzinger, McGraw -Hill, New York 1996. 2. Engineering Ethics, Govindarajan M., Natarajan S, Senthil Kumar V. S, PHI, 2004. 3. Engineering Ethic, Charles D. Fleddermann, Pearson Education / SPrentice Hall, New Jersey, 2004. 4. Engineering Ethics-Concepts and Cases, Charles E Harris, Michael S. Protchard, Michael J Rabins, Wadsworth Thompson Learning, United States, 2000

Course Outcomes:

At the end of the course the students will be able to:

1.	Explore the relationship between ethics and business.
2.	Explain the relationship between ethics, morals and values in the workplace.
3.	Practice human values with the deep understanding of theory.
4.	Understand diversity of workforce.
5.	Understand the importance of Corporate Social Responsibility.

BCA302: Database Management Systems

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Computer Organization, Operating System, Data Structure, Mathematics

Course Objectives:

1. Understand values of Data.
2. Understand significant role of DBMS.
3. Understand need for normalizing a Database.
4. Understand problems with unnecessary duplication of data.
5. Understand concepts of transaction
6. Understand concepts of concurrent transactions

Detailed Syllabus:

Unit-1

Introduction to Database System: Definition of DBMS, file processing system Vs DBMS, Limitation of file processing system, Comparison of File processing system and DBMS, Advantages and Disadvantages of DBMS, Users of DBMS, DBA, Capabilities of good DBMS, Overall System structure, three schema architecture for database system and data independence.

Unit-2

Data Models: Introduction to Data Models, Object Based Logical Model, Record Base Logical Model-Relational Model, Network Model, Hierarchical Model. Entity Relationship Model, Entity Set, Attribute, Relationship Set. Entity Relationship Diagram (ERD) Extended features of ERD.

Unit-3

Relational Databases: Introduction to Relational Databases and Terminology-Relation, Tuple, Attribute, Cardinality, Degree, Domain. Keys, Super Key, Candidate Key, Primary Key, Foreign Key, Relational Algebra. Operations, Select, Project, Union, Difference, Intersection Cartesian product, Join, Natural Join.

Unit-4

Structured Query Language (SQL): Introduction to SQL, History of SQL, Basic Structure, DDL Commands, DML Commands, TCL Commands, Simple Queries, Nested Queries, Join queries, semi-join queries, self-join. Aggregate Functions and Clauses.

Unit-5

Relational Database Design: Introduction to Relational Database Design, DBMS vs RDBMS, Anomalies of un-normalized database.

Unit-6

Normalization: Need of Normalization, Normal Forms-1NF, 2NF, 3NF, BCNF and functional dependency.

Text and Reference Books

1. Database System Concepts, Henry Korth , A. Silberschatz, 5th Edition, 2005.
2. An Introduction to Database System, Bipin Desai, Galgotia Publications, 1991.
3. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB Publications, 4th Edition.
4. Schaum's Outline of "Fundamental of Relational Databases", Ramon A. Mata, Pauline K. Cushman, McGraw Hill, December, 2006.

Course Outcomes:

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|---|
| 1. Acquire knowledge of handling large volume of data. |
| 2. Acquire skills to deal with Real life database implementation. |
| 3. Response off faster queries and serve as many users as possible concurrently. |
| 4. Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning. |
| 5. Fit with any Database project in industry after completion of degree. |

BCA303: Data Structure Using C

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite :-

1. Familiarity with the fundamentals of C or other programming language
2. A solid background in mathematics, including probability, set theory

Course Objectives:

1. To learn the basics of abstract data types.
2. To learn the principles of linear and nonlinear data structures.
3. To build an application using sorting and searching.

Detailed Syllabus

UNIT I (10 Hours)

Introduction Data Structure: Introduction to Data Structure, Classification of data Structure, Operation on data structure, Top down and Bottom-up approaches to algorithm, Analysis of algorithm, Frequency count, Complexity measures in terms of time and space.

UNIT II (10 Hours)

Arrays: Representation of array (single & multi dimensional arrays), Traversing, insertion and deletion operations. Merging, matrix addition, subtraction, multiplication, transpose, sparse matrix

UNIT III (10 Hours)

Stacks: Introduction to stack, primitive operation on stack, **Stacks application: Infix, post fix, Prefix and Recursion.**

Queues: Introduction to queues, Primitive Operations on the Queues, **Circular queue, Dequeue, Priority queue, Applications of queue.**

UNIT IV (10 Hours)

Linked List: Introduction to the Linked List, Basic operations on linked list, Header nodes, **Doubly Linked List, Circular Linked List, and Application of Linked List.**

UNIT V (6 Hours)

Trees: Basic Terminology, **Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Application of Binary tree, Threaded binary tree, Heap Tree, B-tree & Height balanced tree.**

UNIT VI (10 Hours)

Searching and Sorting: **Sequential search & binary search, Hashing, sorting method (Insertion sort, Selection sort, Bubble sort, Quick sort, Merge sort, Heap sort).**

Text and Reference Books

1. Data Structures and Program Design in C, R.L. Kruse, B.P. Leung and C. L. Tondo, PHI, 2008.
2. Data Structures, Seymour Lipschutz, McGraw Hill Publication, 2009
3. Data structures using C, Aaron M. Tenenbaum, Pearson education, 2004.
4. Data structure through C, Yashvant Kanetkar, BPB Publication, 2006.

Course Outcomes:

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| 1. Solving problems and simulate the insertion and deletion by using DS methods. |
| 2. Understanding the concept and recognize the basic terminology used in computer programming. |
| 3. Write, Compile and Debug programs in C language and use different data types for writing the programs. |
| 4. Design programs connecting decision structures, loops and functions. |
| 5. Understand the dynamic behavior of memory by the use of pointers |
| 6. Use different data structures and create / manipulate basic data files and developing applications for real world problems. |

BCA 304: Computer Networking

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the fundamentals of Digital Electronics.
2. A network simulation method.

Course Objectives:

1. Learn how computer network hardware and software operate.
2. Investigate the fundamental issues driving network design.
3. Learn about dominant network technologies.

Detailed Syllabus

UNIT-I (10 Hours)

Introduction to Computer Networks: Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Network topologies, ISO-OSI reference model, TCP/IP reference model.

UNIT-II (6 Hours)

Physical Layer: Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise,. Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching methods, integrated services digital networks.

UNIT-III (10 Hours)

Medium Access sub layer: Channel Allocations, LAN protocols -ALOHA protocols, Collision free Protocols-Token Passing, **IEEE standards**, Ethernet and Token Ring. Data Link Layer: Framing, **Error detection and correction codes**: checksum, CRC, hamming code, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ,

UNIT-IV (10 Hours)

Network Layer: Point-to Point networks, Routing algorithms, Congestion control algorithms, Internetworking Devices, **IP protocol**, **IP addresses: IPv4 classful and classless addressing**, Introduction to IPv6.

UNIT-V (10 Hours)

Transport Layer: Connection management: Three-way Handshaking. Introduction of User Datagram Protocol (UDP), Basics of Transmission Control Protocol. (TCP).

UNIT- VI (10 Hours)

Application Layer: File Transfer Protocol, Domain Name System, Electronic mail, Intro of Client server model, Hyper Text Transfer Protocol, WWW, Example Networks - Internet and Public Networks

Text and Reference Books

1. Computer Networks, A. S Tanenbaum, Pearson education, 4th Edition.
2. Data and Computer Communication, W. Stallings, Macmillan Press, 7th Edition
3. Data Communication & Networking, 4th Edition, Tata McGraw Hill. By Behrouz A. Forouzan.
4. Computer Networking, 3rd Edition, Pearson Education by James F. Kurose and Keith W. Ross

Course Outcomes:

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| 1. Explain and demonstrate the mechanics associated with IP addressing, device interface, association between physical and logical addressing, subnetting and supernetting |
| 2. Understand the techniques and protocols used (DSL, SONET, ATM). |
| 3. Know the principles of congestion control and trade-offs in fairness and efficiency |
| 4. Distinguish between analog and digital signals and understand their characteristics (Fourier representation, signal corruption). |

BCA 401: Software Engineering

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite: - BCA 103 Computer Fundamental and Programming using C.

Course Objectives:

1. To recognize basic software design principles, software engineering methods and practices, software cost estimation, testing approaches and their appropriate application.
2. To exemplify the critical understanding of software process models, project management and requirements, implementation issues, verification and validation.
3. To implement techniques, skills, and modern software engineering tools for designing a system and to apply the basic project management practices in real life projects.
4. To demonstrate development of a computing-based system in terms of design, verification, validation, implementation, and maintenance within realistic constraints.
5. To evaluate software design principles, software requirements with existing tools and to test the project with respect to effort and development time.

Detailed Syllabus

Unit-1

Introduction: Introduction to Software Engineering, Software Characteristics, Software Engineering Processes, And Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, and Iterative Enhancement Models.

Unit-2

Software Requirement Specifications (SRS): Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Data Flow Diagrams, **Entity Relationship Diagrams, Decision Tables, SRS Document.**

Unit-3

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Coupling and Cohesion, Top-Down and Bottom-Up Design Strategies: Function Oriented Design, Object Oriented Design.

Unit-4

Software Testing : Testing Objectives, Test Data Suit Preparation, **Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up testing. White Box Testing, Black Box Testing, Alpha and Beta Testing of Products. Formal Technical Reviews, Walk Through, Code Inspection, Compliance with Design and Coding Standards.**

Unit-5

Software Maintenance: Need for Maintenance, Preventive, Corrective and Perfective Maintenance Cost of Maintenance, **Maintenance Models.**

Unit-6

Software Project Management: **Estimation of Various Parameters such as Size, Cost, Efforts, Schedule/Duration, Constructive Cost Model (COCOMO), Resource Allocation Models, Software Risk Analysis and Management, Software Quality Attributes and Factors Software Configuration Management, CASE Tools.**

Text and Reference Books

1. Software Engineering: A Practitioners Approach, R. S. Pressman, McGraw Hill, 6th Edition.
2. Fundamentals of Software Engineering, Rajib Mall, PHI Publication, 2nd Edition.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers, 3rd Edition.
4. Software Engineering, Pankaj Jalote, Wiley, 5th Edition.
5. Ian Sommerville, Software Engineering, Addison Wesley, 7th Edition.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Understand that how to apply the software engineering lifecycle by demonstrating competence in planning, analysis, design, testing and implementation. |
| 2. Identify the best software model to develop a real-life software product. |
| 3. Demonstrate an ability to use the techniques and tools necessary for engineering practice. |
| 4. Work in one or more significant application domains. |
| 5. Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle. |
| 6. Work as an individual and as part of a multidisciplinary team to develop and deliver quality software. |

BCA402: Computer Graphics and Animation

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test – 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
	Attendance – 12 Marks
Credits: 4	End Semester Exam – 70 Marks

Prerequisite: Linear Algebra, Matrix, and C-Programming.

Course Objectives:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Detailed Syllabus:

Unit-1

Introduction to computer graphics: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Color CRT, Flat panel displays, Frame buffer and video controller, interactive input and output devices.

Unit-2

Line drawing algorithms: DDA, Bresenham.

Circle generating algorithms: Midpoint circle generating algorithm, Bresenham circle generating algorithm.

Ellipse generating algorithms: Midpoint ellipse generating algorithm, Bresenham ellipse generating algorithm.

Unit-3

Polygon Filling: Scan line Polygon filling Algorithm, Boundary fill Algorithm, Flood fill Algorithm.

2D Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing.

Unit-4

Segment and Display files: Segments, Functions for segmenting the display file, Posting and un-posting a segment, segment naming schemes, Default error conditions, Appending to segments, Refresh concurrent with reconstruction, Free storage allocation, display file structure. Interactive picture construction techniques.

Unit-5

Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non rectangular clip windows; Polygon clipping – Sutherland Hodgeman

polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit-6

ThreeDimensional: 3-D geometric primitives, 3-D Transformation, 3-D viewing, projections, 3-D Clipping. **Curves and Surfaces:** Quadric surfaces, Spheres, Ellipsoid, Blobby objects, introductory concepts of Spline, Bezier curves and surfaces.

Suggested Readings:

1. Computer Graphics-C Version, Donald Hearn, M. Pauline Baker, Pearson Education, 2007
2. Computer graphics, Schaum's outline, TMH, 2006.
3. Computer Graphics: A Programming Approach, Steven Harrington, TMH, 1984.
4. Computer Graphics Principles and Practice, James D Foley, Pearson education 2004.

Course Outcomes:

1. Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
2. Have a knowledge and understanding of geometrical transformations and 3D viewing.
3. Have a knowledge and understanding of techniques for representing 3D geometrical objects.
4. Have a knowledge and understanding of interaction techniques.
5. Create interactive graphics applications.
6. Use C builds functions or equivalent graphics tools.
7. Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

BCA403: Object Oriented Programming using C++

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : -

1. Computer Fundamentals
2. Principles of computer programming
3. Basic mathematical formulas.

Course Objectives:

1. To get familiar with the main features of the C++ language.
2. Be able to write a C++ program to solve a well specified problem.
3. Understand a C++ program written by someone else.
4. Be able to debug and test C++ programs;
5. Understand how to read C++ doc library documentation and reuse library code.
6. To make the students understand the features of object oriented principles.
7. Familiarize them with virtual functions, templates and exception handling.
8. To make the students to develop applications using C++.

Detailed Syllabus

UNIT I (6 Hours)

Object-Oriented Analysis and Data Modeling: Object oriented Analysis Modeling, Data Modeling.

Object-Oriented Design (OOD): Origins of OOD, OOD concepts, OOD methods, notation for object-oriented Design.

UNIT II (10 Hours)

Introduction to OOP: Basic concepts of OOPs, Advantages of OOP, Need of object-oriented programming, characteristics of object-oriented languages, Object oriented approach vs procedure oriented approach, Object, Classes, Encapsulation, Data Abstraction, Inheritance, Polymorphism, Dynamic binding, Message Passing, Application of OOPs.

UNIT III (10 Hours)

C++ Programming Basics: Introduction to C++, Difference between C++ and C. Basic program construction, input/output using cin/count; keywords, identifiers, data types, manipulators, Operators in C++, Operator Precedence, Typecast operator, Control structures, Loops.

UNIT IV (10 Hours)

Functions: Simple functions, Function Prototyping, Call by reference, Return by Reference, Default Arguments, Constant Arguments, Inline Function, functions Overloading, Friend and virtual Functions, static function.

UNIT V (10 Hours)

Objects and classes: Specifying class & object, : Array Fundamentals, Arrays as class member data, Arrays of objects, Constructors and Destructors, objects as function arguments.

Operator Overloading: Overloading Unary & Binary operators, Data conversion.

UNIT V1 (10 Hours)

Inheritance: introduction, defining derived classes, overriding member functions, Single Inheritance, multilevel Inheritance, multiple Inheritance, Hierarchical Inheritance, Virtual Base Class.

Files and Streams: Introduction, classes for file stream operations, opening and closing files, file pointers and their manipulations, Error Handling, command-line Arguments.

Text and Reference Books

1. Object Oriented Programming with C++, E. Balaguruswamy, 4th Edition.
2. Object Oriented Programming in C++, Robert Lafore, Sams, Dec., 2001.
3. C++ Programming, D. Ravichandran, TMH, 2nd Edition, Dec. 2002.
4. Mastering C++, Venugopal, TMH, September, 1997.

Course Outcomes:

- | |
|--|
| 1. Understanding the concept and recognize the basic terminology used in computer programming. |
| 2. Students will be able to apply the computer programming techniques to solve practical problems. |
| 3. Students will be able to understand the concepts and implementation of class , constructors and destructors. |
| 4. Students are able to learn C++ data types, memory allocation/deallocations, functions and pointers. |
| 5. Use different data structures and create / manipulate basic data files and developing applications for real world problems. |
| 6. Students are able to apply object oriented programming concepts to software problems in C++ |
- Outcome(s)

BCA404: Organization Behavior

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Principles of Management (BCA 104)

Course Objectives:

1. To establish a social system in the organization.
2. To determine the motivation level.
3. To encourage the people, to work enthusiastically in the organization.
4. To create an environment for the development of effective leadership.
5. To increase the moral of employees.
6. To find out the ways for effective organizational development.

Detailed Syllabus

Unit-1

Introduction to Organization Behaviour: Concept, Nature, Characteristics, Historical Background, Fundamental concepts of OB, 21st Century corporate, Models of Organizational Behaviour, Management Challenge, A Paradigm Shift, Relationship with Other Fields.

Unit-2

Perception Process: Nature and Importance, Perception Process, Management and Behavioural Application of Perception.

Personality & Attitudes: Meaning of personality, Theories of Personality Nature and dimensions of attitude, Job Satisfaction, Organizational Commitment, and Attitude Measurement.

Learning: Process of Learning, Principles of Learning

Unit-3

Motivation: Motives, Characteristics, Classification of motives, Primary Motives, Secondary motives, Theories of Work Motivation, Early and Contemporary views.

Leadership: Definition, Importance, Leadership Styles, Models and Theories of Leadership Styles.

Unit-4

Group Dynamics: Definition, Stages of Group Development, Group Cohesiveness, Formal and Informal Groups, Group Processes and Decision Making , **conflict management**, Conflict Process, **Strategies for encouraging constructive conflict, Strategies for resolving destructive conflict.**

Unit-5

Management of Change: Importance, Forces responsible for change, Resistance to change, Overcoming resistance to change. Introduction of change in the organization, Organizational Development as a toll for introduction of change.

Unit – 6

Organizational Design: various organizational structures and their effects on human behaviour. Organizational Climate, Organizational Culture, Organizational Effectiveness.

Text and Reference Books

1. Organizational Behaviour, Robbins Stephen P., Pearson Education, 13th Edition.
2. Organizational Behaviour: Human Behaviour at Work, Newstrom John W., TMH, 12th Edition.
3. Organizational Behaviour, Mc Shane L. Steven, Glinow Mary Ann Von, Sharma Radha R., TMH, 4th Edition.
4. Organizational Behaviour, Luthans Fred, Tata Mc Graw Hill, 10th Edition.

Course Outcomes:

- | |
|--|
| 1. Understanding of the social system in the organization. |
| 2. Understanding the motivation level of the employees. |
| 3. Result into encouragement of the people to work enthusiastically in the organization. |
| 4. Help in creating an environment for the development of effective leadership. |
| 5. Increase the moral of employees. |
| 6. Help in finding out the ways for effective organizational development. |

BCA-502: Java Programming

Teaching Scheme

Lectures: 4 hrs/Week

Lab: 3 hrs/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - BCA203 (C programming), BCA 251 (C Programming Lab), BCA 403 (Object Oriented Programming using C++), BCA 451 (Object Oriented Programming using C++ Lab)

Course Objectives:

1. To describe concepts of OOPS using Java.
2. To summarize the uses of packages in Java programming.
3. To implement string and exception handling concepts using Java.
4. To analyze concepts of strings and file handling, exception handling.
5. To test significance of multithreading and socket programming.
6. To design GUI application along with the database connectivity.

Detailed Syllabus

UNIT I

Introduction: Features of the Java Language, Platform Independency, JVM, Byte-code, Operator, Data type, Variables, Robustness.

OOPS: Object, Class, Classifications, Methods & classes, Inheritance, Static and non Static methods, Overloading, Overriding of methods, Abstraction, Interface, Polymorphism.

UNIT II

Packages: Data Encapsulation, Concept of Package, **Creating package, Importing packages**, Child Packages.

Exception Handling: Exceptions & Errors, Types of Exception, Control Flow in Exceptions, Use of the try, catch, finally, throw, throws in Exception Handling. In-built and User Defined Exceptions, **Checked and Unchecked Exceptions.**

UNIT III

I/O, String Handling: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer.

I/O and File Handling: Bufferedreader class, InputStreamReader class, Scanner class, Creating File, Finding File Reading and Writing File (Doc File, Html File, a Text File).

Array and Loop: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array and Control Statements.

UNIT IV (10 Hours)

Multi Threading: Understanding Threads, Needs of Multi-Threaded Programming, Solution of Producer consumer problem by Multi Thread, Thread Life-Cycle, Thread Priorities, **Synchronization of Thread.**

Java Networking: Concept of client and Server, Introduction of TCP, Concept of Socket, Importance of Socket, **Socket programming, communication between client and server.**

UNIT V

GUI Application Development: Introduction to AWT, **AWT controls Java Applet, Layout Managers, Menus, Images, Graphics, Event Handling, Swing, Containers, Panes, Frames, Dialogue boxes, working with image controls.**

UNIT VI

JDBC: The connectivity Model, JDBC/ODBC Bridge, Java, SQL package, connectivity to remote database, navigating through multiple rows retrieved from a table/ multiple tables of a database.

Text and Reference Books:

1. The Complete Reference Internet, Margaret Levine Young, TMH, 1999.
2. The Complete Reference JAVA 2, Naughton Schildt, TMH, 5th Edition.
3. Programming in JAVA, E. Balagurusamy E, TMH, 3rd Edition, 2006.
4. Java Black book, Steven Helzner, Dreamtech , 2002

Course Outcomes:

After completing the course , students will be able to:

- | |
|--|
| 1. Understand concepts of OOPS. |
| 2. Analyze the effect of using OOPS concepts. |
| 3. Understand the communication between client and the server. |
| 4. Understand the concept of multithreading on the single processor. |
| 5. Start doing programming for the GUI applications. |
| 6. Understand the connectivity process with the database server . |

BCA 505: Data and Network Security

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - BCA 203 C Programming, BCA 304 Computer Networking.

Course Objectives:

- 1- To define cryptography, its use, areas where cryptography is needed.
- 2- To understand security concepts, Ethics in Network Security, security threats, and the security services.
- 3- To develop code to implement a cryptographic algorithm using any programming language.
- 4- To analyze all key less and keyed algorithms to identify their strength and weaknesses and try to solve and remove the limitations or optimize the complexity of algorithm(s).
- 5- To test different available algorithms in terms of complexity, response time, key size, data size, security assurance, etc.
- 6- To design an algorithmic solution of a problem either by applying existing algorithms or a new one. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.

Detailed Syllabus

Unit-1

Introduction to Cryptography: Introduction To Security Attacks, Services & Mechanisms, And Conventional Encryption: Classical Techniques, cryptanalytic attacks.

Unit-2

Private Key Encryption: Modern Techniques: Simplified DES, Block Cipher Principles, **DES Standard, Double DES, Triples DES.**

Unit-3

Public Key Encryption: Public-Key Cryptography: Principles of Public-Key Cryptosystems, **RSA Algorithm, public key distribution, symmetric key distribution using asymmetric cryptosystem.**

Unit-4

Hash Functions: **Message Authentication & Hash Functions, Authentication Functions, Message Authentication Codes (MAC), Secure Hash Algorithm (SHA), Digital Signatures.**

Unit-5

Application Layer Security: **Electronic Mail Security, Pretty Good Privacy (PGP).** **Transport Layer Security:** Secure Socket Layer & Transport Layer Security. **Network Layer Security:** Authentication Header, Encapsulating Security Payloads.

Unit – 6

Network and System Security: Authentication Applications-Kerberos X.509, Secure Electronic Transaction (Set), System Security: Intruders, Viruses, Fire wall Design Principles.

Text and Reference Books

1. Cryptography and Network Security: Principles and Practice, William Stallings, Prentice Hall, New Jersey, 4th Edition.
2. Introduction to cryptography, Johannes A. Buchmann, Springer, Verlag, 2001.
3. Cryptography and Network Security, Atul Kahate, TMH, 2nd Edition.
4. Cryptography, Forouzan, TMH, 2007.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Identify some of the factors driving the need for network security. |
| 2. Identify and classify particular examples of attacks . |
| 3. Define the terms vulnerability, threat and attack. |
| 4. Identify physical points of vulnerability in simple networks. |
| 5. Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems. |

BCA 506: Data Mining and Warehousing

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - BCA 201 Engineering Mathematics and BCA 302 Database Management Systems

Course Objectives:

1. To have an idea about data mining and its various applications.
2. To understand multidimensional behavior of data and data warehouse architectures.
3. To apply data pre-processing concepts to clean, integrate and transform different datasets, apply data mining methods to information systems and generate results for decision making systems.
4. To analyze various data mining techniques to solve problems.
5. To demonstrate data mining techniques to solve problems in other disciplines using mathematical approach.
6. To create and design intelligent program using data mining techniques.

Detailed Syllabus

Unit-1

Definition, Data Mining as the Evolution of Information Technology, Knowledge Discovery Process (KDP), Classification of Mining systems, Techniques involved.

Unit-2

Needs, Pre-processing data, Data Cleaning, Data integration and transformation, data reduction, discretization, Concept of hierarchy generation.

Unit-3

Definition, Differences between Operational Database Systems and Data Warehouses, OLTP vs. OLAP, 3 Tier Architecture of Data Warehouse, Concept of ETL.

Unit-4

Data Cube- A Multidimensional Data Model, Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional Data Models, OLAP operation.

Unit-5

Introduction to Association Rule and Association Rule Mining, Classification: Decision Tree Induction and Bayesian Classification algorithm, K-nearest neighbor, Clustering: Cluster Analysis.

Unit-6

Mining Complex Data Types, Methodologies of Data Mining, Data Mining Applications, Web Mining.

Text and Reference Books

1. Data Mining -Concepts and Techniques, Han, Kamber, Harcourt India, 2006.
2. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson, 2002.
3. Data Mining Techniques, Arjun K. Pujari, University Press, 2001.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Understand the functionality of the various data mining and data warehousing component. |
| 2. Appreciate the strengths and limitations of various data mining and data warehousing models. |
| 3. Explain the analyzing techniques of various data. |
| 4. Describe different methodologies used in data mining and data warehousing. |
| 5. Compare different approaches of data warehousing and data mining with various technologies. |

BCA 507: Grid and Cloud Computing

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - BCA 205 Introduction to Operating Systems, BCA 304 Computer Networking.

Course Objectives:

1. To describe grid and cloud computing as an emerging technologies.
2. To understand the importance of grid and cloud computing along with various security issues.
3. To identify the differences between various types of computing techniques, Cloud deployment models and service models.
4. To understand the implementation of cloud security and mobile cloud computing concepts..
5. To analyze various virtualization and scheduling techniques.
6. To study the design approaches used by various cloud service providers.

Detailed Syllabus

Unit-1

Recent trends in computing, Introduction to Grid Computing: Motivation, Definition of Grid Computing, Evolution of Grid, Examples and Usages, Research Possibilities, Benefits of Grid Computing.

Unit-2

Grid Basics: Grid Architecture and its relationship to other distributed technologies, Grid Application Areas. **Security Issues in Grids:** Kerberos, GSI and Grid Security Framework. **Migrating to Cloud.**

Unit-3

Cloud Computing Basics- Cloud Computing Overview, Characteristics, Applications, Components, Benefits, Limitations, Challenges. First Movers in Cloud.

Cloud Computing Technology: Hardware and Infrastructure, Clients, Security, Network, Services.

Unit-4

Cloud Deployment Models: Private Cloud; Public Cloud; Community Cloud; Hybrid Cloud.

Cloud Computing Service Models: Infrastructure as a Service; Platform as a Service; Software as a Service. **Accessing the Cloud:** Web Applications, Web API's, and Web Browsers.

Unit-5

Cloud Storage and Security: Overview, Advantages, Storage as a Service, Security, Reliability, Advantages, Cautions, Theft, Cloud Storage Providers. **Standards:** Applications, Client, Infrastructure, Services.

UNIT-6

Virtualization Technologies: Types of Virtualization, Benefits of Virtualization, **Hypervis or.**

Scheduling: Overview of Scheduling problem, Different types of scheduling, Scheduling Algorithms. **Case Study of Amazon S3. Major Cloud Service providers.**

Text and Reference Books

- 1- The Grid- Blueprint for a New Computing Infrastructure, Ian Foster, Carl Kesselman, 2nd Edition, Morgan Kaufmann Publications, 2003.
- 2- Grid Computing: Making the Global Infrastructure a Reality, Francine Berman, Geoffrey Fox, Tony Hey, John Wiley & Sons, 2003.
- 3- Cloud Computing: Principles and Paradigms, Rajkumar Buyya and James Broberg, John Wiley & Sons, 2011.
- 4- Cloud Computing, A Practical Approach, Anthony T Velte, Mc Graw Hill, 2010.

Course Outcomes:

Students will able to:

- | |
|--|
| 1. Define Cloud Computing and memorize the different Cloud service and deployment models. |
| 2. Describe importance of virtualization along with their technologies. |
| 3. Use and Examine different cloud computing services. |
| 4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing. |
| 5. Describe the key components of Amazon web Service. |
| 6. Design & develop backup strategies for cloud data based on features. |

BCA511: Multimedia and its Applications

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Data Structure, Design and Analysis of Algorithms, Discrete Mathematics.

Course Objectives:

1. Introduce to the students the characteristics and design methodologies of Multimedia
2. Expose students to theoretical and fundamental concepts of multimedia, its applications and the techniques involved
3. Help students learn the issues involved in capturing, processing, manipulating, storing, and retrieving various kinds of continuous media.
4. To understand the image creation.
5. To work on animation and video.

Detailed Syllabus

Unit-1

Introduction to Multimedia: Definition of Multimedia, CD-ROMs and Multimedia applications. Multimedia requirements-Hardware, Software, Creativity and organization, Multimedia skills and training.

Unit-2

Multimedia Hardware: Hardware requirement for multimedia, Macintosh versus PC. The Macintosh platform, PC platform, Connections, Memory and storage devices, input devices, output hardware, Communication devices.

Unit-3

Multimedia Software : Basic tools, painting and drawing tools, OCR software, Sound editing programs, Animation devices and digital movies and other accessories, **Linking multimedia objects, office suites, word processor, spreadsheets presentation tools,** Types of authoring tools card and page-based, Icon based and time based authoring tools, Object oriented tools.

Unit-4

Multimedia Software : Basic tools, painting and drawing tools, OCR software, Sound editing programs, Animation devices and digital movies and other accessories, **Linking multimedia objects, office suites, word processor, spreadsheets presentation tools,** Types of authoring tools card and page-based, Icon based and time based authoring tools, Object oriented tools.

Unit-5

Production Tips: Image-creation, **making still images,** images colors, Image, File format, **image editing.**

Unit-6

Animation and video: Animation-principals of animation, **making workable animations,** Video, using video, Broadcast video, standard, integrating computer and TVs, shooting and editing video, using recording formats, Video tips.

Text and Reference Book

1. Multimedia Making It Work, Tay Vaughan, TMH, 5th Edition.
2. Multimedia Power Tools, Peter Jerram, M. Gosney, Random House Electronics Publishing, 2nd Edition

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Identify different media; representations of different multimedia data and data formats. |
| 2. Analyze various compression techniques. |
| 3. Compare various audio and video file formats. |
| 4. Apply different coding technique for solving real world problems |
| 5. Choose optical storage media suitable for multimedia applications. |
| 6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing. |

BCA 512: Android Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Unit Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Basics of Java language and PL/SQL

Course Objectives:

1. To gain knowledge of installing Android Studio.
2. To learn designing of User Interface and Layouts for Android App.
3. To learn how to use intents to broadcast data within and between Applications.
4. To use Content providers.
5. To introduce Android APIs.
6. To design basic applications.

Detailed Syllabus

UNIT I

JAVA Concepts (10 hrs): Platform Independency, OOPs Concepts, Inheritance in detail, Exception handling, Packages & interfaces, JVM & .jar file extension, Multi threading (Thread class & Runnable Interface).

SQL: DML & DDL Queries in brief

UNIT II

Introduction to Android: Introduction of Android, Setting up development environment, Installing the SDK, Creating Android Emulator, Android development Tool.

Fundamentals: Basic Building blocks - Activities, Services, Broadcast Receivers & Content provider, UI Components - Views & notifications, Components for communication -Intents, Android API levels (versions & version names)

UNIT III

Application Structure: AndroidManifest.xml, Resources & R.java, Assets, Layouts & Draw-able Resources, Activities and Activity lifecycle, First sample Application

UNIT IV:

Emulator-Android Virtual Device: Launching emulator, Logcat usage, Introduction to DDMS.

Second App: (switching between activities), Develop an app for demonstrating the communication between Intents

UNIT V

Basic UI design: Form widgets, Text Fields, Button, TextView, EditText, Checkbox, Radio Button, View, ViewGroup, Layouts, [dip, dp, sip, sp] versus px, Examples

UNIT VI

Menu: Option menu, Context menu, Sub menu, Menu from xml, Menu via code, Examples

UI design: Time and Date, Images and media, Composite, Alert Dialogs & Toast

Text and Reference Books

1. Android Application Development (With Kitkat Support), Black Book, by Kogent Learning Solutions Inc. by Pradeep Kothari.
2. Android Application Development Cookbook: 93 Recipes for Building Winning Apps (WROX), by Wei-Meng Lee.
3. Professional Android 4 Application Development, by Reto Meier.
4. Beginning Android 4 Application Development, Wei-Meng Lee.
5. Android Application Development, by Lombardo John and Blake Meike.

Course Outcomes:

After completing the course, students will be able to:

1. Understand basic knowledge of Java fundamental concepts and PL/SQL
2. Design and Implement User Interfaces and Layouts of Android App.
3. Use Intents for activity and broadcasting data in Android App.
4. Design and Implement Content Providers.
5. Evaluate performance of Application in terms of activity switching
6. Able to design menu driven applications

BCA 513: Advanced SQL Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-requisites: Basic computer literacy including ability to create and manipulate files and install software.

Course Objectives:

1. Knowledge of DBMS, both in terms of use and implementation/design.
2. Understand basic database concepts, including the structure and operation of the relational data model. Discussed about the normalizations.
3. Learn structured query language (SQL) to an intermediate/advanced level.
4. Understand the structure and design of relational databases and using different queries.
5. Be able to write PL/SQL statements that create database objects.
6. Understand the importance commands are procedure, function, trigger.

Detailed Syllabus

Unit-1

Database Concept: Database and Data Base Management System Definition, File Management System and its disadvantages, Benefits of DBMS, RDBMS Definition, DBMS V/S RDBMS.

Unit-2

Relational Databases: E.F Codd's Rules, Normalization: 1NF, 2NF, 3NF, BCNF. Relational Databases Terminology: Relation, Tuple, Attribute, Cardinality, Degree, Domain.

Unit-3

Keys: Super Key, Candidate Key, Primary Key, Foreign Key. Structured Query Language: Features of SQL, SQL *PLUS, SQL V/s SQL *PLUS, Rules for SQL, SQL Delimiters, Components of SQL. Constraints: Data constraints, Types of data constraints: UNIQUE, NOT NULL at column level, CHECK, NULL value constraint

Unit-4

Relational Databases: Relational Algebra. Operations, Select, Project, Union, Difference, Intersection Cartesian product, Join, Natural Join, Simple Queries, Nested Queries, Join queries, semi-join queries, self-join.

Unit-5

PL/SQL: Basic Introduction, Advantages of PL/SQL, The generic PL/SQL block, Literals, Variables, Constants, Comparisons, Comments. Control Structure: Conditional Control, Iterative Control and Sequential Control.

Unit-6

PL/SQL Transaction: Cursor, Types of Cursor: Implicit cursor, Explicit cursor.

PL/SQL Database objects: Introduction of Procedure and Functions, Advantages of using Procedure and Functions, Database Triggers, Triggers v/s Procedure, Types of Triggers

Text and Reference Books

1. Database System Concepts, Henry Korth , A. Silberschatz, 5th Edition, 2005.
2. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB Publications, 4th Edition.
3. Schaum's Outline of "Fundamental of Relational Databases", Ramon A. Mata, Pauline K. Cushman, McGraw Hill, December, 2006.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Students will familiar database and file management. |
| 2. Students will follow the E.F Codd's Rules and understand the normalization and importance in RDBMS. |
| 3. To understand the indignity constraints and various keys, features of SQL, SQL *PLUS. |
| 4. Students will study of Relational databases and Relational algebra. |
| 5. Students will understand the Literals, Variables, Constants, Comparisons, Comments. |
| 6. To understand the PL/SQL Transaction used by Cursor, Implicit cursor, Explicit cursor and type of trigger. |

BCA 514: Artificial Intelligence

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: -

Course Objectives:

1. To understand how these algorithms works so the main objective of this course is and how to analyze the data to make a proper decision.
2. To know the application areas and building blocks of AI as presented in terms of intelligent agents.
3. To initiate the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems in different fields.
4. To evaluate the different stages of development of the AI field from human like behavior to Intelligent Agents.
5. To build intelligent machine which can perform and act like humans.

Detailed Syllabus

Unit-1

Introduction to Artificial Intelligence, Simulation of sophisticated & Intelligent Behavior in different area, problem solving in games, natural language, automated reasoning, visual perception, and heuristic algorithm versus solution guaranteed algorithms.

Unit-2

Introduction to Search: Searching for solutions, uniformed search strategies, informed search strategies, Local search algorithms and optimistic problems.

Unit-3

Knowledge Representation First order predicate calculus, Horn Clauses, Semantic Nets, Partitioned Nets, Case Grammar Theory, Production Rules Knowledge Base, The Interface System, Forward & Backward Deduction.

Unit-4

Expert System Existing Systems (DENDRAL, MYCIN) domain exploration, Meta Knowledge.

Unit-5

Pattern Recognition Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception Semantic & Model, Object Identification, Speech Recognition.

Unit-6

Understanding Natural Languages, Natural Language Processing with its various components. Programming Language- Introduction to programming Language, LISP, PROLOG.

Text and Reference Books

1. Charnick "Introduction to A.I.", Addison Wesley
2. Rich & Knight, "Artificial Intelligence"
3. Winston, "LISP", Addison Wesley
4. Marcellous, "Expert System Programming", PHI
5. Elamie, "Artificial Intelligence", Academic Press
6. Lioyed, "Foundation of Logic Processing", Springer Verlag

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. How to solve a particular problem by using different algorithms which is impossible for humans. |
| 2. How to make proper decisions by gathering information and analyzing them. |
| 3. How expert system works and perform tasks. |
| 4. How to convert a particular sentence into logical statement. |
| 5. Analyze the problem as a state space, graph, design heuristics and select amongst different search based techniques to solve them. |

BCA 602: GUI using .Net Framework

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: HTML and CSS.

Course Objectives:

1. Learn about MS.NET framework developed by Microsoft.
2. You will be able to using XML in C#.NET specifically ADO.NET and SQL server.
3. Be able to understand use of C# basics, Objects and Types, Inheritance .
4. To develop, implement and creating Applications with C#.
5. To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web.
6. To understand and be able to explain Security in the .NET framework and Deployment in the .NET.
7. To develop Assemblies and Deployment in .NET, Mobile Application Development.

Detailed Syllabus:

Unit-1

The .Net framework: Introduction of .Net, The Origin of .Net Technology (OLE technologies, COM technologies, .NET technologies), The architecture of .Net Framework, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In –Time Compilation, Framework Base Classes.

Unit-2

Introduction of Programming Language C#: Introduction of C#, Characteristics of C#, Differences between C# and C++, Differences between C# and JAVA, C# program introduction: The Main method specification, Namespace, Variables: Declaring implicit and explicit variables, Data-types, Boxing and Un-boxing.

Unit-3

Controlling program execution: IF statements, CASE (switch) statements, Operators, Looping, Storing multiple values with arrays. Inheritance, Method Overloading and method overriding, Polymorphism, Operator Overloading, Abstract Class, Inner Class, Interface, Delegates, Partial Classes, Errors and its types, Exception Handling.

Unit-4

GUI –Controls and There Event Handling: Text Box, Rich Text Box, Masked Text-box, Label, Link Label, Radio Button ,Check Box, List Box ,Combo Box ,Checked List Box .Date Time Picker Control, Calendar Control, Tool Tip, Shock Web Flash Object.

Navigation Control and Its Event Handling: Context Menu Strip, Tool Strip, Status Strip, Tool Strip Container.

Unit-5

Containers and its Event Handling: Flow Layout Panel, Group Box, Panel, Split Container, Tab Control, Table Layout Panel.

Dialog Boxes and its Event Handling: Message Dialog Boxes, Color Dialog, Folder Browser Dialog, Font Dialog, Open File Dialog, Save File Dialog.

Unit-6

Data Controls: Data Source, Data Set, and Data Grid View displaying Record in the Grid View Controls. ADO.Net: Connected and Disconnected Architecture, Displaying Record from the Database, Inserting Record into Database, Creating Login using Database, Deleting Record from the Database, Fetching Record from the Database, Update Record in the Database, Creating Setup of .Net Application using Set up Wizard.

Suggested Readings:

1. Beginning Visual C# 2008, John Wiley, Wrox, May 2008.
2. Microsoft .Net for Programmers, Fergal Grimes, SPI, 2002.
3. Programming with C#, E. Balagurusamy, TMH, 1st Edition.

Course Outcomes:

After completing the course, students will be able to:

1. Learn to develop applications using C# and VB.NET.
2. Learn to apply these languages to develop server-side applications which make use of ADO.NET, ASP.NET, Web Services etc.
3. Understand use of C# basics, Objects and Types, Inheritance
4. Develop, implement and creating Applications with C#.
5. Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web
6. Understand and be able to explain Security in the .NET framework and Deployment in the .NET.

BCA 603 Web Based System Development

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite :-Java Programming (BCA502), Database management system (BCA302), Software Engineering (BCA401)

Course Objectives:

1. The main objective of this course to introduce the skills and project-based experience needed for entry into web application and development careers.
2. Objective of this course is to understand how to develop web pages and communicate with the server side.
3. To implement web-based information systems using various specialized web tools and technologies.
4. To understand concepts and specialist theories of web based system development.
5. To understand the development phases of web-based systems.

Detailed Syllabus

UNIT I

Introduction to Web Based System Development: History of web, Growth of the Web, Protocols, governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber Laws, Web project, Web Team, Team dynamics.

UNIT II

Communication Issues: the Client, Multi-department & Large scales Websites, Quantity Assurance and testing, Technological advance and Impact on Web Teams.

UNIT III

HTML: HTML Formatting Tags, Links, List, Tables, Frames, Forms, Comments in HTML.

UNIT IV

Web Scripting: DHTML, JavaScript Introduction, documents, and documents, forms, Statements, Functions, Object in JavaScript, Events and Event Handling Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

UNIT V

XML: Introduction, Displaying an XML document, Data Interchange with an XML document, document type definitions, Parsers using XML, Client side usage, Server Side usage.

UNIT VI

Introduction of Server Side Programming: JSP, Tomcat Server, ASP, ASP.NET, PHP

Text and Reference Books

1. Collaborative Web Development, Burdman, Addison Wesley, 1st Edition, 1999.
2. Developing E-Commerce Sites, Sharma, Sharma, Addison Wesley, 1st Edition.
3. Web Technologies Part II, Ivan Bayross, BPB Publications, 2008.
4. Essential COM, DON Box, Addison Wesley, 1997.
5. Bhav, "Programming with Java", Pearson Education
6. ASP Developer's Guide, Greg Buczek, TMH, October, 2002.
7. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Learn different types of roles in web team and duties in web project in development. |
| 2. Learn programming builds and develop programs that use strings, dates, arrays, functions, classes and objects. |
| 3. Implement different parameters to create secure web sites. |
| 4. Design and develop web pages for any web application. |
| 5. Gather the skills to implement software for a client-server environment by using different programming and scripting languages. |
| 6. Learn markup language to build own tags to create web pages and server side scripting language to communicate between client and server. |

BCA 611: Software Project Management

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : -

Course Objectives:

1. Apply project management concepts and techniques to an IT project.
2. Identify issues that could lead to IT project success or failure.
3. Explain project management in terms of the software development process.
4. Describe the responsibilities of IT project managers.

Detailed Syllabus

Unit-1

Project Evaluation and Project Planning: Importance of Software Project Management, Activities, Methodologies, Categorization of Software Projects. Setting objectives, Management Principles, Management Control, Project portfolio Management, Cost-benefit evaluation technology. Risk evaluation, Strategic program Management Stepwise Project Planning.

Unit-2

Project Life Cycle and Effort Estimation: Software process and Process Models, Choice of Process models, Rapid Application development, Agile methods, Dynamic System Development Method, Extreme Programming, Managing interactive processes, Basics of Software estimation, Effort and Cost estimation techniques, COSMIC Full function points, COCOMO II – a Parametric Productivity Model.

Unit-3

Activity Planning : Objectives of Activity planning, Project schedules, Activities, Sequencing and scheduling, Network Planning models, Formulating Network Model, Forward Pass & Backward Pass techniques, Critical path (CRM) method.

Unit-4

Risk Management: Risk identification, Assessment, Risk Planning, Risk Management, PERT technique. Monte Carlo simulation, Resource Allocation, Creation of critical paths, Cost schedules.

Unit-5

Project Management and Control: Framework for Management and control, Collection of data, Visualizing progress, Cost monitoring, Earned Value Analysis, Prioritizing Monitoring, Project tracking, Change control, Software Configuration Management, Managing contracts, Contract Management.

Unit-6

Staffing In Software Projects: Managing people, Organizational behavior, Best methods of staff selection, Motivation, The Oldham Hackman job characteristic model, Stress, Health and Safety, Ethical and Professional concerns, Working in teams, Decision making, Organizational structures, Dispersed and Virtual teams, Communications genres, Communication plans, Leadership.

Text and Reference Books:

- 1- Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
- 2- Robert K. Wysocki, Effective Software Project Management – Wiley Publication, 2011.
- 3- Walker Royce, Software Project Management- Addison-Wesley, 1998.
- 4- Gopalaswamy Ramesh, Managing Global Software Projects – McGraw Hill Education (India), Fourteenth Reprint 2013.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Identify the different project contexts and suggest an appropriate management strategy. |
| 2. Practice the role of professional ethics insuccessful software development. |
| 3. Identify and describe the key phases of project management. |
| 4. Perform case studies on cost estimation models like COCOMO and COCOMO II . |
| 5. Determine an appropriate project management approach through an evaluation of the business context and scope of the project. |
| 6. Implement a WBS for a given specific software application. |
| 7.Comparative analysis on Process Vs Product metrics. |

BCA 612: Mobile Computing

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-requisites: Mobile communication and Computer Network, INTERNET, Router

Course Objectives:

1. To introduce the characteristics, basic concepts and systems issues in mobile and pervasive computing.
2. Describe and designing of GSM architecture and HLR/VLR .So that it can be able to solve the mobile connective problems
3. To design successful mobile and pervasive computing applications and services.
4. To analyze the strengths and limitations of the tools and devices for development of pervasive computing systems
5. To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.
6. Creatively analyze mobile and wireless networks

Detailed Syllabus

Unit-1

Introduction to mobile communication and computing, Generations of mobile computing, Issues and Applications of mobile computing, Cellular concept and cellular architecture, Frequency reuse, handoff in mobile computing.

Unit-2

GSM: GSM architecture, HLR, VLR, protocol, Call flow sequence in GSM, Security in GSM.CDMA, IS-95 the North American CDMA, Service aspects, radio aspects.

Unit-3

Wireless LAN, Architecture, IEEE-802.11, Hidden and Exposed Terminal Problems. Bluetooth, Bluetooth Architecture, Mobile IP, Terminologies.

Unit-4

Location Management- Motivation, Network Architecture, Location Management in Cellular Network, Static and Dynamic Location Management, Location Management in Wireless Data Networks.

Unit-5

Data Management- Data Management Issues, Mobile Databases, Impact of Mobile Computing in the Area of Data Management, Data Replication, Asynchronous and Synchronous Replication.

Unit-6

File System: CODA File System. Adaptive Clustering: Adaptive Clustering for Mobile Wireless Networks, Architecture, Algorithm, Cluster Maintenance.

Text and Reference Books

1. Ashok K Talukdar: Mobile Computing-Technology, Applications and Service Creation, 1st Edition, TMH Publication, 2006.
2. J Schillar: Mobile Communications, 2nd Edition, Pearson Education, 2009.
3. Vishnu Sharma- Mobile computing , 4th Edition, Pearson Education, 2010.

Course Outcomes:

After completing the course, students will be able to:

- | |
|--|
| 1. Apply the fundamental design paradigms and technologies to mobile computing applications. |
| 2. Demonstrate the different wireless technologies such as CDMA, GSM, and GPRS etc. |
| 3. To design and considerations for deploying the wireless network infrastructure |
| 4. To easily understand and design network architecture |
| 5. Evaluate network protocols, routing algorithms, connectivity methods and characteristics |
| 6. To understand and evaluate CODA File System and Adaptive Clustering for mobile computing |
- .

BCA 613: Artificial Neural Networks

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Machine Learning

Course Objectives:

1. Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
2. Introduce students to artificial neural networks and fuzzy theory from an engineering perspective.
3. To give design methodologies for artificial neural networks.
4. To provide knowledge for network tuning and overfitting avoidance.
5. To offer neural network implementations.
6. To demonstrate neural network applications on real-world tasks.

Detailed Syllabus

Unit-1

Fundamental of Neural Networks: Introduction, Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN Systems, Single Layer NN System, Applications.

Unit-2

Multilayer NN System and Backpropagation Networks: Background, Backpropagation Learning, Backpropagation Algorithm, Learning in Multilayer NN Systems. Applications of Backpropagation Algorithm.

Unit-3

Associative Memory: Introduction, Auto-associative Memory, Bi-directional Hetro-associative memory. Applications of Associative Memory.

Unit-4

Self Organizing Maps (SOMs): Introduction to supervised and unsupervised learning. Competitive Learning, SOMs and their working principles, applications.

Unit-5

Adaptive Resonance Theory: Stability-Plasticity Dilemma, ART Networks, Iterative Clustering, Unsupervised Learning, ART Networks and their working principles, applications.

Unit-6

Introduction to Soft Computing: Basics of Soft Computing, Components of Soft Computing. Introduction to Fuzzy Logic, Genetic Algorithms.

Text and Reference Books

1. Neural Networks, Fuzzy Logic and Genetics Algorithms- Synthesis and Applications.
2. Rajasekaran and G.A. Vijayalakshmi Pai, Prentice Hall.
3. Neural Networks: A Comprehensive Foundation by Simon S. Hakin, Prentice Hall.
4. Fundamental of Neural networks: Architecture, Algorithms and Applications by Laurene V. Fausett, Prentice Hall.

Course Outcomes:

After completing the course, students will be able to:

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
4. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
5. Reveal different applications of these models to solve engineering and other problems.

MCA 101: Computer Concepts and C Programming

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - Boolean algebra, Number System and basic mathematical formulas.

Course Objectives:

1. To develop the programming skills of students
2. To know the principles of designing structured programs
3. To write basic C programs using
 - i) Selection statements
 - ii) Repetitive statements
 - iii) Functions
 - iv) Pointers
 - v) Arrays
 - vi) String
 - vii) File handling

Detailed Syllabus

UNIT I (8 Hours)

Introduction & Basic Concepts of 'C' Programming Language: History of 'C' Programming, Assembly language, Machine Language, Editors, Translators (Compiler, Interpreter, Assembler), Programming Rules, Algorithm, Flowcharts, Structure of C program, Executing the C program. C Character Set, C Keywords/Reserve words, Identifiers, Rules to form an Identifier, Variables, Constants, Types of Constant(Numeric, Character, String, Symbolic), Comments in C, Data types in C, Operators-Types of operators(Arithmetic, Relational, Logical, Unary, Assignment, Compound Assignment, sizeof(), Conditional/Ternary, Bitwise) , Precedence and Associativity, Comments, Concept of header files, Types of problems(Sequential, Selective & Repetitive).

UNIT II (10 Hours)

Introductions to Control structures: Control statements- if, if-else, if-else ladder, Nesting of if, break, continue, Switch statement, use of break and default with switch, goto, exit. Program Loops and Iteration: Loops/Iteration, types of loops, for, Nesting of for, while, do-while. Difference b/w while & do-while, break & exit, break & continue.

UNIT III (10 Hours)

Array, Structure and Union: Introductions to Arrays, Structures and Union: Array (Definition, Declaration, Initialization, characteristics), How to store values in an array, How to display values stored in an array, Sorting (Selection, Bubble, Insertion), Searching (Linear, Binary), Multidimensional arrays (Definition, Declaration, and Initialization), Pointers and arrays, Pointer and 2-d arrays, Pointer to an array, Array of Pointers, Dynamic memory allocation. Structure, Structure declaration, Declaration & Initialization of structure variable how to store values in a structure, how to access values of structure elements, Nesting of structures, Array of structure, Differentiate between array & structure, passing structure to function, passing array of structure to function, Structure pointer, Union

UNIT IV (10 Hours)

Functions and Macros: Function (Declaration, Definition, Calling), Function Prototype, types of function, return statement, function calling methods (Call by value, call by Reference), Storage Classes, Recursion. Macro, Macro Declaration, nesting of macros, Macros with argument, Diff between macro & function.

UNIT V (8 Hours)

Strings:Strings-Definition, declaration and initialization of strings, standard library functions: strlen(), strcpy(), strcat(), strcmp(), etc. Pointer and Strings, Two Dimensional array of characters, Array of Pointers to String.

UNIT VI (10 Hours)

File Handling: File, File operations, Opening and Closing Files, File opening modes, Reading and Writing a data file, Text files Vs Binary files, Command Line Arguments(argc,argv), sprintf() & sscanf(), gets() & puts(), fgetc() & fputc(), fseek() & ftell().

Text and Reference Books

1. Rajaraman V. Fundamental of Computers
2. Ram B. Computer Fundamentals, New Age International
3. Kerninghan B.W. & Ritchie D.M. - The C Programming Language
4. Gottfried - Programming with C Schaum
5. Kanetkar Y. - Let us C
6. Balaguruswamy - Programming in C

Course Outcomes:

After completing the course, students will be able to:

- | |
|--|
| 1. Understanding the concept and recognize the basic terminology used in computer programming. |
| 2. Write, Compile and Debug programs in C language and use different data types for writing the programs. |
| 3. Design programs connecting decision structures, loops and functions. |
| 4. Understand normal and abnormal combustion phenomena in SI and CI engines |
| 5. Understand the dynamic behavior of memory by the use of pointers |
| 6. Use different data structures and create / manipulate basic data files and developing applications for real world problems. |

MCA201: Data Structure Using C

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the fundamentals of C or other programming language
2. A solid background in mathematics, including probability, set theory

Course Objectives:

1. To learn the basics of abstract data types.
2. To learn the principles of linear and nonlinear data structures.
3. To build an application using sorting and searching

Detailed Syllabus

UNIT I (10 Hours)

Introduction to Algorithm Design and Data Structures: Abstract data types, Fundamental and derived data types. Representation, Primitive data structures.,Algorithm Definition, Analysis of Algorithm, Comparison of Algorithms. Top Down and bottom up Approaches, Complexity- time and space. Structured approach to programming.

UNIT II (10 Hours)

Arrays: Representation of Arrays(Single and Multidimensional arrays), Address calculation using column and row major ordering, Operations on Arrays. Application of arrays- Matrix Multiplication, Sparse matrix.

Stacks and Queues: Representation of Stacks and Queues using Arrays and Linked-list. Circular queues, Priority Queue and DeQueue, Recursion.Applications of stacks-Conversion from infix to postfix and prefix expressions, Evaluation of postfix expression using stacks.

UNIT III (10 Hours)

Linked lists: Singly Linked List, Operations on Linked list, Polynomial representation and manipulation using linked lists. Circular linked lists, doubly linked lists, Header Link list.

UNIT IV (10 Hours)

Trees: Binary tree, Traversing methods- Preorder, In-order, Post-ordered traversing. Recursive and non-recursive Algorithms for above mentioned Traversal methods. Representation of trees and applications- Binary tree representation of a tree. Conversion of general tree into Binary tree. Threaded binary trees. Binary search tree-Height balanced (AVL) tree, B-trees.

UNIT V (6 Hours)

Searching, Sorting and complexity: Searching- Sequential and binary searches, Indexed search, Hashing Schemes. Sorting-Insertion, selection, Bubble, Quick, Merge, Radix, Bucket, Shell, Heap sort. Comparison of time complexity.

UNIT VI (10 Hours)

Graphs: Graph representation- Adjacency matrix, Adjacency lists, Traversal Schemes- Depth first search, Breadth first search. Spanning trees- Definition, Minimal spanning tree algorithms. Shortest Path algorithms (Prime's and Kruskal's).

Text and Reference Books

1. "Data Structure", Seymour Lipschutz(Schaum Outlines), TMH, 2009.
2. "Data Structures and Program Design in C", R.Kruse, C.L Tondo and B.Leung, Pearson Education, 2008.
3. "Data Structures Using C ", V.Langsam, M.J.Augenstein and A.M.Tanenbaum, Pearson Education, 2004.
4. "Data Structures through 'C'Language", S.Chottopadhyay, D.Ghoshdastidar & M.Chottopadhyay, BPB Publication, 2001
5. "Data Structures through C", Yashavant kanetkar , BPB Publication, 2007.
6. "Fundamentals of Data Structures",E. Horowitz, Sahni ,Galgotia Publiction, 2002

Course Outcomes:

- | |
|--|
| 1. Solving problems and simulate the insertion and deletion by using DS methods. |
| 2. Understanding the concept and recognize the basic terminology used in computer programming. |
| 3. Write, Compile and Debug programs in C language and use different data types for writing the programs. |
| 4. Design programs connecting decision structures, loops and functions. |
| 5. Understand the dynamic behavior of memory by the use of pointers |
| 6. Use different data structures and create / manipulate basic data files and developing applications for real world problems. |

MCA202: Database Management Systems

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-requisites: Database Management System and Relational Database Management System and Oracle

Course Objectives:

1. Knowledge of DBMS, both in terms of use and implementation/design
2. Understand basic database concepts, including the structure and operation of the
3. Understand and successfully apply database normalization and anomalies.
4. Construct simple and moderately advanced database queries using SQL
5. Understand the concept of a database transaction and related database facilities, including
6. concurrency control, journaling, backup and recovery, and data object locking and protocols.
7. Describe and discuss selected advanced database topics, such as distributed database

Detailed Syllabus

Unit-1

Introduction Database Systems: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

Unit-2

Data Modeling using Relational Data Model: Modeling Techniques-Different Types of Models. Hierarchical Database, Network Database, and Relational Database. Relational data model-Codd's Rules, Concept of Domain, Tuple, and Cardinality. Introduction to ERD-ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation.

Unit-3

Normalization and Functional Dependencies: Functional dependencies, Concept of Anomalies. Advantages and disadvantages of Normalization, 1NF, 2NF, 3NF and BCNF with examples.

Unit-4

SQL: Basic Structure of SQL, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Complex Queries, Modification of the Database, Joined Relations, Data-Definition Language.

Unit-5

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling. **Concurrency Control**-Concurrency control, Protocols for concurrency control-locking, Time stamping, validation based protocol. Multiple granularity, Multi-version schemes, Recovery with concurrent transaction.

Unit-6

Modern Database Systems: Transaction Processing in Distributed system, data fragmentation, Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distributed database. Parallel databases, multimedia databases, spatial and temporal databases, data warehousing and data mining, deductive databases.

Text and Reference Books

Suggested Readings:

1. Database System Concepts, Silberschatz, Korth, Sudarshan, 6th Edition, 2009.
2. Database Management System, Ramakrishna and Gehrke, McGraw Hill, 3rd Edition, 2010.
3. Schaum's Outline of "Fundamental of Relational Databases", Ramon A. Mata, Pauline K. Cushman, McGraw Hill, December, 2006.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. |
| 2. Understand database concepts and structures, Query language and Understand the E R model and relational model |
| 3. Students will apply various Normalization techniques |
| 4. Students will Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers |
| 5. Students will execute various advance SQL queries related to Transaction Processing & Locking using concept of Concurrency control., |
| 6. Students will understand the modern database system and distributed database on the bases of parallel processing |

MCA298: Human Values and Ethics

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Prerequisite: - Understanding and Learning skills.

Course Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.
2. To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession.
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life.
6. To enable students to lead a practical life adding value to human relations.

Detailed Syllabus

Unit-1

Introduction: Concept of values, value formation, nature of values. Categories of values: material, social, aesthetic, ethical, cultural, religious and spiritual values. Value crisis in the contemporary Indian society.

Ethics: development of ethics, ethical dilemma, ethical decision- making process, relevance of ethics and values in business.

Unit-2

Human Values and Indian Ethos: Different perceptions of human values, behavioral scientists approach, humanity, human aspirations, hope and joy, human values and freedom, creativity, love and wisdom, relative and absolute values, truth, goodness and beauty, Satyam Shivam Sundaram.

Unit-3

Religious and Social Values: Values of Justice, democracy, nationalism, secularism, national integration, human dignity and human rights, education system and values. Four Purusharthas, the five debts, nishkama karma, sthithapragya, Concept of unity of all life, Buddha and Jain philosophy, Gandhism—Truth and Non-violence. Cases/Exercises

Unit-4

Human Values and Corporate World: Interpersonal relationships in work group, Indian heritage in production and consumption, corporate responsibility of business, corporate social responsibility towards customers and shareholders. Case Study.

Unit-5

Stress Management: Meaning, sources and consequences of stress, stress management and detached involvement, stress reduction through yoga and meditation. Exercises and cases

Unit-6

Globalization and Values: Technology and human values, ethical issues in international business, westernization and modernization, business ethics in Japan, UK & USA. Case Study

Text and Reference Books

1. Chakraborty, S. K.: Foundations of Managerial Work – Contributions from Indian Thought, Himalaya Publishing House Delhi 1998.
2. S.K. Chakravarty: Managerial Effectiveness and Quality of Work Life – Indian Insights, Tata McGraw Hill Publishing Co. Ltd. New Delhi 1987.
3. Chakravarty S. K. Management by Values, Oxford University Press, 1991.
4. Parathasathy, Human Values & Management: 20 Key Principles for Modern Management, Ane Books Pvt. Ltd.
5. Sekhar R. C. Ethical Choices in Business, Response Books, New Delhi, 1997.
6. Ananta K Giri, Values, Ethics and Business: Challenges for Education and Management, Rawat Publication, Jaipur.
7. Tripathy A. N. Human Values New Age International Publishers 2003.
8. Banerjee B P, Foundations of Ethics and Management, Excel Books, 2005.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Understand the significance of value inputs in a classroom and start applying them in their life and profession |
| 2. Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc. |
| 3. Understand the value of harmonious relationship based on trust and respect in their life and profession |
| 4. Understand the role of a human being in ensuring harmony in society and nature. |
| 5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |

MCA301: OOPS Concepts using Java

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: C Programming, and OOPs Concepts.

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6. To understand Java Swings for designing GUI applications based on MVC architecture.

Detailed Syllabus:

Unit-1

Object Modeling: Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, Meta data, candidate keys, constraints.

Dynamic Modeling: Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concepts, a sample dynamic model.

Unit-2

Functional Modeling: Data flow diagram, specifying operations, constraints, a sample functional model. OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparisons of methodologies, SA/SD, JSD.

Introduction of Java: Features of Java Language, Platform Independency, JVM, Byte-code, Operator, Data type, Variables, Robustness.

Unit-3

OOPS: Object, Class, Classifications, Methods & classes, Inheritance, Static and non Static methods, Overloading, Overriding of methods, Abstraction, Interface, Polymorphism.

Packages and Exception Handling: Data Encapsulation, Concept of Package, Creating package, Importing packages, Child Packages. Exceptions & Errors, Types of Exception, Control Flow in Exceptions, Use of try, catch, finally, throw, throws in Exception Handling. Checked and Un-Checked Exceptions.

Unit-4

I/O and File Handling: Buffered Reader class, InputStreamReader class, Scanner class, Creating File, Finding File Reading and Writing File (Doc File, Html File, Text File).

Multi Threading: Understanding Threads, Needs of Multi-Threaded Programming, Solution of Producer consumer problem by Multi Thread, Thread Life-Cycle, Thread Priorities, Synchronization of Thread.

Unit-5

GUI Application Development: Introduction to AWT, AWT controls Java Applet Layout Managers, Menus, Images, Graphics.

Event Handling, Swing, Containers, Panes, Frames, Dialogue boxes, working with image controls.

JDBC: The connectivity Model, JDBC/ODBC Bridge, Java, SQL package, connectivity to remote database, navigating through multiple rows retrieved from a table/ multiple tables of a database.

Unit-6

Web Application Development using Java: Http protocols, client server terminology, Introduction to client side and server side programming. Servlet, Session management, Introduction to JSP. Application of Servlets and JSP with JDBC.

Suggested Readings:

1. The Complete Reference: Java, Herbert Schildt, TMH, 7th Edition 2006
2. Programming in JAVA, E. Balagurusamy, TMH, 2nd Edition 2007
3. Object Oriented Modeling and Design, James Rumbaugh et al, PHI, 4th Edition 2003
4. Object Oriented Analysis & Design with Application, Booch Grady, Pearson Education, New Delhi, 3rd Edition, 2006.

Course Outcomes:

After completing the course, students will be able to:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.

MCA 302: Web Engineering: Tools and Technologies

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Course Objectives:

1. To give an over view of Internet application development.
2. To understand web technology and its uses on current IT market.
3. To introduce with tools of web engineering where students can developed their project.
4. To interact with various automated designed framework for web development

Detailed Syllabus

UNIT I (6 Hours)

Introduction: Introduction to web, protocols governing the web, web development strategies, Web applications, web project, web team.

UNIT II (10 Hours)

Web Page Designing using HTML: Structure of HTML page, link, list, table, images, frames, forms, CSS; DHTML

UNIT III (10 Hours)

XML: DTD, XML schemes, presenting and using XML.

UNIT IV (10 Hours)

Java script: Introduction, documents, forms, statements, functions, objects; event and event handling; introduction to AJAX, VB Script

UNIT VI (10 Hours)

PHP (Hypertext Preprocessor): Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form ,mail, file upload, session, error, exception, filter, PHP-ODBC.

UNIT V (10 Hours)

Server Side Programming: Introduction to active server pages (ASP), ASP.NET, java server pages (JSP), JSP application design, tomcat server, JSP objects, declaring variables, and methods, debugging, sharing data between JSP pages, Session, Application: data base action , development of java beans in JSP, introduction to COM/DCOM.

Text and Reference Books

1. Heywood J. B., "Internal combustion Engine Fundamentals", McGraw Hill, 1988
2. Obert E. F., "Internal combustion Engine and Air Pollution", Intext Educational Pub, 1974 Ganesan V., "Internal combustion Engines", 6 th Ed. Tata Mc Graw Hill Publishing Co. Domkundwar V.M. "Internal Combustion Engines"-
3. Mathur M.C., Sharma R.D., "Internal combustion engines", 8th Ed.; Dhanpat Rai publication., 2003 Pulkrabek W., "Engineering Fundamentals Of Internal Combustion Engine", Prentice Hall, 1997

Course Outcomes:

After completing the course, students will be able to:

1. Understand various types of Web engineering.
2. Analyze the effect of various framework of web development
3. Identify tools to operate in applications and software's.
4. Understand designing of dynamic and statics applications.
5. Evaluate performance of web pages on various browsers.

MCA303: Data Communication and Computer Network

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-requisites: Data Communication and Computer Network, INTERNET, Router

Course Objectives:

1. To discuss and explain about basics of data communication and networking concepts
2. Explain how the data link layer prepares data for transmission and list the component parts of a Layer
3. To discuss the medium access control and to create a logical design and physical design of a simple Ethernet LAN
4. Describe how routers use next-hop addresses to determine the path that packets need to take to reach their destinations and then describe the IP addressing structure
5. Explain the difference between TCP and UDP and describe how TCP and UDP functions are worked
6. Describe and application layer for using end user application such as DNS, SMTP and Telnet etc

Detailed Syllabus

Unit-1

Introduction: Introduction to Data Communication and Computer Network, Network Topologies, Network Types, OSI Reference Model, TCP/IP Protocol Suite.

Unit-2

Data Link Layer: Error Detection and Correction Techniques, LRC, VRC, CRC and Hamming Code. **Flow Control and Error Control Techniques:** Stop and Wait, Sliding Window, Go Back N, Selective Repeat Protocol.

Unit-3

MAC Sub layer: **Aloha, S-Aloha, CSMA, CSMA/CD, CSMA/CA and CDMA Protocol.** LANs: **Ethernet, Fast Ethernet, Gigabit Ethernet, Token Ring, FDDI and Wireless LAN.**

Unit-4

Network Layer: **IP Protocol, IP Addresses,** And Introduction to IPv6 Routing Protocols: **Distance Vector Routing, Link State Routing and Path Vector Routing.**

Unit-5

Transport Layer: **UDP and TCP Protocol, TCP Connection Establishment and Release, Congestion Control and Quality of Service.**

Unit-6

Application Layer: **DNS, FTP and HTTP, Network Management and SNMP Multimedia and Data Compression.**

Text and Reference Books

1. Data Communication and Networking, Behrouz A Frouzan, TMH, 4th Edition 2004.
2. Data and Computer Communications, William Stallings, Prentice Hall, 9th Edition, 2010.
3. Computer Networks, Andrew S. Tannenbaum, Pearson Education, 4th Edition 2003.
4. Computer and Communication Network, Nadernd Mir, Prentice Hall, 1st Edition 2006.
5. Data Networks, Bertsekas and Gallagar, PHI, 2nd Edition 1992.

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. Recognize and Describe about the working of Computer Networks and Illustrate reference models with layers, protocols and interfaces. |
| 2. Illustrate data link layer for using different error Control techniques |
| 3. Examine problems of a computer networks related techniques for CSMA/CD, Aloha, Ethernet and WLAN |
| 4. Students will understand for network layer internetworking technologies, Routing, IP Addressing and routing protocol for using shortest path for destination |
| 5. Students will understand TCP/IP implementation |
| 6. Students will understand the end user application for such domain name system , HTTP, UDP ,Telnet and SMTP etc |

MCA304: Design and Analysis of Algorithm

Teaching Scheme Lectures: 4 hrs/Week Lab: 3 hrs/Week Credits : 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - C Programming Concepts, Data Structure Concepts, Discrete Mathematics concepts.

Course Objectives:

1. To analyze the asymptotic performance of algorithms.
2. To analyze of Advanced Data Structure Concepts.
3. To analyze Greedy and Dynamic Programming Concepts and its application
4. To analyze concepts of Graphs.
5. To analyze Branch and Bound and Backtracking Concepts and its applications.
6. To analyze Deterministic and Non deterministic Problem.

Detailed Syllabus

UNIT I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis Of algorithm-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Recurrences and their solutions, Amortized analysis.

Divide and Conquer: General method, applications-Binary search, Quick sort, Merge sort, Heap Sort, Strassen's matrix multiplication.

UNIT II

Advanced Data Structure: Red Black Tree, Binomial Heap, B tree, Fibonacci Heap.

Disjoint Sets: disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT III

Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem.

UNIT IV

Graph Algorithm: Graph Algorithms, BFS, DFS, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow, Membership, Pumping lemma for CFLs.

UNIT V

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT VI

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

Text and Reference Books:

1. Introduction to Algorithms, Thomas H Cormen, Leiserson et al, PHI, 2nd Edition 2001
2. Computer Algorithms: Introduction to Design and Analysis, Sara Baase and Allen Van Gelder, Pearson Education, 3rd Edition 2000
3. Algorithm Design, Jon Kleinberg and Eva Tardos, Pearson Education, 1st Edition 2005
4. The Design and analysis of Algorithms, A V Aho et al, Pearson Education, 3rd Edition 2007
5. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni and Rajasekharam, Galgotia Publications, 2009

Course Outcomes:

After completing the course, students will be able to:

1. Understand Asymptotic Notation.
2. Understand Advanced Data Structure Concepts and searching concepts.
3. Understand the Concepts of Greedy Methods and Dynamic Programming methods and solve problem related with its.
4. Understand the concepts of Graph.
5. Understand the concepts of Backtracking and Branch and bound Concepts and solve problem related with its.
6. Understand the Concepts of NP hard and NFA DFA Concepts.

MCA 305: Software Engineering

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the fundamentals of system analysis and design
2. Basic terminologies used in software development.

Course Objectives:

1. It aims to develop a broad understanding of the discipline of software engineering.
2. It seeks to complement this with a detailed knowledge of techniques for the analysis and design of complex software intensive systems.
3. It aims to set these techniques in an appropriate engineering and management context..

Detailed Syllabus

UNIT I (10 Hours)

Introduction to Software and Software Engineering: Software Characteristics and Applications, Software Engineering a Layered Technology, Software Process.

UNIT II (10 Hours)

Software Life Cycle Models: Classical Waterfall Model, Iterative Waterfall Model, Prototyping Model, Evolutionary Model, RAD Model, Spiral Model, Agile Software Development Model, Comparison of different Life Cycle Models.

UNIT III (10 Hours)

Software Project Management: Project Planning, Project size estimation-LOC and FP Metric, Project Estimation Technique-COCOMO Model, Project Scheduling-WBS, Gantt chart, PERT Chart, Activity Network and Critical Path Method, Risk Management, Software Configuration Management.

UNIT IV (10 Hours)

Requirement Engineering: Requirement Gathering, Requirement Analysis-ERD, DFD, Data Dictionary, Decision Tree, Decision Table, SRS Document, Characteristics of good SRS Document, SRS Verification and Validation.

UNIT V (6 Hours)

Software Design: Characteristics of good Software Design, Cohesion and Coupling. Function Oriented Design: Structured Analysis. Object Oriented Design: OOPS Concepts, UML and USE Case Model.

UNIT VI (10 Hours)

Testing and Implementation: What is Testing and Debugging, Design of Test Cases, Unit Testing, Integration Testing, White Box and Black Box Testing, System Testing, McCabe's Cyclomatic Complexity, System Testing, Software Reliability Models, SQA, SEI/CMM, CASE, Software Maintenance Models.

Text and Reference Books

1. Software Engineering, Roger S Pressman, Tata McGraw Hill, 6th Edition 2005
2. Fundamentals of Software Engineering, Rajib Mall, PHI, 3rd Edition 1997
3. Software Engineering, I. Sommerville, Pearson Education, 8th Edition 2007
4. Software Engineering Concepts, R Fairley, Tata McGraw Hill, 4th Edition 1997

Course Outcomes:

1. Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility.
2. Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.
3. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- 4 an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

MCA401: .NET Framework using C#

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: HTML and CSS.

Course Objectives:

1. Learn about MS.NET framework developed by Microsoft.
2. You will be able to using XML in C#.NET specifically ADO.NET and SQL server
3. Be able to understand use of C# basics, Objects and Types, Inheritance
4. To develop, implement and creating Applications with C#.
5. To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web
6. To understand and be able to explain Security in the .NET framework and Deployment in the .NET.
7. To develop Assemblies and Deployment in .NET, Mobile Application Development.

Detailed Syllabus:

Unit-1

The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In-Time Compilation, Framework Base Classes.

Programming Language C#: Declaring implicit and explicit variables, Unicode characters and strings, creating Object and Classes, The Main method specification.

Unit-2

Object oriented programming with C#: Inheritance, Method Overloading and method overriding, Polymorphism, Operator Overloading, Abstract Class, Inner Class, Interface. Delegates, Partial Classes, Exception Handling, Creating Name-Space, Input-Output and File Handling, Multithreading, **Windows Application:** Introduction of windows form, Linking Window Form, Creating Properties, window form controls, MDI form.

Unit-3

Containers and its Event Handling: Flow Layout Panel, Group Box, Panel, Split Container, Tab Control, Table Layout Panel. **Navigation Control and Its Event Handling:** Context Menu Strip, Tool Strip, Status Strip, Tool Strip Container.

Dialog Boxes and its Event Handling: Message Dialog Boxes, Color Dialog, Folder Browser Dialog, Font Dialog, Open File Dialog, Save File Dialog, Data Grid View, Dataset.

Unit-4

Introduction to ASP.NET with C#: Introduction of web application, web site, A Review of Classic ASP, ASP.NET Web Applications, Rendering HTML with Server Controls.

Working with Web Forms Controls and C#: Introduction to Web Forms Controls, Simple Input Controls, Hyperlinks, Button Controls and List Controls. Dropdown List Control, Overview of ASP.NET Validation Controls, Client-Side Validation, Server-Side Validation, File Upload controls, Wizard controls. Master Page, Ad Rotator Control, Login Controls, Session Management using Cookies, Session.

Unit-5

ADO.Net: Overview of ADO.NET, ADO. NET Classes, Connected and Disconnected Architecture and different operation with database.

Using the Data List and Repeater, Data grid Controls: Overview of List-Bound Controls , Creating a Repeater Control, Creating a Data List Control , Introduction to the Data Grid , , Using Advanced Data Grid Features.

Unit-6

Working with XML: Data handling using XML, Creating web Services, Net Assemblies features and Structure.

Configuring and Deploying ASP.NET Applications: Creating Setup of Web Application, Configuring IIS and the .NET Framework, Deploying ASP.NET Applications.

Suggested Readings:

1. Beginning Visual C# 2008, Wiley, Wrox Publication, 2nd Edition 2008
2. Programming with C#, E. Balagurusamy, TMH, 2nd Edition 1999
3. Microsoft .Net for Programmers, Fergal Grimes, SPI Edition,

Course Outcomes:

After completing the course, students will be able to:

1. Learn to develop applications using C# and VB.NET.
2. Learn to apply these languages to develop server-side applications which make use of ADO.NET, ASP.NET, and Web Services etc.
3. Understand use of C# basics, Objects and Types, Inheritance
4. Develop, implement and creating Applications with C#.
5. Develop, implement, and demonstrate Component Services, Threading, Remoting, Windows services, web.
6. Understand and be able to explain Security in the .NET framework and Deployment in the .NET.

MCA402: Computer Graphics

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test – 12 Marks

Teachers Assessment – 6 Marks

Attendance – 12 Marks

End Semester Exam – 70 Marks

Prerequisite: Linear Algebra, Matrix, and C-Programming.

Course Objectives:

Students will try to learn:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Detailed Syllabus:

Unit-1

Introduction: Definition of computer graphics, Types of computer graphics, applications Graphic Displays- CRT, Random scan displays, Raster scan displays, Color CRT, LCD, DVST, Plasma Display panel, Frame buffer and video controller.

Unit-2

Output Primitives: Points and lines, Line drawing algorithms, Circle generating algorithms, Midpoint circle generating algorithm, conic sections, parallel version of these algorithms. Character generation: Stroke Method, Dot matrix method

Unit-3

Ant aliasing: Post filtering and pre filtering.

Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. Polygon: Representation, Inside outside Test, Filling polygon- Scan line, Boundary fill, Flood Fill algorithms

Unit-4

2D Viewing: Viewing pipeline, Viewing transformations Windowing and Clipping: Point clipping, 2D Line Clipping algorithms-Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Nicholl Lee Nicholl algorithm, Line clipping against non rectangular clip windows; Polygon clipping: Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit-5

Three Dimensional: 3-D Display methods, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Unit-6

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surfaces. Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

Suggested Readings:

1. Computer Graphics C Version, Donald Hearn and M Pauline Baker, Pearson Education, 2007.
2. Computer graphics, Schaum's outline, TMH, 2006.
3. Computer Graphics, Amrendra N Sinha and Arun D Udai, TMH, 2008
4. Computer Graphics: A Programming Approach, Steven Harrington, TMH, 1984
5. Computer Graphics Principles and Practice, James D Foley, PEARSON, 2004

Course Outcomes:

After completing the course, students will be able to:

1. Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
2. Have a knowledge and understanding of geometrical transformations and 3D viewing.
3. Have a knowledge and understanding of techniques for representing 3D geometrical objects.
4. Have a knowledge and understanding of interaction techniques.
5. Create interactive graphics applications.
6. Use C builds functions or equivalent graphics tools.
7. Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

MCA 403: Data Warehousing and Data Mining

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the data base management system
2. Knowledge of repository system.

Course Objectives:

1. Be familiar with mathematical foundations of data mining tools.
2. Understand and implement classical models and algorithms in data warehouses and data mining
3. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4. To explain the stages and process different data mining techniques. E. To learn mining and warehouse techniques through the use of different tools (e.g. ORACLE)

Detailed Syllabus

UNIT I (10 Hours)

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining. **Data Pre-processing:** Needs, Pre-processing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II (10 Hours)

Introduction: Data Warehouse and OLAP Technology for Data Mining, Data Warehouse Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining. Data Mining Primitives, Data Mining Query Languages.

UNIT III (10 Hours)

Concepts Description: Characterization and Comparison, Data Generalization and Summarization-Based Characterization. Analytical Characterization, Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

UNIT IV (10 Hours)

Mining Association Rules in Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis.

UNIT V (6 Hours)

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back-propagation, Classification Based on Association Rule Mining, Other Classification Methods, Prediction, and Classifier Accuracy.

UNIT VI (10 Hours)

Cluster Analysis Introduction: Types of Data in Cluster Analysis, a Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Outlier Analysis. **Mining Complex Types of Data:** Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining-Spatial Databases, Multimedia Databases, Time-Series and Sequence Data, Text Databases, World Wide Web.

Text and Reference Books

1. Data Mining -Concepts and Techniques, Han, Kamber, Harcourt India, 2006.
2. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson, 2002.
3. Data Mining Techniques, Arjun K. Pujari, University Press, 2001.

Course Outcomes:

After completing the course, students will be able to:

1. The candidate will get knowledge of - Data preprocessing and data quality..
2. Modeling and design of data warehouses
3. Algorithms for data mining.
4. Be able to design data warehouses.
5. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis

MCA 411: Advanced Computer Network

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: -

1. Familiarity with the Data Communication
2. Knowledge of internet networking.

Course Objectives:

1. To understand the state-of-the-art in network protocols, architectures and applications.
2. Analyze existing network protocols and networks.
3. Develop new protocols in networking
4. To understand how networking research is done
5. To investigate novel ideas in the area of Networking via term-long research projects.

Detailed Syllabus

UNIT I (10 Hours)

Introduction: A Brief History of ARPANET, MILNET, CSNET, NSFNET, The Internet Today, Protocols and Standards, Standards Organizations, Internet Standards, Internet Administration.

UNIT II (10 Hours)

Network Models: The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite, Addressing, TCP/IP Versions. Underlying Technologies: LANs, Point to Point WANs, Switched WANs, Connecting Devices .

UNIT III (10 Hours)

IP Protocol: IP Datagram, Fragmentation, Options, Checksum, IP Package. **ARP & RARP:** ARP, ARP Package, RARP. **IP Addresses:** Classful Addressing, Other Issues. **Subnetting and Supernetting:** Subnetting, Supernetting, Classless Addressing.

UNIT IV (10 Hours)

Delivery and Routing: Connection Oriented Vs Connectionless Services, Direct Vs Indirect Delivery, Routing Methods, Static Vs Dynamic Routing, Routing Table and Routing Module.

Classless Addressing: CIDR. **Unicast Routing Protocol:** Interior and Exterior Routing, RIP, OSPF, BGP. **Multicast Routing Protocol:** Multicast Routing, Multicast Trees, DVMRP, MOSPF, CBT, PIM, MBONE.

UNIT V (6 Hours)

UDP & TCP: UDP, Checksum, UDP Operation, Use of UDP, UDP Packages. TCP Services, Numbering Bytes, Flow and Error Control, Silly Window Syndrome, TCP Timers, Congestion Control, Option, Checksum, Connection Control, State Transition Diagram, TCP Operation, TCP Packages.

Socket Interface: Definitions, Byte Ordering, Address Transformation, Byte Manipulation Function, Information about Remote Host, Socket System Calls, Connectionless Iterative Server, UDP Client/Server Programs, Connection Oriented Concurrent Servers, TCP Client/Server Program.

UNIT VI (10 Hours)

Application Layer Protocols: BOOTP & DHCP, DNS, TELNET & Rlogin, FTP, TFTP, SMTP, HTTP, WWW, RTP.

Next Generation IPv6: IPv6, IPv6 Addressing, IPv6, Packet Format, Transition from IPv4 to IPv6.

Text and Reference Books

1. . Behrouz A Frouzan: TCP/IP Protocol Suite, 4th Edition, 2010, TMH
2. Douglas E Comer: TCP/IP Protocol, 6th Edition, 2008, Pearson Education
3. Behrouz A Frouzan: Data Communication and Networking, 4th Edition, 2006, TMH
4. Richard Stevens: TCP/IP Illustrated Vol 1: The Protocols, 1st Edition, 2006, Pearson Education, India.

Course Outcomes:

After completing the course, students will be able to:

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Classify the routing protocols and analyze how to assign the IP addresses for the given network.
3. State the properties and challenges of Ad Hoc wireless networks.
4. To understand the principles and functionality of mobile IP, explaining its concretization in IPv6; to understand the needs of optimization of the mobility mechanisms and description of some extensions that aim to reduce handover latency and requirements from terminals.
5. to identify and discuss the concepts underlying IPv6 protocol, and their main characteristics and functionality.
6. recognize the need for service integration and discuss how it can be accomplished.

MCA 412 Cryptography and Network Security

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - MCA 101 Computer Concepts and C programming, MCA 303 Data Communication & Computer Network

Course Objectives:

- 1- To define cryptography, its use, areas where cryptography is needed.
- 2- To understand security concepts, ethics in Network Security, security threats, and the security services and mathematical foundation required for various cryptographic algorithms.
- 3- To develop code to implement a cryptographic algorithm or write an analysis report on any existing security product.
- 4- To analyze all key less and keyed algorithms to identify their strength and weaknesses and try to solve and remove the limitations or optimize the complexity of algorithm(s).
- 5- To test different available algorithms in terms of complexity, response time, key size, data size, security assurance, etc.
- 6- To design an algorithmic solution of a problem either by applying existing algorithms or a new one. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.

Detailed Syllabus

UNIT I

Introduction to Cryptography and Network Security: Security Goals, Attacks, Services and Mechanisms, Techniques, Traditional Symmetric Key Cipher.

UNIT II

Modern Symmetric Key Ciphers: Fiestal Cipher, S-DES, **DES, Double DES, Triple DES, AES**, Block Cipher. Modes of Operation : ECB, CBC, CFB, OFB and CTR, KDC.

UNIT III (10 Hours)

Introduction to Mathematics for Cryptography: Modular Arithmetic, The Euclidian Algorithm, Extended Euclid, Farmet's and Euler's Theorem, Chinese Remainder Theorem.

UNIT IV (10 Hours)

Asymmetric Key Cryptography: **RSA Algorithm, ECC, Key Management- Public Key Distribution, Sharing of secret key using A-symmetric Key Cryptosystem.**

UNIT V (10 Hours)

Message Authentication: **MAC, SHA-512 and MD5. Digital Signature**: DSS Key Management: Symmetric Key Distribution, Kerberos.

UNIT VI (10 Hours)

Network Security: IPsec, SSL and TSL, PGP AND S/MIME, SET, System Security: Malicious Software, Firewalls and Intruders.

Text and Reference Books

1. Cryptography and Network Security, Behrouz A Frouzan, TMH, 1st Edition 2007.
2. Cryptography and Network Security, William Stallings, Pearson Education, 4th Edition, 2006.
3. Applied Cryptography, Bruce Schinner, Willy and Sons, 2nd Edition 1996.

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Identify some of the factors driving the need for network security. |
| 2. Identify and classify particular examples of attacks. |
| 3. Define the terms vulnerability, threat and attack. |
| 4. Identify physical points of vulnerability in simple networks. |
| 5. Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems. |

MCA413: Distributed Database Systems

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - Database management system

Course Objectives:

The objectives of this course are

1. Enhanced the knowledge in the area of Distributed Database system.
2. Comprehend the Distributed query processing.
3. The subject explores the ideas of Transaction management and concurrency control.
4. Know the parallel database system architecture.
5. Become conscious about current trends.

Detailed Syllabus:

UNIT I

Introduction: Distributed Data processing, Distributed Database Systems (DDBMSs), Promises of DDBMSs, Complicating factors and Problem areas in DDBMSs, Overview Of Relational DBMS, Relational Database concepts, Normalization, Integrity rules, Relational Data Languages, Relational DBMS.

UNIT II

Distributed DBMS Architecture: DBMS Standardization, Architectural models for Distributed DBMS, Distributed DBMS Architecture. Distributed Database Design: Alternative design Strategies, Distribution design issues, Fragmentation, Allocation. Semantic Data Control: View Management, Data security, Semantic Integrity Control.

UNIT III

Overview of Query Processing: Query processing problem, Objectives of Query Processing, Complexity of Relational Algebra operations, characterization of Query processors, Layers of Query Processing.

UNIT IV

Introduction to Transaction Management: Definition of Transaction, Properties of transaction, types of transaction. Distributed Concurrency Control: Serializability theory, Taxonomy of concurrency control mechanisms, locking based concurrency control algorithms.

UNIT V

Parallel Database Systems: Database servers, Parallel architecture, Parallel DBMS techniques, Parallel execution problems, Parallel execution for hierarchical architecture. Database Interoperability: Database Integration, Query processing.

UNIT VI

Distributed Object Database Management systems: Fundamental Object concepts and Object models, Object distribution design. Architectural issues, Object management, Distributed object storage, Object query processing. Transaction management.

Text and Reference Books

1. Principles of Distributed Database Systems, M.TamerOzsu, Patrick Valduriez, 2nd Edition, 1999.
2. Distributed Databases principles and systems, Stefano Ceri, Giuseppe Pelagatti, TMH, 2008.

Course Outcomes:

After completing the course, students will be able to:

- | |
|--|
| 1. Aware of fundamentals of Distributed Database systems. |
| 2. Use the different techniques of Distributed query processing |
| 3. Set the rules over management of transaction and concurrency control. |
| 4. Familiar with parallel database system architecture. |
| 5. Apprehend Machine Learning Algorithms. |

MCA 421: Android Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Unit Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Basics of Java language and PL/SQL

Course Objectives:

1. To gain knowledge of installing Android Studio
2. To learn designing of User Interface and Layouts for Android App.
3. To learn how to use intents to broadcast data within and between Applications.
4. To use Content providers
5. To introduce Android APIs
6. To design basic applications

Detailed Syllabus

UNIT I

JAVA Concepts (10 hrs): Platform Independency, OOPs Concepts, Inheritance in detail, Exception handling, Packages & interfaces, JVM & .jar file extension, Multi threading (Thread class & Runnable Interface). **SQL:** DML & DDL Queries in brief.

UNIT II

Introduction to Android: Introduction of Android, Setting up development environment, Installing the SDK, Creating Android Emulator, Android development Tool. **Fundamentals:** Basic Building blocks - Activities, Services, Broadcast Receivers & Content provider, UI Components - Views & notifications, Components for communication -Intents & Intent Filters, Android API levels (versions & version names)

UNIT III

Application Structure: AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Draw-able Resources, Activities and Activity lifecycle, First sample Application.

UNIT IV

Emulator-Android Virtual Device: Launching emulator, Editing emulator settings, Emulator shortcuts, Logcat usage, Introduction to DDMS. **Second App:** (switching between activities), **Develop an app for demonstrating the communication between Intents.**

UNIT V

Basic UI design: Form widgets, Text Fields, Layouts, [dip, dp, sip, sp] versus px, Examples **Preferences:** Shared Preferences, Preferences from xml, Examples.

UNIT VI

Menu: Option menu, Context menu, Sub menu, Menu from xml, Menu via code, Examples **UI design:** Time and Date, Images and media, Composite, Alert Dialogs & Toast, Popup, Examples

Text and Reference Books

1. Android Application Development (With Kitkat Support), Black Book, by Kogent Learning Solutions Inc. by Pradeep Kothari
2. Android Application Development Cookbook: 93 Recipes for Building Winning Apps (WROX), by Wei-Meng Lee
3. Professional Android 4 Application Development, by Reto Meier
4. Beginning Android 4 Application Development, Wei-Meng Lee
5. Android Application Development, by Lombardo John and Blake Meike

Course Outcomes:

After completing the course, students will be able to:

- | |
|---|
| 1. Understand basic knowledge of Java fundamental concepts and PL/SQL |
| 2. Design and Implement User Interfaces and Layouts of Android App. |
| 3. Use Intents for activity and broadcasting data in Android App. |
| 4. Design and Implement Content Providers. |
| 5. Evaluate performance of Application in terms of activity switching |
| 6. Design menu driven applications |

MCA 422: Oracle DBA

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite : - Database Management Systems

Course Objectives:

1. Understand DBMS architecture
2. Understand Transaction control language.
3. Understand Updating and deleting data through views.
4. Oracle Overview and Architecture.
5. Maintaining and monitoring redo log files.
6. Managing Users and Security.

Detailed Syllabus:

UNIT I

Introduction: DBMS architecture and data independence, DBA roles and responsibilities. SQL *PLUS Overview: SQL plus Fundamentals, Producing more readable outputs, Accepting values at runtime, Using iSQL *Plus.

UNIT II

Modifying Data: Introduction to DML Statements, Truncating a table, Transaction control language. Managing Constraints: Creating constraints, dropping constraints, enabling and disabling constraints, deferring constraints checks.

UNIT III

Managing Views: Creating and modifying views, Using views, Inserting, Updating and deleting data through views. User Access and Security: Creating and modifying use accounts, creating and using roles, granting and revoking privileges, managing user groups with profiles.

UNIT IV

Oracle Overview and Architecture: An overview of logical an physical storage structures, Oracle memory structures, Oracle background processes, connecting to oracle instance, processing SQL command. Managing Oracle: starting up the oracle instance, managing sessions, and shutting down the oracle instance, instances messages and instance alerts.

UNIT V

Control and Redo Log Files: Managing the control files, Maintaining and monitoring redo log files. Managing tables, indexes and constraints: Storing data (create, alter, analyzing, and querying table information), Managing indexes, Managing constraints.

UNIT VI

Managing Users and Security: Profiles, Managing users, managing privileges, managing roles, querying role information. Introduction to Network Administration: Network design considerations, network responsibilities for the DBA, network configuration, Overview of oracle Net features, Oracle Net Stack Architecture.

Text and Reference Books

1. C.J. Date, Database Systems, Addison Wesley, 2000
2. Chip Dawes, Biju Thomas, Introduction to Oracle 9i SQL, BPB, 2002
3. Bob Bryla, Biju Thomas, Oracle 9i DBA Fundamental I, BPB, 2002
4. Doug Stums, Matthew Weshan, Oracle 9i DBA Fundamental I, BPB, 2002
5. Joseph C. Johnson, Oracle 9i Performance Tuning., BPB, 2002

Course Outcomes:

- | |
|--|
| 1. Acquire knowledge of handling large volume of data. |
| . Acquire skills to deal with Real life database implementation. |
| 3. Response off faster queries and serve as many users as possible concurrently. |
| . Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning. |
| 5. Fit with any Database project in industry after completion of degree. |

MCA 424: UNIX and Shell Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test - 12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - DOS Operating System

Course Objectives:

1. To familiarize the students with the Operating System.
2. To demonstrate the process, memory, file and directory management issues under the UNIX
3. Operating system.
4. To introduce UNIX basic commands.
5. To make students how to make simple programs in UNIX and administrative task of UNIX.

Detailed Syllabus

UNIT I (6 Hours)

Introduction to UNIX: features of UNIX, Shell Vs Kernel, types of shell, System Calls, System calls Vs Library functions, UNIX file System, The Parent-Child Relationship, Orphan, Zombie, UNIX Architecture, UNIX Commands.

UNIT II (10 Hours)

The first faltering step(Login), Password, Password Ageing, files related commands, Symbolic links, Listing Files & directories, Hidden files, Shell Meta characters, Masking file permission, Changing file permission(Absolute & Symbolic mode), Sticky bit, Directory related commands, Best calculator.

LAB WORK—who am i, who, logname, uname, id, tty, sty, passwd, touch, cat, cp, rm, mv, ls, ln, umask, chmod, pwd, mkdir, rmdir, cd, bc, cal, date, echo, printf.

UNIT III (10 Hours)

The UNIX file system, INODE Table, Disk related commands, File related commands, viewing files, Locating files, Taking printouts, File Compression (File Compression & Archiving), Filters, The Stream Editors, I/O redirection & Piping, Command substitution.

LAB WORK—df, dfspace, du, ulimit, file, dosdir, doscat, pg, more, find, lp, lpstat, cancel, pr, tr, cmp, comm., diff, compress, uncompress, gzip, gunzip, bzip, bunzip, zip, unzip, tar, wc, sort, grep, cut, head, sort, uniq, use of (>, <, >>, |).

UNIT IV (10 Hours)

Process basic, process status, Mechanism of process creation, Job Control, background processes, Killing a process, Daemon, Changing process priorities, Scheduling a process, process synchronization, Semaphores, Communication In UNIX,

System Administration in UNIX- the System administrator's login, the administrator's privileges, Adding & Removing groups, user's management, Booting & Shutdown, Making a file system, Mounting & Unmounting File system, Monitoring System Usage.

LAB WORK—ps, nohup, kill, nice, at, batch, crontab, finger, talk, write, mesg, wall, mail, mailx, pine, motd.

UNIT V (10 Hours)

Editor, types of editor (vi and ed), Modes of operation in vi, Navigation in vi (use of h, j, k and l keys), word navigation (use of b, e and w keys), Scrolling, deleting text, copy & paste in vi, block commands, Searching, Find & replace, Abbreviation(abbr), set command.

UNIT VI (10 Hours)

Shell Scripts/program, need of shell scripts, Interactive shell scripts, shell variables, shell keywords, System variables, shell keywords, System variables, user defined variables, Command line arguments, exit and status of command, use of operators, Control Instructions in shell, arrays, functions, Positional parameters, trapping signals.

Text and Reference Books

- 1.UNIX shell programming By Yashvant Kanetkar ---BPB Publications
- 2.UNIX Concepts and Application By Sumitabha Das--- Tata McGraw-Hill publication
- 3.The C Odyssey UNIX the open boundless C By Meeta Gandhi--- BPB Publications

Course Outcomes:

After completing the course, students will be able to:

1. Knowledge about working environment in UNIX.
2. Knowledge about the UNIX commands to perform different tasks.
3. Difference between DOS and UNIX environment.
4. Create or design different scripts using shell programming.
5. Implement process, thread, semaphore concept of operating system
6. Responsibilities and duties of a system administrator along with the knowledge how to grant permission to users, create user account etc.

MCA425: Advanced Java and Internet Programming

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test – 12 Marks Teachers Assessment – 6 Marks Attendance – 12 Marks End Semester Exam – 70 Marks
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Prerequisite: HTML, CSS, C Programming, and OOPs Concepts.

Course Objectives:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.
6. To understand Java Swings for designing GUI applications based on MVC architecture.

Detailed Syllabus:

Unit-1

Internet: Internet, Development of Internet, Internet Service Provider (ISP), Intranet, Extranet, World Wide Web (WWW). Web Browsers, Active –X-controls.

Protocols: IP, TCP, HTTP, HTTPS, FTP, SMTP.

Introduction: Web Application and its Life Cycle, Web Page, Websites, Type of Websites, Client side Application, Server side Application. Search Engine and Search Technique.

Unit-2

GUI Component: Introduction of Java Beans, Advantages, Properties, Bean Development Kit (BDK), Creating GUI Component.

Overview of J2EE: Distributed Multi-tiered Applications, J2EE Application Components, J2EE Architecture, Introduction of J2EE API's, Introduction and working of Web Application Server's: Sun Micro System's Application Server, Web Logic (Bea).

AJAX: HTML, Java Script, CSS, XML, XMLHttpRequest, MSXMLDOM, AJAX Examples

Unit-3

Java Servlet Technology: Introduction of Servlet, Life cycle of a Servlet, Sharing Information, Initialization a Servlet, Compilation, Debugging and Execution of Servlet, Writing Service Methods, Filtering Request and Response, Invoking Other Web Resources, Accessing Web Context, Maintaining Client State, Finalizing a Servlet.

Session Management and Tracking using: Cookies, URL Re-Writing, Hidden from Fields, Session Object.

HttpSession: Putting data into a session object, Retrieving data from a session object.

Unit-4

Java Server Pages Technology: Introduction of JSP, Life Cycle of JSP, JSP Processing, JSP Application Design, Creating Static and Dynamic Content, Expression Language, Adding Applet to Jsp Page, Types of Tag, Using add Bean Tags, Using Custom Tags.

JDBC: Database Programming Using JDBC, java, sql package, Accessing Database on JSP page, Creating Login and Logout in JSP page, Creating Registration Page, searching data as a Grid and searching records based on Primary Key, deleting records from the Database, Joining Tables.

Unit-5

Enterprise Java Beans (EJB): Introduction of EJB, Enterprise Bean Architecture, Creating the application Client, Creation of web Client, Session Bean, Entity Bean, Message-Driven Bean, Introduction of Bean-Managed Persistence Examples(BMP), Container-Managed Persistence Examples. **Application Based on EJB:** A shopping cart an online bookstore Application

Unit-6

RMI (Remote method Invocation): Introduction to Distributed Applications, RPC, RMI Architecture, RMI Examples, Java Naming and Directory Interface Web Services: Interoperability, CORBA, SOAP, UDDI, WSDL, JAXP, JAX-RPC, JAXB, JAXM. **Design Patterns Struts:** MVC, MVC 2, **Command Pattern, Front Controller**, Introduction to Struts Framework.

Suggested Readings:

1. The Complete Reference JAVA 2, NaughtonSchildt, TMH, 5th Edition 2010
2. Programming in JAVA, Balagurusamy E, TMH, 2nd Edition 2007
3. The complete Reference Internet,Margaret Levine Young, TMH, 2nd Edition 2005
4. Inside Servlets, Dustin R. Callway, Addison Wesley, 2nd Edition 2001
5. Java enterprise Edition, Mark Wutica, QUE ,3rd Edition,2007
6. Java Black book, Steven Helzner, Dreamtech, 3rd Edition,2009

Course Outcomes:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture.

MCA 501: Php Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Course Objectives:

1. To give knowledge about server site programming.
2. To introduce latest web development language.
3. To give knowledge about MySQL database management.
4. To explore the skills of programming in the file of online web project.

Detailed Syllabus

Unit-1

Introduction to PHP:- Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type , Operator and Expression, Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html.

Unit-2

Function:- What is a function, Define a function, Call by value and Call by reference, Recursive function, PHP GET and POST, Built-in Functions, User-Defined Functions, Functions with Parameters, Values and arguments in Function..

Unit-3

String and Array:-String - Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function , Array- Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and foreach(), Some useful Library function

Unit-4

Introduction to OOPS- Introduction, Objects, Declaring a class, The new keyword and constructor, Destructor, Access method and properties using \$this variable, Public, private, protected properties and methods, Static properties and method, Class constant, Inheritance & code reusability, Polymorphism, Parent:: & self:: keyword, Instance of operator, Abstract method and class, Interface, Final

Unit-5

Exception Handling, file and Directories:-Understanding Exception and error, Try, catch, throw, Global Exception Handler, Defining Custom Exceptions, Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, working with directories.

Unit-6

Database Connectivity with MySql:-Introduction to RDBMS,Connection with MySql Database, Performing basic database operation (DML) (Insert, Delete, Update, Select), Executing query, Framework.

Text and Reference Books

1. Lynn Beighley & Michael Morrison- Head First Php & MySQL.
2. Robin Nixon: Learning Php, MySQL, Java script and CSS: A step-by-step guide to creating dynamic websites.
3. Luke Welling & Laura Thompson: PHP & MYSQL web development

Course Outcomes:

After completing the course, students will be able to:

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|---|
| 1. Understand various types of website development using php and mysql. |
| 2. Analyze the latest language designing and optimize new technology. |
| 3. Identify difference between traditional web development and php web development. |
| 4. Understand level of web technology at corporate level. |
| 5. Learning professional framework of php and mysql for project development. |

MCA 505 Grid and Cloud Computing

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite:- MCA 204 Operating Systems, MCA 303 Data Communication & Computer Network.

Course Objectives:

1. To describe grid and cloud computing as an emerging technologies.
2. To understand the importance of grid and cloud computing along with various security issues.
3. To identify the differences between various types of computing techniques, Cloud deployment models and service models.
4. To understand the implementation of cloud security and mobile cloud computing concepts.
5. To analyze various virtualization and scheduling techniques.
6. To study the design approaches used by various cloud service providers.

Detailed Syllabus

UNIT I

Recent trends in computing: Cluster Computing, Grid Computing, Utility Computing, Cloud Computing. Introduction to Grid Computing: Motivation, Definition of Grid Computing, Evolution of Grid, Scope in Grid Computing, Benefits of Grid Computing.

UNIT II

Grid Basics: Grid Architecture and its relationship to other distributed technologies, Grid Application Areas. Security Issues in Grids: Authentication Issues Trust and Privacy related Issues, Authorization Issues, Grid Security Framework, and GSI.

UNIT III

Basics Cloud Computing Overview, Characteristics; Applications; Benefits; Limitations; Challenges; Cloud Computing Service Models: Infrastructure as a Service; Platform as a Service; Software as a Service; Cloud Computing Deployment Models: Private Cloud; Public Cloud; Community Cloud; Hybrid Cloud, Major Cloud Service providers

UNIT IV

Cloud Storage and Security: Overview, Advantages, Storage as a Service, Security, Reliability, Advantages, Cloud Storage Providers. Accessing the Cloud: Web Applications and Web API's. Standards: Applications, Client, Infrastructure, Services.

UNIT V

Virtualization Technologies: Types of Virtualization, Benefits of Virtualization, Hypervisors. Scheduling in Cloud Overview of Scheduling problem, Different types of scheduling, Introduction to Mobile Cloud Computing.

UNIT VI

Developing Applications: Programming Paradigms – MapReduce, Hadoop Library from Apache, Cloud Computing Platform and Tool, Google App Engine, Amazon AWS. Cloud Software Environments - Eucalyptus, Open Nebula, OpenStack, Aneka.

Text and Reference Books

- 1- The Grid- Blueprint for a New Computing Infrastructure, Ian Foster, Carl Kesselman, 2nd Edition, Morgan Kaufmann Publications, 2003.
- 2- Grid Computing: Making the Global Infrastructure a Reality, Francine Berman, Geoffrey Fox, Tony Hey, John Wiley & Sons, 2003.
- 3- Cloud Computing: Principles and Paradigms, Rajkumar Buyya and James Broberg, John Wiley & Sons, 2011.
- 4- Cloud Computing, A Practical Approach, Anthony T Velte, McGraw Hill, 2010.

Course Outcomes:

After completing the course, students will be able to:

1. Define Cloud Computing and memorize the different Cloud service and deployment models.
2. Describe importance of virtualization along with their technologies.
3. Use and Examine different cloud computing services.
4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing.
5. Describe the key components of Amazon web Service.
6. Design & develop backup strategies for cloud data based on features.

MCA 503 Artificial Intelligence

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Artificial Intelligence is the sub-division of computer science and the main goal is to enable a smart device perform activities that are normally done by people, so before starting in the field of AI we should have knowledge about advanced mathematics(e.g. correlation algorithm) (Computer based optimization techniques MCA204), programming language(data structure MCA201, C MCA101) etc..

Course Objectives:

1. The main objective of AI to build intelligent machine which can perform and act like humans.
2. so the main objective of this course is to understand how these algorithms works and how to analyze the data to make a proper decision.
3. As we know AI is in used in all fields like healthcare industry, mobile world, Retail, Fraud detection etc. so demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
4. To initiate the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems in different fields.
5. To evaluate the different stages of development of the AI field from human like behavior to Intelligent Agents.

Detailed Syllabus

UNIT I

Introduction: Overview Of Artificial Intelligence- Problems Of AI, AI Technique. Problem Solving : Problems, Problem Space & Search: Defining The Problem As State Space Search, Production System, Problem Characteristics, Issues In The Design Of Search Programs.

UNIT II

Search Techniques: Uniform Search Strategies: Breadth First Search, Depth First Search, Depth Limited Search, Bidirectional Search, Comparing Uniform Search Strategies, Greedy Best-First Search, A* Search, Memory Bounded Heuristic Search: Local Search Algorithms & Optimization Problems: Hill Climbing Search, Simulated Annealing Search, Local Beam Search, Genetic Algorithms.

UNIT III

Knowledge representation: Knowledge Representation Issues, Representation and Mapping, Approaches To Knowledge Representation, Issues In Knowledge Representation, Knowledge manipulation, Knowledge acquisition.

UNIT IV

Using Predicate Logic: Representing Simple Fact In Logic, Representing Instant & ISA Relationship, Computable Functions & Predicates, Resolution, Natural Deduction. Representing Knowledge Using Rules : Procedural Verses Declarative Knowledge, Logic Programming, Forward Verses Backward Reasoning, Matching, Control Knowledge.

UNIT V

Probabilistic Reasoning: Representing Knowledge in An Uncertain Domain, The Semantics of Bayesian Networks, Dempster-Shafer Theory. Natural Language Processing : Introduction, Syntactic Processing, Semantic Analysis, Discourse & Pragmatic Processing.

UNIT VI

Expert System-Rule based system architecture, Non production system architecture, knowledge organization and validation, Existing Systems (DENDRAL, MYCIN).

Text and Reference Books

1. "Artificial Intelligence", Ritch & Knight, TMH, 2006.
2. "Introduction to Artificial Intelligence & Expert Systems", Patterson, PHI, 2007.
3. "Artificial Intelligence: A Modern Approach", Russell, S., Norvig, P, Pearson Education, 2006.
4. "Introduction to A.I.", Charnick, Addison Wesley, 1999.

Course Outcomes:

After completing the course, students will be able to know:

- | |
|---|
| 1. How to solve a particular problem by using different algorithms which is impossible for humans. |
| 2. How to make proper decisions by gathering information and analyzing them. |
| 3. How expert system works and perform tasks. |
| 4. How to convert a particular sentence into logical statement. |
| 5. Analyze the problem as a state space, graph, design heuristics and select amongst different search based techniques to solve them. |
| 6. Apply concept Natural Language processing to problems leading to understanding of cognitive computing. |

MCA 511: Python

Teaching Scheme

Lectures: 3 hrs/Week
Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks
Teachers Assessment - 6Marks
Attendance – 12 Marks
End Semester Exam – 70 marks

Course Objectives:

1. To give knowledge about python programming.
2. To introduce python development language.
3. To give knowledge about concept of python.
4. To explore the skills of web programming using python.

Detailed Syllabus

Unit-1

Introduction to Python: Importance of Python, Installing and working with Python in Windows, Linux and Mac, Using Python as calculator, Comments, How to define main function in Python
The concept of data types - Variables, Arithmetic Operators and Expressions.

Unit-2

Subscript Operator, Indexing, Slicing a string, Converting strings to numbers and vice versa, split function, **Control flow** - if statements, for and while loops, nested loops, Short-circuit (lazy evaluation), range() function, break and continue statements, pass statements.

Unit-3

Data Structures: Lists - Basic list operations, Replacing, inserting, removing an element; Searching and sorting a list, Methods of list objects, Using lists as Stacks and Queues, How efficient lists are when used as stack or queue, List and nested list Comprehensions Tuple, Sets, Difference between list and tuple, **Dictionary** - adding and removing keys, accessing and replacing values, traversing dictionaries

Unit-4

Python functions and modules - **OS** and **SYS** modules, Defining python functions, calling a function, function arguments, Lambda and map function, Importing python module, **Useful Python Packages** – Beautiful Soup, NumPy, iPython, tkinter, **Classes and OOP** - Class definition syntax, objects, class and instance variables, Inheritance and multiple inheritance, Polymorphism, Overloading, Overriding, Data Hiding.

Unit-5

Regular Expressions - re module, Searching a string (match and search), Finding a string (findall), Break string into substrings (split), Replace part of a string (sub), **Examples of Regex** - Return the first word of a given string, Extract all the words of a given string, Extract domain name from given e-mail id's, Extract date from given string, Return all the words of a string that starts with vowel, Split a string with multiple delimiters, Retrieve some information from HTML or XML file.

Unit-6

File Handling - Reading keyboard input, opening and closing file, Read, Write and Append mode, Create and Read a text file, Looping over a file object, Writing on a file, with statements, splitting lines in a text file, Renaming and Deleting files, **Exception Handling** - Exceptions, Why use exceptions, Raising an exception, try and except, try, except and else clause; try and finally

Text and Reference Books

1. Python Programming for the Absolute Beginner By Laila M. Dawson
2. Learn Python the Hard Way By Zed A. Shaw
3. Learning Python By Mark Putz Python Documentation (<https://docs.python.org>)

Course Outcomes:

After completing the course, students will be able to:

- | |
|--|
| 1. Understand various types of website development using python. |
| 2. Analyze the latest language designing and optimize new technology. |
| 3. Identify benefits of using python in the fields of latest development in machine learning, web. |
| 4. Understand data structure using python implementation. |
| 5. Data mining and data analyzing. |

MCA 512 Big Data and R Programming

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Database Management System, Data Mining and Warehousing.

Course Objectives:

1. To describe the concept of Big data and its features.
2. To understand the importance Big Data Analytics with various challenges.
3. To know about the architecture of Hadoop with its components.
4. To perform analysis on the data using R programming language.
5. To identify the role of cloud computing in Big Data.
6. To generate data and manipulating it using R.

Detailed Syllabus

UNIT I (6 Hours)

Introduction to Big Data Classification of Digital Data, Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Classification of Analytics, Top Challenges Facing Big Data, Responsibilities of data scientists, Big data applications in healthcare, medicine, advertising.

UNIT II (6 Hours)

Hadoop Architecture Hadoop Architecture, Hadoop Storage: HDFS, Hadoop MapReduce paradigm, Introduction to Hive, Introduction to Pig.

UNIT III (6 Hours)

Introduction to NoSQL & Hadoop Introduction to NoSQL Advantages of NoSQL, SQL versus No SQL, Introduction to Hadoop, Features of Hadoop, Hadoop Versions, Hadoop Versus SQL.

UNIT-IV (8 Hours)

Types of Analytics & Techniques Open source technology for Big Data Analytics – cloud and Big Data – Mobile Business Intelligence and Big Data.

UNIT V (8 Hours)

Predictive Analysis Predictive Analytics, Supervised, Unsupervised learning, Clustering Techniques.

UNIT VI (6 Hours)

Basics of R, Working of R - Creating, listing and deleting the objects in memory - The on-line help Data with R Objects, R data Frames and Matrices, Reading data in a file, Saving data, Generating data, Manipulating data using R

Text and Reference Books

1. 1 An Introduction to Statistical Learning: With Applications in R: Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani.
2. BIG Data and Analytics, Sima Acharya, Subhashini Chhellaappan, Wiley
3. VigneshPrajapati, "Big Data Analytics with R and Hadoop", Packet Publishing 2013.
4. The Culture of Big Data, Mike Barlow, by Oreilly
5. Big Data Analytics; Frank J. Ohlhorst, by Wiley

Course Outcomes:

After completing the course, students will be able to:

1. Understand the role and importance of Big Data and Big Data Analytics.
2. Understand the architecture of Hadoop.
3. Know the role of Pig and Hive.
4. Understand the concept of various types of Analysis.
5. Work on the provided data using R programming.

MCA513: MATLAB

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Basic Mathematics, Elementary knowledge of computer programming and basic understanding of matrices, linear algebra, calculus, trigonometric functions and geometry.

Course Objectives:

Familiarization of the syntax, semantics, data-types and library functions of numerical computing languages such as MATLAB and/or SCILAB, and application of such languages for implementation/simulation and visualization of basic mathematical functions relevant to electronics applications.

Detailed Syllabus

UNIT I (6 Hours)

Basics of MATLAB: Starting MATLAB, matrices, variables, and the colon operator, linspace, plotting vectors.

UNIT II (10 Hours)

Matrices: Typing matrices, concatenating matrices, useful matrix generators, subscripting, end as a subscript, deleting rows or columns, matrix arithmetic, transpose.

UNIT III (10 Hours)

MATLAB Programming: Logical expressions, for loops, while loops, conditional programming, scripts, function m scripts, return statements, recursive programming.

UNIT IV (10 Hours)

Basic Graphics: Plotting many lines, adding plots, plotting matrices, clearing the figure window, subplots.

Graphics of Functions of Two Variables: Basic plots, color maps, color bar.

UNIT V (10 Hours)

Text Strings and cell arrays: String matrices, comparing strings, string manipulations, converting numbers to strings, using strings as commands, introduction and use of cell arrays.

UNIT VI (10 Hours)

Multidimensional Arrays: Generating Multidimensional Grids, Operations with Multidimensional Arrays. Digital Image Processing using MATLAB: Reading and writing gray scale image, Conversion of gray scale image to binary image, finding the number of density, perimeter, branch, area points of the image.

Text and Reference Books

1. Basics of MATLAB and beyond, Andrew knight, CRC Press LLC, 2000.
2. A Guide to MATLAB for Beginners and Experienced Users, Brian R. Hunt, Ronald L. Lipsman, Cambridge University, 2005.
3. Digital Image Processing using METLAB, Rafel, Richard & Steven, Pearson, 2007.

Course Outcomes:

On successful completion of the course, the students should be able to

1. Understand the need for simulation/implementation for the verification of mathematical functions.
2. Understand the main features of the MATLAB program development environment to enable their usage in the higher learning.
3. Implement simple mathematical functions/equations in numerical computing environment such as MATLAB.
4. Interpret and visualize simple mathematical functions and operations thereon using plots/display.
5. Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.

MCA514: SQL Server

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Pre-Requisites: Basic computer literacy including ability to create and manipulate files and install software.

Course Objectives:

1. Learn structured query language (SQL) to an intermediate/advanced level.
2. Be able to write data retrieval queries and evaluate the result set
3. Be able to write SQL statements that edit existing data
4. Be able to write SQL statements that create database objects.
5. Understand the structure and design of relational databases.
6. Understand the importance and major issues of database security and the maintenance of Data integrity.

Detailed Syllabus

Unit-1

SQL Server Overview: What Is SQL Server, SQL Server Integration, SQL Server Databases, SQL Server Security, Working with SQL Server. Planning to Install SQL Server, Hardware Installation Considerations, SQL Server 2000/2005 Editions, Software Installation Considerations, Methods of Installing SQL Server, Verifying the Installation, Configuring SQL Server Enterprise Manager, Troubleshooting.

Unit-2

Data Storage Management: Introduction to Data Structures, Creating Databases, Managing Databases, Placing Database Files and Logs, Optimizing the Database Using Hardware-based RAID, Optimizing the Database Using File groups, Optimizing the Database Using File groups with Hardware-based RAID, Capacity Planning, Performance Considerations, Creating A Database, Managing File groups, Viewing Metadata

Unit-3

Managing Security/Security Management: Windows Security Management for SQL Server, Windows Authentication Mode, Implementing an Authentication Mode, Assigning Logins to Users and Roles, Assigning Permissions to Users and Roles, Managing Security within SQL Server, Managing Application Security, Managing SQL Server Security in the Enterprise

Unit-4

Performing Administrative Tasks: Configuration Tasks, Routine SQL Server Administrative Tasks, Automating Routine Maintenance Tasks, Creating Alerts, Troubleshooting SQL Server Automation, Automating Multi-Server Jobs. Backing Up Databases, Preventing Data Loss, Setting and Changing a Database Recovery Model, SQL Server Backup, When to Back Up Databases, Performing Backups, Types of Backup Methods, Planning a Backup Strategy, Performance Considerations

Unit-5

Restoring Databases: SQL Server Recovery Process, Preparing to Restore a Database, Restoring Backups, Restoring Databases from Different Backup Types, Restoring Damaged System Databases, Monitoring/Tuning SQL Server, Why to Monitor SQL Server, Performance Monitoring and Tuning, Tools for Monitoring SQL Server, Common Monitoring and Tuning Tasks, T-SQL Tuning, SQL Tuning, Diagnosing Storage and System Problems, Diagnosing Session and O/S Issues

Unit-6

Managing Data with DTS Utility/High Availability: Introduction to Transferring Data, Tools for Importing and Exporting Data in SQL Server, Introduction to DTS, Transforming Data with DTS, Introduction to Availability, Increasing Availability Using Failover Clustering, Standby Servers and Log Shipping, Introducing Replication, Introduction to SQL Server Replication, SQL Server Replication Agents, SQL Server Replication Types, Physical Replication Models, Creating a Replication Topology

Text and Reference Books

Suggested Readings:

1. MS SQL Server Study Guide for DBA: by Zakir Hossain
Microsoft SQL Server 2008 Administrator's Pocket Consultant, 2nd Edition, Microsoft Press.
2. Complete Reference, Jeffrey R Shapiro, McGraw-Hill Companies, 2005
3. SQL Server 7 Essential Reference, Sharon Dooley, Sams, 2000.

Course Outcomes:

After completing the course, students will be able to:

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| 1. Students will familiar for SQL architecture, client/server relation, and database types. |
| 2. Students will create table and modifying data using SQL quires, Views, and Stored Procedures |
| 3. To understand the Managing Security/Security Management issues and Managing Application Security |
| 4. Students will Performing Administrative Tasks related Automating Routine Maintenance Tasks and Backing Up Databases |
| 5. Students will understand how to Restoring Databases, SQL Server Recovery Process |
| 6. To understand the managing data with DTS Utility/High availability backup and restoration of databases and SQL Server Replication |

MCA 521 Digital Image Processing

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite:- Basic Logical operations, Computer Graphics.

Course Objectives:

1. To describe and explain basic principles of digital image processing.
2. To study basic image operations.
3. To understand the algorithms that perform basic image processing (e.g. noise removal and image enhancement).
4. To design and implement algorithms for advanced image analysis (e.g. image morphing, image segmentation).
5. To expose students to current applications in the field of DIP.

Detailed Syllabus

UNIT I (6 Hours) Elements of Visual Perception, Image Sensing and Acquisition, Steps of DIP and its Applications, Components of Image Processing system, Image sampling and Quantization.

UNIT II (10 Hours) **Image Enhancement in Spatial Domain:** Basic Gray Level Transformation, Histogram Processing, Spatial Filtering, Smooth Spatial Filtering: Smoothing Linear Filters, Order-Statistics filters. Enhancement using arithmetic/Logic Operations: Image subtraction, Image Averaging, Use of Second Derivatives for Enhancement-The Laplacian.

UNIT III (10 Hours) **Image Enhancement in Frequency Domain:** one dimensional Fourier frequency domain and its inverse, Two dimensional Fourier frequency domain and its inverse, Basic properties of frequency domain, Smoothing Frequency-Domain Filters- Ideal Lowpass Filters, Butterworth Lowpass Filters, Gaussian Lowpass Filters, Sharpening Frequency Domain Filters- Ideal Highpass Filters, Butterworth Highpass Filters, Gaussian Highpass Filters, Unsharp Masking, High-Boost Filtering.

UNIT IV (10 Hours) **Image Restoration:** Model of the Image Degradation/Restoration Process, Noise Models- Spatial and Frequency Properties of Noise, Important Noise Probability Density Functions, Periodic Noise, Restoration in the Presence of Noise- Mean Filters, Order-Statistics Filters, Linear, Position-Invariant Degradations, Estimating the Degradation Function- Estimation by Image Observation, Estimation by Experimentation, Estimation by Modeling Inverse Filter, Minimum Mean Square Error (Wiener) Filter, Geometric Mean Filter.

UNIT V (10 Hours) **Morphological Image Processing:** Basic Concepts from Set Theory, Logic Operations Involving Binary Images, Dilation and Erosion, Opening and Closing, Hit or Miss Transformation, **Morphological Algorithms- Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning, Extensions to Gray-Scale Images- Dilation, Erosion, Opening and Closing.**

UNIT VI (10 Hours) Image Segmentation: Detection of Discontinuities- Point Detection, Line Detection, Edge Detection, Edge Linking and Boundary Detection- Local Processing, Global Processing via the Hough Transform, Global Processing via Graph-Theoretic Techniques, Thresholding- Foundation, Basic Global Thresholding, Basic Adaptive Threshold, Region-Based Segmentation- Basic Formulation, Region Growing, Region Splitting and Merging.

Text and Reference Books

1. Fundamentals of Digital Image Processing, Anil K. Jain, Pearson, IIIrd, 2004.
2. Digital Image Processing, Rafael C. Gonzalez & Richard E. Woods, PHI, 10th, 2005.
3. Digital Image Processing using MATLAB, Rafael, Richard & Steven, Pearson, IIInd, 2007.
4. Digital Image Processing, JayaramanS, VeerakumarT, Esakkirajan S, TMH, Ist, 2009.

Course Outcomes:

After completing the course, students will be able to:

1. Understand general terminology of digital image processing.
2. Examine various types of images, intensity transformations and spatial filtering.
3. Develop Fourier transform for image processing in frequency domain.
4. Evaluate the methodologies for image segmentation, restoration etc.
5. Implement image process and analysis algorithms.
6. Apply image processing algorithms in practical applications.

MCA 522: Artificial Neural Networks

Teaching Scheme

Lectures: 3 hrs/Week

Tutorials: 1 hr/Week

Credits: 4

Examination Scheme

Class Test -12Marks

Teachers Assessment - 6Marks

Attendance – 12 Marks

End Semester Exam – 70 marks

Prerequisite: - Machine Learning

Course Objectives:

1. Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
2. Introduce students to artificial neural networks and fuzzy theory from an engineering perspective
3. To give design methodologies for artificial neural networks
4. To provide knowledge for network tuning and overfitting avoidance
5. To offer neural network implementations.
6. To demonstrate neural network applications on real-world tasks

Detailed Syllabus

Unit-1

Overview of biological neurons: Structure of biological neurons relevant to ANNs. Fundamental concepts of Artificial Neural Networks: Models of ANNs; **Feed-forward & feedback networks**; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner-take all learning rule, etc.

Unit-2

Single layer Perceptron Classifier: Classification model, Features & Decision regions; **training & classification using discrete perceptron algorithm**, single layer continuous perceptron networks for linearly separable classifications.

Unit-3

Multi-layer Feed forward Networks: linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, generalized delta learning rule, Error back-propagation training, learning factors, Examples. Single layer feedback Networks: Basic Concepts, Hopfield networks, Training & Examples.

Unit-4

Associative memories: Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; Bi-directional associative memory, Architecture, Association encoding & decoding, Stability.

Unit-5

Fuzzy Logic and Genetic Algorithms: Fuzzy set theory, Crisp set, Crisp relations, Fuzzy relations, Fuzzy systems – crisp logic, Predicate logic, Fuzzy logic, Rule based system, Defuzzification methods. **Genetic Algorithms**- Basic concept, working principle, flow chart of genetic algorithms.

Unit-6

Applications of Neural Network: Approach to solve hard problems- **Travelling Salesman problem, Time Series prediction, Speech Recognition, Autonomous Vehicle Navigation, Handwritten Digit Recognition, Image compression, Visual processing networks.**

Text and Reference Books

1. "Introduction to artificial neural systems", Jacek M. Zurada, 1994, Jaico Publ. House.
2. "Neural Networks- A comprehensive foundation", Simon Haykin, Pearson Education Asia, II edition, 2002
3. "Neural Networks", Kosko, 1992, PHI.
4. "Neural Network fundamentals with Graph Algorithms & Applications", P. Liang and N.K. Bose, TMH, 2003.
5. "Neural Networks, Fuzzy Logic and Genetic Algorithms", S. Rajasekaran and G. A. V. Pai, PHI, 2003.

Course Outcomes:

After completing the course, students will be able to:

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
4. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
5. Reveal different applications of these models to solve engineering and other problems.

MCA525: Software Testing Tools

Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - programming languages, software engineering.

Course Objectives:

The objectives of this course are

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. To highlight the strategies for software testing and understand the various types of black box and white box testing methods.
3. To discuss various software testing issues and solutions in unit testing, integration, regression, and system testing
4. To identify the issues in testing management and understand test planning.
5. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Detailed Syllabus:

UNIT I (6 Hours)

Software Quality Assurance: Software crisis, Birth of software engineering, Why Software engineering, Criteria for the success of a software project, phases in SDLC, Software Quality Assurance, Quality Management Systems.

UNIT II (10 Hours)

Software Testing Process: Verification and Validation, Cost of Quality, Why Testing is difficult, Levels of testing-Unit Testing, Module Testing, Integration and System Testing, Acceptance Testing, Testing Approaches: Top-down versus Bottom-up, Functional versus Structural testing, Mutation testing, Regression Testing, Types of Testing, Manual Testing and its Limitations.

UNIT III (10 Hours)

Software Testing Tools: Need for Automated Testing Tools, Taxonomy of testing tools, Functional/Regression Testing Tools, Performance Testing tools, Testing Management Tools, Source Code Testing Tools, How to select a Testing Tool?

UNIT IV (12 Hours)

Win Runner: Overview, Testing an application using Win Runner, Test Script Language(TSL), GUI MAP file, Synchronization of Test cases, Data driven testing, Checking GUI objects.

UNIT V (12 Hours)

SQA Robot: overview, testing an application, Synchronization of Test procedures, creating checkpoints. **Test Director:** overview, testing management process, managing the testing process using Test Director.

UNIT VI (6 Hours)

Source Code Testing Utilities in Unix and Linux Environnement: GNU tools, Timings of programs, Profiler, Code optimization, Productivity tools, Portability Testing Tool, Configuration Management Tools, Coding Guidelines and Standards.

Text and Reference Books

1. "Effective Software Testing", Elfriede Dustin, Pearson Education, IV edition.
2. "Software Testing Concepts and Tools", N. R. Pusuluri, Dreamtech press, 2008.
3. "Automated Software Testing", Jeff Rashka, John Paul and E. Dustin, Pearson Education, 2008.
4. "Effective Methods For Software Testing", W. E. Perry, Wiley-India, III edition.

Course Outcomes:

After completing the course, students will be able to:

1. Have an ability to apply software testing knowledge and engineering methods. Have an ability to design and conduct a software test process for a software testing project.
2. Have an ability to understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods
3. Have an ability to design and conduct various types and levels of software testing for a software project.
4. Have basic understanding, knowledge of contemporary issues in software testing and test planning. Have an ability to use various communication methods and ethical skills to communicate with their teammates to conduct their practice-oriented software testing projects.
5. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.

BCE-304	STRENGTH OF MATERIALS	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the concept of stress and strain, principal stress and strain and application in various fields, temperature stress and strain, two dimensional stress system for various cases, mohr's circle
CO2	To classify direct and shear stress in beam due to transverse and axial loads, concept of pure bending, derive the bending equation, derive the torsion equation
CO3	To determine the deflection of beam by macaulay's and moment area method, middle third and middle quarter rules, euler's theory for different end conditions,
CO4	To differentiate between thin and thick cylinders and spheres, radial, axial and circumferential stress in thick cylinders subjected to external and internal pressures, compound cylinders,
CO5	To detect the stress in rotating shaft and cylinders, hollow and solid circular shafts, deflection of helical and leaf springs, springs subjected to axial load and twisting moment.
CO6	To design the shafts subjected to combined torsion and bending, beams with large curvature, crane hook and circular rings.

Course Content:

MODULE- I

Simple stresses and strains: Concept of stress and strain: principle of stress and strain diagram, Hooke's law, Young's modulus, Poisson ratio, stress at a point, stresses and strains in bars subjected to axial loading, Modulus of elasticity, stress produced in compound bars subjected to axial loading, Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

Compound stresses and strains: Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stress.

Stresses in Beams: Review of pure Bending. Direct and shear stresses in beams due to transverse and axial loads.

Deflection of Beams: Equation of elastic curve, cantilever and simply supported beams, Macaulay's method, area moment method.

MODULE- II

Columns and Struts: Combined bending and direct stress, middle third and middle quarter rules. Struts with different end conditions. Euler's theory and experimental results, Examples of columns in mechanical equipments and machines.

Thin cylinders & spheres: Hoop and axial stresses and strain. Volumetric strain.

Thick cylinders: Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures, Compound cylinders. Stresses in rotating shaft and cylinders. Stresses due to interference fits.

MODULE- III

Torsion: Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsion rigidity, combined torsion and bending of circular shafts.

Helical and Leaf Springs: deflection of springs by energy method, **helical springs** under axial load and under axial twist (respectively for circular and square cross sections) axial load and twisting moment acting simultaneously both for open and closed coiled springs, laminated springs.

Curved Beams: **Bending of beams** with large initial curvature, position of **neutral axis** for rectangular, trapezoidal and circular cross sections, stress in crane hooks, stress in circular rings subjected to tension or compression

BCE-302	BUILDING MATERIAL AND CONSTRUCTION	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the fundamental properties of material, principles of cold working, terminology, construction principle, building maintenance, ingredients definitions.
CO2	To classify the material and their performances, classification of clay bricks, lime, timber, composition and type of element in material, types of thermal and sound insulating material.
CO3	To determine properties of material like stone, brick, gypsum, lime, mortar, puzzolona, timber, asphalt, bitumen, tar. Requirement of good material, methods for layout, damp proofing, different plastering types: pointing, distempering, colour washing, painting.
CO4	To compare different types of ventilation, windows, door, comparison of desirable and undesirable properties, Discussion on reinforcing steel mechanical and physical properties chemical composition.
CO5	To judge method of using aluminium and lead, analysis of Vertical circulation means staircases ramp design, construction detailing of lintels, chajja, analysing Defects in timber, Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.
CO6	Explain of bituminous material, preservation of stones, specification in construction, flooring material, Cavity wall hollow block and Waffle slab construction, specification in construction.

Course Content:

MODULE- I

Classification of materials, **materials and their performance, economics of the building materials.**

Stones, Requirement of **good building stone,** **characteristics of stones** and their testing. Common building stones. Preservation of stones.

Bricks: **Manufacture of clay bricks, and their classification. Properties of clay bricks and their testing. Problems of efflorescence & lime bursting in bricks & tiles.**

Gypsum: properties of gypsum plaster, **building products of gypsum** and their uses.

Lime: Manufacture of lime, classifications of limes, and **properties of lime.**

Mortars: Introduction, Composition, Types and Functions

Puzzolona: **Natural and Artificial fly ash, Surkhi (burnt clay puzzolona), rice husk and ash puzzolona,** properties and specifications for use in construction.

Timber: Classification and identification of timber, Fundamental Engineering properties. Defects in timber, Factors affecting strength of timber, seasoning and preservation of timber. Wood based products.

Asphalt, Bitumen and Tar: Terminology, specifications and uses, bituminous materials.

MODULE- II

Chemistry of Plastics manufacturing process, classification, advantages of plastics, Mechanical properties and their use in construction.

Paints varnishes and distempers, Common constituents, types and desirable properties, Cement paints.

Ferrous metals, Desirable characteristics of reinforcing steel. Principles of cold working. Detailed Discussion on reinforcing steel mechanical and physical properties chemical composition. Brief discussion on properties and uses of Aluminium and lead.

Glass: Ingredients, properties types and use in construction.

Insulating Materials: Thermal and sound insulating material desirable properties and type.

MODULE- III

Components of building area considerations, Construction Principle and Methods for layout, Damp proofing ant termite treatment, Vertical circulation means staircases ramp design and construction.

Different types of floors, and flooring materials (Ground floor and upper floors).

Bricks and stone masonry construction,. Cavity wall hollow block and Waffle slab construction.

Doors, Windows and Ventilations its types & Construction details, type of roofs& its details, lintels & chajja.

Plastering different types, pointing, Distempering, Colour washing, Painting etc.

Principles & Methods of building maintenance

BCE- 303	Surveying	4 Credits
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CO1	To define surveying, levelling and contouring, Importance of surveying for engineers, Basic terms used in surveying and levelling, Definition, Principles of stadia systems, subtends bar and tangential methods
CO2	To understand Reference meridians, bearing and azimuths, magnetic declination, compass traversing, Introduction to vertical curves, Theory and methods of setting out simple circular curves, transition curves- types and their characteristics,
CO3	To calculate Bearings, elevations, traversing, area, Earthwork, apply equations of various transition curves, triangulation field work, calculation of volume of earth work
CO4	To differentiate plane tabling and geodetic surveying, Fore bearing and back bearing, surveying and levelling, traversing and triangulation
CO5	To Compare Plane surveying and geodetic surveying, Evaluate bearing of traverse if area affected by local attraction, Evaluate latitude and departure to remove closing error.
CO6	To Justify the measure differences in elevation, create the drawing of given area by radiation, intersection, resection method, Justify given area by two point problem and three point problem

Course Content:

MODULE- I

Importance of surveying to engineers, plane and geodetic surveying, principles of surveying, **classification of surveys**

Principles of different methods and their accuracies, measurement by tape, Reference meridians, bearing and azimuths, magnetic declination, compass, Vernier theodolite, temporary adjustments, measurements of horizontal angle, modern trends- EDM, electronic theodolites and Electronic Total Station.

Methods of determining elevations, Direct levelling- basic terms and definitions, principle, booking and reduction of field notes, curvature and refraction, automatic levels, **Contouring- methods and uses**

Definition, Principles of stadia systems, subtense bar and tangential methods

MODULE- II

Elements of simple circular curves, theory and methods of setting out simple circular curves, transition curves- **types** and their characteristics, ideal transition curve, equations of various transition curves, Introduction to vertical curves

Principles of traversing by compass and theodolite, computations of traverse coordinates, Principles and classification of **triangulation systems**, strength of figures, satellite stations, intervisibility of stations, triangulation field work

MODULE- III

Plane table surveying, Principles, Accessories of Plane table, orientation, Procedure of setting up Plane table over a station, Methods of plane tabling, special methods of resection, Procedure of Plane table traversing & advantages and disadvantages of Plane table surveying

BCE-501	GEOTECHNICAL ENGINEERING	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To learn Scope and objective methods of exploration and boring. sampling representative and undisturbed sampling , sampling techniques split spoon sampler, thin tube sampler.
CO2	To perform Stationary piston sampler Penetration tests (SPT and SCPT) Data interpretation (strength parameters and liquefaction potential) selection of foundation based on soil condition.
CO3	To get familiar with location and depth of foundation, Bearing capacity of shallow foundation on homogeneous deposits Terzaghi's formula and BIS formula factors affecting bearing capacity
CO4	To understand allowable bearing pressure, settlement components of settlement, determination of settlement of foundations on granular and clay deposits, allowable settlements, methods of

	minimizing settlement ,differential settlement.
CO5	To determine Types of foundation, contact pressure distribution below footings and raft Isolated and combined footings type proportioning, mat foundation types use proportioning
CO6	To understand Plastic equilibrium in soils, active and passive states, Rankine's theory, cohesionless and cohesive soil, coloumb's wedge theory, condition for critical failure plane, earth pressure on retaining walls , graphical methods, pressure on the wall due to line load, stability of retaining walls

Course Content:

MODULE I

SITE INVESTIGATION AND SELECTION OF FOUNDATION

Scope and objective methods of exploration and boring. sampling representative and undisturbed sampling sampling techniques split spoon sampler, thin tube sampler, stationary piston sampler **Penetration tests (SPT and SCPT)** Data interpretation (strength parameters and liquefaction potential) selection of foundation based on soil condition.

FOUNDATION

Introduction location and depth of foundation, **Bearing capacity of shallow foundation** on homogeneous deposits Terzaghi's formula and BIS formula factors affecting bearing capacity, allowable bearing pressure, settlement components of settlement, determination of settlement of foundations on granular and clay deposits, allowable settlements, **methods of minimizing settlement** ,differential settlement.

MODULE II

FOOTINGS AND RAFTS

Types of foundation, contact pressure distribution below footings and raft Isolated and combined footings type proportioning, mat foundation types use proportioning.

PILES

Types of piles and their function, factors influencing the selection of pile carrying capacity of single pile in granular and cohesive soil , static formula dynamic formulae engineering news and Hiley's) capacity from in situ tests (SPT and SCPT), **negative skin friction**

MODULE III

RETAINING WALLS

Plastic equilibrium in soils, active and passive states, Rankine's theory, cohesionless and cohesive soil, coloumb's wedge theory, condition for critical failure plane, earth pressure on retaining walls of simple configurations, **graphical methods** (Rebhann and Culmann)

,pressure on the wall due to line load, **stability** of retaining walls.

BCE-502	STRUCTURAL ANALYSIS-I	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the structures, unsymmetrical bending, arches, influence lines, degree of freedom, static and kinematic indeterminacy, eddy's theorem.
CO2	To classify the structures, rolling loads, various arches used to take loads of structures.
CO3	To determine shear force and bending moment by ILD, to implement Muller breuslau principal to determinate structure, implement ILD for three and two hinged arch, implementation of conjugate beam method to structures.
CO4	To analyse compound and complex trusses, arch subjected to udl and point load, structure by maxwell's reciprocal theorem, bett's theorem, castigliano's theorem and unit load method.
CO5	To detect stress and deflection subjected to unsymmetrical bending, location of shear centre for channel and I section, stresses in beams of small and large initial curvatures.
CO6	To design the structures by various methods.

Course Content:

MODULE I

Classification of Structures, stress resultants, degrees of freedom per node, static and Kinematic determinacy. Classification of Pin jointed determinate trusses, analysis of determinate plane and space trusses (compound and complex).

Rolling loads, influence lines for beams and trusses, Absolute maximum bending moment, Muller-Breslau's principal & **its application for determinate structures**

MODULE II

Analysis of Arches, Linear arch, Eddy's theorem, three hinged parabolic arch, spandrel braced arch, moving load & influence lines.

Strain Energy of deformable systems, **Maxwell's reciprocal & Betti's theorem**, Castigliano's first theorem, unit load & Conjugate beam methods.

MODULE III

Unsymmetrical bending, location of neutral axis, computation of stresses and deflection, Shear Centre its location for common structural section.

Bending of curved bars in plane of bending, stresses in bars of small & large initial curvatures.

BCE-503	TRANSPORTATION ENGINEERING I	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define Modes of Transportation, History of road development, Road types and pattern Air craft characteristics, Nagpur road plan, Bombay road plan & 3rd 20 Year Road Plan.
CO2	To classify the Types of Pavements traffic control devices, signs, signals types of airports, layout of airports , wind-rose diagram,.
CO3	To determine WBM, Surface dressing, bituminous carpeting, Bituminous Bound Macadam and Asphaltic Concrete, Cement Concrete road construction Traffic characteristic, volume studies, estimation of runway length & correction
CO4	To compare different type Design factors, Design of Flexible Pavement by CBR method (IRC: 37-2001), Cross sectional elements, camber, shoulder, sight distance, horizontal curves.
CO5	To judge method Westergaard theory, load and temperature stresses, joints, IRC method of rigid pavement design. (IRC: 58 – 2002) , Intersection at grade and grade separated intersections, design of rotary intersection.
CO6	Explanation of super elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves, Design of rigid pavement

Course Content:

MODULE I

Introduction: Role of Transportation, Modes of Transportation, History of road development, Nagpur road plan, Bombay road plan & 3rd 20 Year Road Plan, Road types and pattern.

Geometric Design: Cross sectional elements, camber, shoulder, sight distance, horizontal curves, super elevation, extra widening, transition curves and gradient, vertical curves, summit and valley curves.

MODULE II

Traffic Engineering: Traffic characteristic, volume studies, speed study, capacity, density, traffic control devices, signs, signals, design of signals, Island, Intersection at grade and grade separated intersections, design of rotary intersection.

Design of Highway Pavement: Types of Pavements, Design factors, Design of Flexible Pavement by CBR method (IRC: 37-2001), Design of rigid pavement, Westergaard theory, load and temperature stresses, joints, IRC method of rigid pavement design. (IRC: 58 – 2002).

MODULE III

Road Construction Methods: WBM, Surface dressing, bituminous carpeting, Bituminous Bound Macadam and Asphaltic Concrete, Cement Concrete road construction.

Airport Engineering: Air craft characteristics, types of airports, layout of airports, airport planning & design, runway orientation, wind-rose diagram, estimation of runway length & correction

BCE-504	IRRIGATION ENGINEERING	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the necessity of irrigation in India , State Kennedy's and lacey's theory , khosla's theory ,Describe canal loses , preliminary section ,water logging ,soil moisture- irrigation relation- ship , irrigation efficiency List types of barrages,Advantages and economics of lining
CO2	To classify the canals , dam ,weirs , barrages , various forces on gravity dam ,various types of lining, various types of spillway, CD works , surface and sub surface drainage , causes and control of water logging, seepage control in earth dams , type of fall
CO3	To determine the canal loses ,draw garrets diagram ,design of irrigation canal, cross section of irrigation canal , draw the well labelled diagram of lining of canal, design of weirs & barrages , draw the layout of diversion head work , mode of failure of structural ability of dams
CO4	Differentiate weirs and barrages, compare high and low gravity dam., compare earth and rockfill dams , different components of diversion of head works
CO5	Test the causes of failure of dams , test the typical cross section , check the validity of all the theories , to judge suitable type to suit a particular condition for CD work
CO6	Concept of Khosla's method of independent variable, reclamation of water logged and saline soils & saline and alkaline land, combination of forces of design.

Course Content:

MODULE I

Introduction: Necessity of Irrigation in India, Advantages and disadvantages of Irrigation, Techniques of water distribution in farms. Quality of irrigation water, crops and crop season, Consumptive use, Irrigation requirements, Estimation of consumptive use of water by climatic approaches, Irrigation efficiencies, Soil moisture-irrigation relationship

Canal Irrigation: Classification of canals, Canal losses, Alignment of canals. Design of Irrigation Canals: Design of stable channels using Kennedy's and Lacey's theory, Garret's diagram, Cross section of irrigation canals, Lining of Irrigation Canals: Advantages and economics of lining, various types of lining, Design of lined canals

MODULE II

Types of Cross-Drainage Works: Types of CD works, Selection of a suitable type to suite a particular condition, Design consideration for CD works, Canal Falls: Necessity, Proper location, Types, Design and detailing of one type of fall; Weirs and Barrages: Weirs and Barrages, Types of weirs and barrages, Layout of a diversion head work, Introduction of different components of a diversion head works, Design of weirs and barrages: Bligh's creep theory, design of weir using Bligh's theory, Lane's weighted creep theory, Khosla's theory, Khosla's method of independent variables, exit gradient

MODULE III

Dams: Typical cross section, Various forces acting on gravity dam, Combination of forces for design, modes of failure and criteria for structural stability, High and low gravity dam, Design of high dam, Typical section of low gravity dam, Earth and Rock fill Dams: Types, Causes of failure, Preliminary section of an earth dam, Preliminary section of an earth dam, Seepage control in earth dams

Spillways: Descriptive study of various types of spillways; Reclamation of Water Logged and Saline Soils: Causes and control of water logging. Reclamation of saline and alkaline land, Surface and Sub-surface drainage.

BCE-505	ENVIRONMENTAL ENGG 1	3-0-0-3	4 Credits
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COURSE OUTCOMES:

CO1	Define water demand in domestic use Define composition and structure of atmosphere, sources of pollutants Discuss classification of pollutants and their effects, air quality, monitoring and standards Define water supply, plumbing systems, water connections, hot water installation and industrial
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	water supply
CO2	Classify various types of conduits , capacity and sizes including economical sizes of rising main. Classify the kinds of water sources and their characteristics
CO3	Estimate the waste water flows and variation in waste water flows Estimation of storm water by different formulas Calculation of sound power level, sound intensity level and sound pressure level Calculate the units of measurements of different levels of noise
CO4	Focus on collection and estimation of storm water Focus on capacity of distribution reservoirs and equivalent pipe method of pipe network analysis rural water supply distribution system
CO5	Detect flow in full and partially full sewers Judge the basic concepts of community noise, transportation noise and industrial noise; acceptable outdoor and indoor noise level, effects of noise, and control measures
CO6	Method of distribution, pressure and gravity distribution systems, concept of service and balancing and reservoirs. Design of sewers

Course Content:

MODULE I

Water supply: Water demands and domestic use, variation in demands; population forecasting by various methods using logistic curve method; per capita supply, basic needs and factors affecting consumption; design period.

Sources of water: Kinds of water sources and their characteristics, collection of surface and ground water; quality of surface and ground waters; factors governing the selection of a source of water supply.

MODULE II

Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control; water hammer and its control measures.

Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, concept of service and balancing reservoirs, capacity of distribution reservoirs and equivalent pipe method of pipe network analysis; rural water supply distribution system. Water supply, plumbing systems in buildings and houses: water connections, different cocks and pipe fittings, hot water installation. Institutional and industrial water supply

MODULE III

Wastewater collection: Systems of sanitation and wastewater collection, estimation of wastewater flows and variations in wastewater flows.

Storm water: Collection and estimation of storm water by different formulae.

Flow in sewers: Flow in full and partially full sewers and design of sewers; types of sewers, materials and construction of sewers, joints and sewer appurtenances, layout and construction of sewer lines.

Air pollution: Composition and structure of atmosphere; units of measurement, sources of pollutants, classification of pollutants and their effects, air quality monitoring and standards. Noise pollution: Definition of decibel, sound power level, sound intensity level and sound pressure level; measurement of noise level; basic concept of community noise, transportation noise and industrial noise; acceptable outdoor and indoor noise levels; effects of noise and control measures.

BCE-506	ESTIMATION COSTING & VALUATION	2-1-0	2 Credits
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COURSE OUTCOMES:

CO1	To State the Importance of estimation, To define Standard Terminology, List Factors affecting the values of property, different types of estimates, Items of work for estimates, describe various Methods of Estimation and valuations, units and measurement of items.
CO2	To classify general and detailed specifications, Interpretation of non-scheduled items and cost indices for building material and labour, Measurement and standard measurement book, Cash and cash book
CO3	To prepare a Detailed estimates of a single roomed and a two roomed single storey residential building with diagram, Estimates of Steel Framed Industrial Building and mechanized construction, estimation for highways /irrigation/ airways projects.
CO4	To outline the Organization set up for various works departments, Duties and responsibilities of officers, Administrative, Technical and Financial approvals, System of P.W. accounts, Stores, Issue of stores, Material at site account,. Release of payments.
CO5	To evaluate of material and other cost through analysis of rates (market rates, PW.D. Schedule rates), Analysis of Equipment costs and productivity.
CO6	To understand the principle of Analysis of rates, Resource planning, Temporary advance, years purchase, capitalized value and depreciation. Standard rent, free hold and lease hold propriety, Mortgage and easement, Defect Liability considerations

Course Content:

MODULE I

Estimation Fundamentals

Importance of estimation, different types of estimates, general and detailed specifications.

Methods of Estimation: Items of work for estimates, units and measurement of items.

Detailed Estimation of Buildings and Analysis of Rates

Detailed estimates of a single roomed and a two roomed single storey residential building.

Estimates of Steel Framed Industrial Building, Analysis of rates, material and other cost considerations. Resource planning through analysis of rates, market rates, PW.D. Schedulerates, non scheduled items and cost indices for building material and labour.

MODULE II

Establishments, Organization Structures and Standard Work Procedures

Organization set up for various works departments. Duties and responsibilities of officers.

Administrative, Technical and Financial approvals, System of P.W. accounts, Cash and cash book, Temporary advance, Stores, Issue of stores, Material at site account, Measurement and standard measurement book. Release of payments. Defect Liability considerations.

Valuation of Assets

Standard Terminology, Factors affecting the values of property. Methods of valuation, years purchase, capitalized value and depreciation. Standard rent, free hold and lease hold propriety, Mortgage and easement.

MODULE III

Estimation for Mechanized Construction and Infrastructure Projects 07(L)

Estimation for mechanized construction including slip forming pumped concreting.

Equipment costs and productivity analysis. Estimation of highways /irrigation/ airways projects including cross drainage structures.

BCE-601	CONCRETE STRUCTURE	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the structural elements of building like beam , column , & Slab . Introduction to development length, Anchorage bond, flexural bond, Effective height of columns, Minimum eccentricity, Short column under axial compression
CO2	To classify one way slab & two way slab , singly and doubly reinforced beam , Short column under axial load and uni-axial bending,
CO3	To determine Behaviour of RC beams in Shear, Shear Strength of beams with and without shear reinforcement, Minimum and Maximum shear reinforcement, design of beam in shear. Anchorage bond, flexural bond. (Detailed Examples by Limit State Design Method)
CO4	To compare the Singly and Doubly Reinforced Sections by Working Stress Method & Limit state Method. Shear Strength of beams with and without shear reinforcement, Minimum and Maximum shear reinforcement
CO5	To judge failure of beam under shear, Concept of Equivalent Shear and Moments. Distinguish the type of loading on column i.e. concentric and eccentric loading.
CO6	To design Rectangular Singly and Doubly Reinforced beams, T-beams, L-beams by Limit State Design Method, Design of one way and two way solid slabs, Design of columns.

Course Content:

MODULE I

Introduction to Various Design Philosophies, Design of Rectangular Singly and Doubly Reinforced Sections by Working Stress Method.

Assumptions in Limit State Design Method, Design of Rectangular Singly and Doubly Reinforced beams, T-beams, L-beams by Limit State Design Method.

MODULE II

Behaviour of RC beams in Shear, Shear Strength of beams with and without shear reinforcement, Minimum and Maximum shear reinforcement, design of beam in shear.

Introduction to development length, Anchorage bond, flexural bond. (Detailed Examples by Limit State Design Method), Failure of beam under shear, Concept of Equivalent Shear and Moments.

MODULE III

Design of one way and two way solid slabs by Limit State Design Method, Serviceability Limit States, Control of deflection, cracking and vibrations.

Design of Columns by Limit State Design Method- Effective height of columns, Assumptions, Minimum eccentricity, Short column under axial compression, requirements for reinforcement, Column with helical reinforcement, Short column under axial load and uni-axial bending, **Design of columns under bi-axial** loading by Design Charts.

BCE-701	STEEL STRUCTURES	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the rolled steel sections, riveted, bolted and welded connections, permissible and working stress in steel, stress-strain curve for mild steel.
CO2	To classify loads subjected to steel structures, classify the patterns used to join two members, classify strength of joint based on type of failure, classify the weld.
CO3	To determine shearing, bearing and tearing strength of joint design of welded joints, effective length and slenderness ratio of compression members, efficiency of joints.
CO4	To analyse tension and compression members subjected to axial loads, analysis of joints based on type of pattern used.
CO5	To detect net and gross sectional areas of tension member, web crippling and web buckling for beams.
CO6	To design joints, slabs and grillage footings, design laterally supported and unsupported beams, lacings for compression members, design roof trusses.

Course Content:

MODULE I

Introduction to rolled steel sections, loads, **factor of safety**, permissible and **working stresses**.

Riveted and welded connections, strength, efficiency and **design of joints**.

Compression members- Effective length, Slenderness ratio, Strength of Compression members, **Design of Struts, Columns, Built-up Columns, Design of eccentrically loaded**

columns.

MODULE II

Tension members – Net and Gross sectional areas, Strength of members and their design.

Design of slab and Gusset bases, Design of Grillage footing.

MODULE III

Beams – web crippling and web buckling, design of laterally supported beam, design of laterally unsupported beam, Purlins.

Design of Industrial Buildings – Detailed design of roof trusses.

BCE-703	Environmental Impact Assessment	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	Define strategic EIA Define rapid and comprehensive EIA
CO2	Classify EIA at project; regional and policy levels Classify economic valuation method cost benefit analysis expert system and gis application
CO3	
CO4	Focus on screening and scoping criteria Focus on EIA in specialized areas like environmental health impact assessment Differentiate EIA report and EIS
CO5	Post project monitoring
CO6	EIA Methodologies

Course Content:

MODULE I

Evolution of EIA: EIA at project; Regional and policy levels; Strategic EIA; EIA process; Screening and scoping criteria; Rapid and comprehensive EIA; Specialized areas like environmental health impact assessment

MODULE II

Environmental risk analysis; Economic valuation methods; Cost-benefit analysis; Expert system and GIS applications; Uncertainties; Practical applications of EIA; EIA methodologies; Baseline data collection; Prediction and assessment of impacts on physical, biological and socio-economic environment

MODULE III

Environmental management plan; Post project monitoring, **EIA report** and **EIS**; Review process. Case studies on project, regional and sectoral EIA; **Legislative and environmental clearance procedures** in India and other countries, Siting criteria; CRZ; Public participation; Resettlement and rehabilitation.

BCE-704	PRE-STRESSED CONCRETE	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To learn concrete and their properties; losses of pre-stress, design of simply supported beams basic assumptions.
CO2	To determine Stress in concrete and steel due to load and pre-stress, pressure line and internal resisting couple, kern distance, cracking moment, limit state design as per IS code, partial pre-stressing; Shear and principal stresses in homogenous elastic beams,
CO3	To perform design of reinforcements for shear and torsion
CO4	To understand Stress distribution in end block—Magnel's method, Guyen's method, Rowe's method, IS code method; Design of pipes and tanks, railway sleepers, electric posts, composite construction.
CO5	To determine Beam deflection short term and long term deflections
CO6	To understand Design of continuous beam-Principles of design of prismatic continuous beams of two and three equal, unequal spans, with variable moments of inertia.

Course Content:

MODULE I

Historical developments, Basic concepts, types, different systems, Materials-Steel, concrete and their properties; losses of pre-stress, **design of simply supported beams** basic assumptions,

Stress in concrete and steel due to load and pre-stress, pressure line and internal resisting couple, kern distance, cracking moment, general approach for service load design, graphical methods, Lin's method, limit state design as per IS code, partial pre-stressing; **Shear and principal stresses in homogenous elastic beams,**

MODULE II

Design of reinforcements for shear and torsion Stress distribution in end block—Magnel's

method, Guyen's method, Rowe's method, IS code method; Design of pipes and tanks, railway sleepers, electric posts, composite construction.

MODULE III

Beam deflection- short term and long term deflections; Design of continuous beam- Principles of design of prismatic continuous beams of two and three equal, unequal spans, with variable moments of inertia. Cap cables. Jaques Muller's theorem.

BCE-801	CONSTRUCTION PLANNING & MANAGEMENT	3-1-0	4 Credits
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COURSE OUTCOMES:

CO1	To define the main objectives of civil engineering management, function of construction management, methods of scheduling, limitations of bar charts, factors influencing, job layout from site plan, methods of recording progress, types of organization.
CO2	To classify the construction industry, Types of organization, major items in construction job requiring quality control, methods of scheduling: bar charts and CPM
CO3	To determine stages in construction from conception to realization, stages at which planning is done by the tender, preparation for actual job layout for building, Organizing labour at site, principle of storing and stacking materials at site, principle of organization.
CO4	To compare different types of trade unions connected with construction industry and trade union act, bar chart and CPM, cost time balancing, function of construction management.
CO5	To judge the control of progress, taking corrective action taking head of office informed, resources for construction industry and conditions of construction workers in India, human relationship concept, need and fundamentals.
CO6	To explain the accident and safety in construction: -accident- causes, safety measure for:- excavation work, drilling and blasting, hot bituminous work, scaffolding ladders and form work, demolitions, safety campaign, resources for construction industry.

Course Content:

MODULE I

Elements of Management: Project cycle, Organisation, planning, scheduling, monitoring, updating and management system in construction.

Network Techniques: Bar charts, milestone charts, work break down structure and preparation of networks. **Application of network Techniques** like PERT, GERT, CPM AON and AOA in construction management.

MODULE II

Engineering Economics : Time value of money, Present economy studies, Equivalence concept, **financing of projects**, economic comparison present worth method Equivalent annual cost method, discounted cash flow method, analytical criteria for postponing of investment retirement and replacement of **asset.Depreciation** and **break even cost analysis**.

Contract Management: **Legal aspects of contraction**, laws related to contracts, land acquisition,labour safety and welfare. Different **types of contracts**, their relative advantages and disadvantages. Elements of tender preparation, **process of tendering**pre-qualification of contracts, Evaluation of tenders, contract negotiation and award of work, monitoring of contract extra items, settlements of disputes, **arbitration and commissioning of project**.

MODULE III

Equipment Management: Productivity, operational cost, owning and hiring cost and the work motion study. Simulation techniques for resource scheduling. **Construction equipments** for earth moving, Haulingequipments, hoisting equipments, conveying equipments, Concrete Production equipments

INVERTIS UNIVERSITY, BAREILLY

**DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERINGSCHEME OF INSTRUCTION
AND DETAILED SYLLABUS OF B.TECH. PROGRAM
IN COMPUTER SCIENCE AND
ENGINEERING.**

Effective from the batches admitted 2016-2017 and onwards

INVERTIS INSTITUTE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION AND MISSION OF THE INSTITUTE

VISION:

To develop responsible citizens who would 'think global and act local' and become the change agents of society to meet the challenges of future.

MISSION:

M1	Providing learner centric Teaching learning process in excellent infrastructure for making the graduates industry ready with social ethics.
M2	To impart high quality Engineering and Management education
M3	budding professionals and provide the ambience needed for developing requisite skills.
M4	Provide world class platform for research and innovation.
M5	Promote intellectual and skilled human capital generating employment and entrepreneurship

VISION AND MISSION OF THE DEPARTMENT

VISION-

To be renowned itself as a reputed organization in engineering education. Creating knowledge of fundamental principles and innovation technologies through research within the core areas of computer science and also in inter- disciplinary topics.

MISSION-

M1	Develop the road map for student for IT Industry.
M2	To empower the students with the required skills to solve the complex technological problems of modern society and also provide them with a framework for promoting collaboration and multidisciplinary activities.
M3	To impart high quality professional training at the postgraduate and undergraduate level with an emphasis on basic principles of computer science and engineering.
M4	Train the students according current scenario.
M5	Teach student for latest languages in computer science

PROGRAM EDUCATIONAL OBJECTIVES (PEO):

PEO1	Technical Expertise: Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO2	Successful Career: Deliver professional services with updated technologies in computer science-based career.
PEO3	Soft Skills: Develop leadership skills and incorporate ethics, team work with time management in the profession.
PEO4	Communication: effective communication
PEO5	Life Long Learning: Conduct research among computing professional as per market needs.

PROGRAM OUTCOMES(PO): At the end of the program the student will be able to:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
P10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
P11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of PEO & PO

Program Educational Objective(s)	Program Outcome(s)	
PEO1	Technical Expertise: Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.	1,2,4,7,8,10
PEO2	Successful Career: Deliver professional services with updated technologies in computer science-based career.	3,5,6,11
PEO3	Soft Skills: Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.	3,9
PEO4	Communication: effective communication	10
PEO5	Life Long Learning: Conduct research among computing professional as per market needs.	12

BCS-502	DATA BASE MANAGEMENT SYSTEMS	L T P 3 1 0	4Credits
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Pre-requisites: None

Course Objectives:

CO1	To describe a sound introduction to the discipline of database management systems.
CO2	To give a good formal foundation on the relational model of data and usage of Relational Algebra.
CO3	To introduce the concepts of basic SQL as a universal Database language.
CO4	To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.
CO5	To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques.

Detailed Syllabus

MODULE-I

Introduction: An overview of database management system, database system Vs file system, Database system concept and architecture, data model schema and instances, data independence and database language and interfaces, data definitions language, DML, Overall Database Structure.

Data Modeling:

ER Data model, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationship of higher degree.

Relational data model concepts, integrity constraints, entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

MODULE-II

Introduction on SQL: Characteristics of SQL, advantage of SQL. SQL data type and literals, Types of SQL commands, SQL operators, Tables, views and indexes, Insert, update and delete operations, Queries and sub queries Aggregate functions, Joins, Unions, Intersection, Minus, Cursors, Triggers.

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

MODULE-III

Transaction Processing Concept: Transaction system, Testing of serializability, serializability of schedules, Types of serializability, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Concurrency Control Techniques: Concurrency control, Locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction, case study of Oracle.

Text Books:-

1. Date C J, “ An Introduction to Database Systems”, Addison Wesley
2. Korth, Silbertz, Sudarshan,” Database Concepts”, McGraw Hill

Reference Books:-

1. Elmasri, Navathe, “ Fundamentals of Database Systems”, Addison Wesley
2. O’Neil, Databases, Elsevier Pub.
3. Leon & Leon,”Database Management Systems”, Vikas Publishing House
4. Bipin C. Desai, “ An Introduction to Database Systems”, Gagotia Publications
5. Majumdar & Bhattacharya, “Database Management System”, TMH

Course Outcomes: After the completion of the course the student will be able to:

CO1	Understand the role of a database management system in an Organization.
CO2	Understand basic database concepts, including the structure and Operation of the relational data model.
CO3	. Construct simple and moderately advanced database queries using Structured Query Language (SQL).

CO4	Understand and successfully apply logical database design Principles, including E-R diagrams and database normalization.
CO5	Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.

BCS-503	JAVA PROGRAMMING	L T P 3 1 0	4 credits
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Pre-requisites: Computer Fundamentals & Principle of Computer Programming, Programming Concepts of C and C++

Course Objectives:

CO1	To understand object-oriented concepts
CO2	To learn the basic concept of JAVA language.
CO3	To learn how to design GUI applications.
CO4	To understand the concept of JDBC
CO5	To learn to build applications in JAVA language

Detailed Syllabus

MODULE-I

The Java Language: History and evolution of Java, Java's Lineage, The Creation of Java, Java's Magic Code; The Byte Code, The Java's Class File Format, The java's Buzzwords, The Evolution of Java. Object Orientation concepts; Class, Object and its significance. Environment variable. Data Types, Variables and Array: Strongly typed Language, Primitive type, Non Primitive type, Wrapper classes, Scope & lifetime of the variables, Type Conversion and casting, Automatic Type promotions, Operators: Arithmetic operator, The Bitwise operator, Relational operator, Assignment operator, The ? Operator, Operator precedence. Control Statements: Selection Statement, Iteration Statement, Jump Statement. **Introducing classes:** Class Fundamentals, Object & Object reference, Object Life time & Garbage Collection, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods, Nested, Inner Class & Anonymous Classes, Abstract Class & Interfaces, Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion, Dealing with Static Members, Mark and sweep principle (Garbage collection), Finalize() Method, Native Method. Use of "this" reference, Use of Modifiers with Classes & Methods, Command line arguments. **Inheritance:** Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data Members and Methods. Role of Constructors. Overloading concept & Overriding Super Class Methods. Use of "super". Polymorphism in inheritance. Type Compatibility and Conversion Implementing interfaces. **Package:** Organizing Classes and Interfaces in Packages. Package as Access Protection Defining Package CLASSPATH Setting for Packages. Making JAR Files for Library Packages Import and Static Import Naming Convention For Packages **Exception Handling:** The Idea behind Exception, Exceptions & Errors Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in

Exception Handling, Inbuilt and User Defined Exceptions, Checked and Un-Checked Exceptions, **Thread**: Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads.

Module II

Array &String :Defining an Array, Initializing & Accessing Array, Multi-Dimensional Array, Operation on String, Mutable & Immutable String, Using Collection Bases Loop for String Tokenizing a String, Creating Strings using StringBuffer. **Java Utilities (java.util Package)** **Java IO**: Streams and the new I/O Capabilities, Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel Serializing**Applet**: Applet & Application, Applet Architecture, Parameters to Applet, Embedding Applets in Web page, Applet Security Policies.**Event Handling**: Event-Driven Programming in Java, EventHandling Process, Event-Handling Mechanism, The Delegation Model of Event Handling, Event Classes, Event Sources, Event Listeners, Adapter Classes as Helper Classes in Event Handling, Anonymous Inner classes a Short –cut to Event Handling, Avoiding Deadlocks in GUI Code, Event Types &Classes. **GUI Programming (Java AWT)**: Components and Containers: Basics of Components, Using Containers, Layout Managers, AWT Components, Adding a Menu to Window, Extending GUI Features Using Swing Components.

MODULE-III

Software development using Java: JavaBeans: What is Java Bean, Advantages of Bean, Introspection, Persistence, the Java Bean API, A Bean Example, Jar file specification, Introducing Swings: The Origin of swings, swings is built on AWT, Two swings key features, Swings package & event Handling. Database Programming using JDBC: Introduction to JDBC, JDBC Drivers & Architecture Servlets: Architecture of Servlets Technology, Life Cycle of Servlets, Javax.Servlet package.

Text Book:

1. Herbert Schieldt, “The Complete Reference: Java” Seventh Edition, TMH.

Reference

Books:

1. Herbert Schieldt“ Java Programming Cook Book” McGraw Hill.
2. Core Java™ 2 Volume I - Fundamentals, Seventh Edition Prentice Hall PTR
3. Core Java™ 2 Volume II - Fundamentals, Seventh Edition Prentice Hall PTR

CO1	Design the process of interaction between Objects and System w.r.t. Object Oriented Paradigm.
CO2	Acquire a basic knowledge of Object Orientation with different properties as well as different features of Java, threads

CO3	Analyze basic programming concepts in Java with different object related issues and various string handling functions as well as basic I/O operations
CO4	Discuss basic Code Reusability concept w.r.t. Inheritance, Package and Interface
CO5	Implement Exception handling, Multithreading and Applet (Web program in java) programming concept in Java

BCS-601	COMPUTER NETWORK	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
CO2	Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
CO3	Study Session layer design issues, Transport layer services, and protocols.
CO4	Gain core knowledge of Network layer routing protocols and IP addressing.
CO5	Study data link layer concepts, design issues, and protocols.

MODULE-I

Introduction Concepts: Goals and Applications of Networks, Network architecture, The OSI reference model, TCP/IP model ,services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods.Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

MODULE-II

Medium Access sub layer - Channel Allocations, Medium Access protocols, Ethernet, Wireless LANS.Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control, IP packet, IP address, IPv6.Transport Layer: Transport Layer - Design issues, connection management.

MODULE-III

Session Layer- Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography – Symmetric-Key and Asymmetric –Key, Security services.Application Layer: DNS, File Transfer Access, Electronic mail, SNMP.

Text Books:

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education

Reference Books:

1. W. Stallings, Data and Computer Communication, Macmillan Press
2. AnuranjanMisra, "Computer Networks", Acme Learning
3. G. Shanmugarathinam, "Essential of TCP/ IP", Firewall Media

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe the functions of each layer in OSI and TCP/IP model.
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CO2	Explain the functions of Application layer and Presentation layer paradigms and Protocols.
CO3	Describe the Session layer design issues and Transport layer services.
CO4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
CO5	Describe the functions of data link layer and explain the protocols.

BCS-064	PHP	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To understand the general concepts of PHP scripting language for the development of Internet websites.
CO2	To understand the basic functions of MySQL database program.
CO3	To learn the relationship between the client side and the server side scripts.
CO4	To implement GET and POST methods
CO5	To develop a final project using the learned techniques.

Detailed Syllabus

MODULE-I

Introduction to PHP- intro to different kinds of languages, intro to PHP for web development, History and future scope, Advantages of PHP over JSP, tools for working in PHP like WAMP, First script in PHP, Environment setup, Language Basics: Syntax overview, Defining variables and types, constant, deleting a variable, Data type- data type and their types, type casting, garbage value, Operator and types.

MODULE-II

Decisions and loops- Making decisions, doing repetitive task with looping Arrays- creating index based and associative array, accessing element, looping with indexed based array, , type, built in functions, multi-dimensional array Strings- creating and accessing, searching and replacing, formatting, library function, Functions- Define, Types, function call, parameters, call by value and call by reference, built in functions, recursive function.

MODULE-III

Web Component: Identifying browser & platform, display image randomly, form, import HTML tags, super global variable, GET and POST methods, File Inclusion, Files and I/O- understanding file and directories, opening and closing a file, coping, renaming and deleting a file, working with directories, file uploading and downloading, Cookie- define and their types, anatomy, setting, creating, accessing, deleting, Session: definition, creating and destroying a session, login/logout, uses.

Text Books:-

- *Jason Lengstorf, " PHP for Absolute beginners", Apress*
- *Robin Nixon, " Learning PHP, MySQL & Java Script: with JQuery, CSS and HTML 5", O'RELLY.*

Reference Book:-

- *Matt Doyle, " Beginning PHP 5.3", Wrox Publication.*

Course Outcomes: After the completion of the course the student will be able to:

CO1	Use a PHP editing program.
CO2	Develop functional PHP script
CO3	Understand the use of PHP with HTML.
CO4	Understand the ability to post and publish a PHP website.
CO5	Develop Database connectivity using MySQL

BCS-704	OS FOR SMART DEVICES	L T P	4 Credits
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	(ANDROID)	3 1 0	
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Pre-requisites: None

Course Objectives:

CO1	To introduce Android platform and its architecture.
CO2	To learn activity creation and Android UI designing.
CO3	To be familiarized with Intent, Broadcast receivers and Internet services.
CO4	To integrate multimedia, camera and Location based services in Android Application.
CO5	To explore Mobile security issues.

Detailed Syllabus

MODULE 1

About Android , Smart phones future, **Preparing the environment-** Installing the SDK ,Creating Android Emulator , Installing Eclipse , Installing Android Development Tools ,Choosing which Android version to use **Android Architecture-** Android Stack, Androidapplications structure

MODULE 2

UI Architecture-Application context , Intents ,Activity life cycle , Supporting multiple screen sizes **User Interface Widgets-** Text controls , Button controls ,Toggle buttons , Images **Notifications and Toasts-** Parameters on Intents ,Pending intents ,Status bar notifications ,Toast notifications **Menus-** Localization, Options menu , Context menu **Dialogues-** Alert dialog , Custom dialog , Dialog as Activity

MODULE 3

Lists-Using string arrays, Creating lists, Custom lists **Location and Maps-** Google maps , Using GPS to find current location **Working of Data Storages-**Shared preferences ,Preferences activity ,Files access , SQLite database **Network Communication-**Web Services , HTTP Client , XML and JSON **Services-**Service lifecycle, Foregroundservice **Publishing the App-**Preparing for publishing ,Signing and preparing the graphics ,Publishing to the Android Market.

Text Books:

1. Bill Philips & Brian Hardy, *Android Programming: The Big Nerd Ranch Guide*
2. Greg Nudelman, *Android Design Patterns: Interaction Design Solutions for Developers*
3. Ian G. Clifton, *Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps*

4. Ed Burnette, *Hello, Android: Introducing Google's Mobile Development Platform* (Pragmatic Programmers).

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe Android platform, Architecture and features.
CO2	Design User Interface and develop activity for Android App.
CO3	Use Intent , Broadcast receivers and Internet services in Android App.
CO4	Use multimedia, camera and Location based services in Android App.
CO5	Discuss various security issues in Android platform

BCS-802	.NET FRAMEWORK	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To Understand basics of .net framework
CO2	To aware of Inheritance
CO3	To aware of multi-threading concept
CO4	To learn about ASP.net language
CO5	To learn about cookies concept

Detailed Syllabus

MODULE-I

The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS) and its Architecture, Microsoft Intermediate Language (MSIL), Just-In-Time Compilation, Framework Base Classes. **Programming Language C#:** Declaring implicit and explicit variables, Unicode characters and strings, creating Object and Classes, The Main method specification.

MODULE-II

Object oriented programming with C#: Inheritance, Method Overloading and method overriding, Polymorphism, Operator Overloading, Abstract Class, Inner Class, and Interface. Delegates, Partial Classes, Exception Handling, Creating Name-Space, Input-Output and File Handling, Multithreading. **Windows Application:** Introduction of windows form, Linking Window Form, Creating Properties, window form controls, MDI form. **Containers and its Event Handling:** Flow Layout Panel, Group Box, Panel, Split Container, Tab Control, Table Layout Panel. Navigation Control and Its Event Handling: Context Menu Strip, Tool Strip, Status Strip, Tool Strip Container.

MODULE-III

Dialog Boxes and its Event Handling: Message Dialog Boxes, Color Dialog, Folder Browser Dialog, Font Dialog, Open File Dialog, Save File Dialog, Data Grid View, Dataset, Creating Setup of Web Application. **Introduction to ASP.NET with C#:** Introduction of web application, web site, A Review of Classic ASP, ASP.NET Web Applications, Rendering HTML with Server Controls. **Working with Web Forms Controls and C#:** Introduction to Web Forms Controls, Simple Input Controls, Hyperlinks, Button Controls and List Controls. Dropdown List Control, Overview of ASP.NET Validation Controls, Client-Side Validation,

Server-Side Validation, File Upload controls, Wizard controls. Master Page, Ad Rotator Control, Login Controls, Session Management using Cookies, Session.

Text Book:

1. Beginning Visual C# 2008, Wiley, Wrox Publication, 2nd Edition 2008
2. Programming with C#, E. Balagurusamy, TMH, 2nd Edition 1999
3. Microsoft .Net for Programmers, Fergal Grimes, SPI Edition,
4. C# Programming Language, Anders Hejlsberg, MadsTorgersen, Scott Wiltamuth, and Peter Golde, Pearson Education Inc, 4th Edition.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Able to build the application in C#
CO2	Able to implement multi-threading concept
CO3	Able to make MDI form-based application
CO4	Able to build web site in ASP.net
CO5	Can implement client server application

BCS-090	BIG DATA ANALYSIS	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To learn about concept of big data
CO2	To learn about Hadoop concept
CO3	To learn how to configure Hadoop
CO4	To learn about HDFS Administering
CO5	To learn about Sorting And Aggregating

Detailed Syllabus

MODULE 1

Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce **INTRODUCTION HADOOP Big Data – Apache Hadoop&HadoopEcoSystem – Moving Data in and out of Hadoop.**

MODULE 2

HADOOP ARCHITECTURE Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, HadoopMapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance

MODULE 3

HADOOP ECOSYSTEM AND YARN Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New FeaturesNameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN, Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating

Text Books.

1-The Big Data-Driven Business: How to Use Big Data to Win Customers, Beat Competitors, and Boost Profits Russell Glass,Sean Callahan.

2.Data Fluency: Empowering Your Organization with Effective Data Communication, Zach Gemignani,ChrisGemignani,RichardGalentino.

3.Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data,GebundeneAusgabe,von EMC Education Services (Herausgeber)

4.Hadoop: The Definitive GuideAuthor: Tom White Publisher: Hadoop: The Definitive Guide

5.Hadoop in ActionAuthor: Chuck Lam Publisher: Manning

Course Outcomes: After the completion of the course the student will be able to:

CO1	Can implement concept of big data
CO2	Can implement Hadoop concept
CO3	Able to configure Hadoop
CO4	Able to HDFS Administering
CO5	Able to implement Sorting And Aggregating

BCS-605	ETHICAL	L T P	4 Credits
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	HACKING	3 1 0	
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Pre-requisites: None

Course Objectives:

CO1	To understand how intruders, escalate privileges.
CO2	To understand Intrusion Detection, Policy Creation, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms
CO3	To learn about ethical laws and tests
CO4	Study about various virus
CO5	Study about Penetration Techniques and Tools.

Detailed Syllabus

MODULE-I

Introduction to Ethical Hacking: Hacking Methodology, Process of Malicious Hacking. Ethical Hacking concepts and essential terminology, Legal implications of Hacking. Footprinting and Scanning: Footprinting, Scanning. Enumeration: Enumeration. System Hacking and Trojans: System Hacking, Trojans and Black Box vs White Box Techniques.

MODULE-II

Attacking Methodology and Network Hacking: Denial of Service, Sniffers, Session Hijacking, Hacking Web Servers. Web Application Vulnerabilities and Web Techniques Based Password cracking Techniques. SQL injection, Hacking Wireless Networking. Viruses and Worms, Physical Security. Linux Hacking. Evading IDS and Firewalls.

MODULE-III

Report writing and Mitigation: Introduction to Report writing and Mitigation, requirements for low level reporting and high level reporting for penetration testing results. Demonstration of vulnerabilities and Mitigation of issues identified including tracking, Introduction to Penetration Techniques and Tools.

Text Books:-

- *Hacking Exposed 7th Edition*, by Stuart McClure, Joel Scambray, George Kurtz-McGraw Hill-2010

Reference Book:-

- Basic of Hacking and Penetration – PatricEngerbrestson 2010

- Certified Ethical Hacker All-in-One – Matt Walker 2011

Course Outcomes: After the completion of the course the student will be able to:

Course Outcomes: After the completion of the course the student will be able to:

CO1	General computer organization and architecture
CO2	Ethical Hacking methodology
CO3	Generalized exploit techniques
CO4	Basic network concepts
CO5	Networking vulnerabilities and countermeasures

BCS-705	CLOUD WEB SERVICES	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To understand about need of amazon
CO2	To study about AWS Workflow Automation And Orchestration Options
CO3	To study about Amazon Machine Images (AMIS)
CO4	To study about Cloud front SNS Pricing
CO5	Understand Key aspects of Amazon RDS, Launch an Amazon RDS instance

Detailed Syllabus

MODULE I

Introduction to Cloud Computing and Amazon Web Services: Introduction to Cloud Computing, Cloud Service Delivery Models (IAAS, PAAS, SAAS), Cloud Deployment Models (Private, Public, Hybrid And Community), Cloud Computing Security, Case Study Introduction to Amazon Web Services, Why Amazon? Use Cases, AWS Storage Options, AWS Compute Options, AWS Database Options, AWS Workflow Automation And Orchestration Options, AWS Systems Management And Monitoring Options, AWS Virtual Private Cloud Introduction, Pricing Concepts.

MODULE II

Introduction to EC2 : Introduction To EC2, Instance Types And Uses, Autoscaling Instances, Amazon Machine Images (AMIS), Modifying Existing Images, Creating New Images Off Of Running Instances, Converting An Instance Store AMI To An EBS AMI, Instances Backed By Storage Types, Creating A Web Server Using Ec2, Elastic Block Storage (EBS), Elastic IPS, Route 53 DNS System, Cloud front SNS Pricing.

MODULE III

Cloudwatch, Elastic Beanstalk and Security: Introduction To S3, Buckets And Objects, Security, Creating A Web Server Using S3 Endpoints, Introduction To Cloud watch, Creating Alarm Notifications, Autoscaling Instances, Describe Amazon Dynamo, Understand Key aspects of Amazon RDS, Launch an Amazon RDS instance, Identify what is Cloud Formation, Describe Amazon Cloud Watch metrics and alarms, Describe Amazon Identity And Access Management (IAM), Security .

Text Books:

1. Douglas K. Barry, “Web Services, Service Oriented Architectures and Cloud Computing”, MK Publication.
2. Andreas Wittig, Michal Wittig, “Amazon Web Services in Action”, Manning.

3. “Cloud Computing with Amazon Web Services”, Pearson.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Aware about need of amazon
CO2	Can implement AWS Workflow Automation And Orchestration Options
CO3	Can use Amazon Machine Images (AMIS)
CO4	Can implement Cloud watch, Creating Alarm Notifications
CO5	Implement Key aspects of Amazon RDS, Launch an Amazon RDS instance

DCS-501	DBMS	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To learn about DBS Concept
CO2	To Learn about concept of key
CO3	To study various models
CO4	To study about key concept
CO5	To learn SQL

Detailed Syllabus

Unit-1

Basic Concepts of DBMS

Introduction to Database Management System, Data Base Vs file oriented approach, Basic DBMS terminology.

Unit-2

DBMC Architecture

Data independence, General Architecture of a Data Base Management Software, Components of DBMS, Advantages and Disadvantages of DBMS.

Unit-3

Data Modeling

Introduction to Data Models, Entities, Attributes, Introduction to entity sets, relationships sets and Attributes.

Unit-4

Entities and Relationships

KEYS in entity & relationship sets: (a) super key, (b) candidate key, (c) primary key, (d) unique key, E-R Diagrams, Database Security & Integrity.

Unit-5

Structured Query Language

Elementary ideas of Structured Query Language – SQL Commands –SQL Data Types, Basic Queries in SQL- Data Definition Language (DDL), Creating Tables, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) From a Table, Dropping Columns.

Reference Books:

1. Database Management Systems by Henry F. Korth .
2. Fundamentals of Database Systems by Shamkant B. Navathe.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe the fundamental elements of relational database management systems.
CO2	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL .

CO3	Design ER-models to represent simple database application scenarios
CO4	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO5	Improve the database design by normalization.

DCS-502	JAVA	L T P	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To study about concept of JAVA
CO2	To learn about concept of inheritance
CO3	To learn about concept of exception handling
CO4	To learn about concept multi-threading
CO5	To learn about concept of array

Detailed Syllabus

Unit-1

The Java Language: History and evolution of Java, Java's Lineage. Object Orientation concepts; Class, Object and its significance. Environment variable. Data Types, Variables and Array: Strongly typed Language, Primitive type, Non Primitive type, Scope & lifetime of the variables, Type Conversion and casting, Automatic Type promotions, Control Statements: Selection Statement, Iteration Statement.

Introducing classes: Class Fundamentals, Creating and Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods, Abstract Class & Interfaces, Defining Methods, Argument Passing Mechanism, Method Overloading.

Unit-2

Inheritance: Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data Members and Methods. Overloading concept & Overriding Super Class Methods.

Package: Organizing Classes and Interfaces in Packages. Package as Access Protection Defining Package CLASSPATH Setting for Packages.

Unit-3

Exception Handling: The Idea behind Exception, Exceptions & Errors Types of Exception, Control Flow In Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.

Unit-4

Thread : Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads.

The Java Library:

Array & String: Defining an Array, Initializing & Accessing Array, Multi-Dimensional Array, and Operation on String, Mutable & Immutable String.

Unit-5

Database Programming using JDBC: Introduction to JDBC, JDBC Drivers & Architecture.

Text Book:

1. Herbert Schildt, "The Complete Reference: Java" Seventh Edition, TMH.

References:

1. Herbert Schildt“ Java Programming Cook Book” McGraw Hill.
2. Core Java™ 2 Volume I - Fundamentals, Seventh Edition Prentice Hall PTR
 1. 3. Core Java™ 2 Volume II - Fundamentals, Seventh Edition Prentice Hall PTR

Course Outcomes: After the completion of the course the student will be able to:

CO1	Read and understand Java-based software code of medium-to-high complexity.
CO2	Use standard and third party Java's API's when writing applications.
CO3	Understand the basic principles of creating Java applications with graphical user interface (GUI).
CO4	Create rich user-interface applications using modern API's such as JAVAFX.
CO5	Understand the fundamental concepts of computer science: structure of the computational process, algorithms and complexity of computation.

DCS-603	COMPUTER NETWORKS	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
CO2	Acquire knowledge of OSI model
CO3	Study various terminology of networking.
CO4	Study various cryptography techniques for data security.
CO5	To study various data transfer and compression techniques.

Detailed Syllabus

Unit-1

Introduction Concepts: Goals and Applications of Networks, Advantages of computer network. Network Topologies, Types of Transmission Media, Switching methods.

Unit-2

Introduction to OSI reference model, Types of Error, Detection and Correction, Sliding Window protocols.

Unit-3

Connecting devices: Repeater, hub, bridge. Routing, IP address, IPv6. Introduction to Congestion control

Unit-4

Introduction to Data compression techniques, Cryptography.

Unit-5

File Transfer, Access and Management, Electronic mail, HTTP, WWW, Introduction to Firewalls.

References :

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education
3. W. Stallings, Data and Computer Communication, Macmillan Press
4. AnuranjanMisra, "Computer Networks", Acme Learning

Course Outcomes: After the completion of the course the student will be able to:

CO1	Describe the functions of each layer in OSI and TCP/IP model.
CO2	Apply cryptography techniques to protect data.
CO3	Able to compress the data for data transfer.
CO4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
CO5	Well known about the networking.

MCS- 103	Advanced Computer	L T P 3 1 0	4 Credits
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	Networks		
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Pre-requisites: None

Course Objectives:

CO1	to study the problematic of service integration in TCP/IP networks focusing on protocol design, implementation and performance issues
CO2	to debate the current trends and leading research in the computer networking area.
CO3	To study about Wireless networking
CO4	To learn about IP multicasting
CO5	To learn about VPN

Detailed Syllabus

MODULE I

IP addressing, subnetting, supernetting, variable length subnet masking (CIDR notation), ARP, RARP, ICMP, IGMP

MODULE II

IPv6, Next Generation IP protocol, Wireless Networks, Mobility in networks, Mobile IP, Mobile TCP, TCP extensions for high speed network, SCTP,

MODULE III

IP multicasting, Multicast routing TCP/IP programming. P2P file sharing, structure overlay network, Virtual Private N/W, Configuration of VLAN

References

1. Larry Peterson and Bruce Davie, "Computer Networks: A Systems Approach", Third Edition, Morgan Kauffmann, 2003, ISBN: 1-55860-832-X.
2. W. Richard Stevens, Bill Fenner and Andrew Rudoff, "UNIX Network Programming, Volume 1: Networking APIs - Sockets and XTI", Third Edition, Prentice Hall, 2004, ISBN: 0-13-141155-1.
3. Behrouz A. Forouzan "Data Communications and Networking", McGraw-Hill.
4. Behrouz A. Forouzan "TCP/IP" McGraw-Hill.

Course Outcomes: After the completion of the course the student will be able to:

CO1	to identify and discuss the concepts underlying IPv6 protocol, and their main characteristics and functionality;
CO2	to understand the principles and functionality of mobile IP, explaining its concretization in IPv6; to understand the needs of optimization of the mobility mechanisms and description of some extensions that aim to reduce handover latency and requirements from terminals
CO3	to recognize the need for service integration and discuss how it can be accomplished;
CO4	to explain and exemplify current QoS architectures and mechanisms, and the QoS support challenges in future networks
CO5	to understand and explain the design issues in transport services in face of applications and services requirements

MCS -201	Advanced Database Systems	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To Learn concept DBMS architecture.
CO2	To Learn about Multiple Granularity and Multi-version Techniques
CO3	To Learn about Recovery in Message passing systems
CO4	To study about the concept of Object-relational databases
CO5	To study about the concept of Object-relational databases

Detailed Syllabus

MODULE I

Transaction and schedules, Concurrent Execution of transaction, Conflict and View Serializability, Testing for Serializability, Concepts in Recoverable and Cascade-less schedules. Lock based protocols, time stamp based protocols, Multiple Granularity and Multi-version Techniques, enforcing serializability by Locks, Locking system with multiple lock modes. Distributed Transactions Management.

MODULE II

Data Distribution, Fragmentation and Replication Techniques, Distributed Commit, Distributed Locking schemes. Issues of Recovery and atomicity in Distributed Databases, Traditional recovery techniques, Log based recovery, Recovery with Concurrent Transactions, Recovery in Message passing systems, Checkpoints, recovery line.

Distributed Query Processing, Multi-way Joins, Semi joins, Cost based query optimization for distributed database, Updating replicated data, protocols for Distributed Deadlock Detection, Eager and Lazy Replication Techniques

MODULE III

Object-relational databases, active databases, and multi-databases. Overview of such as parallel databases, multimedia databases, spatial and temporal databases, data warehousing and data mining, deductive databases.

References

1. Silberschatz, Korth and Sudershan, "Database System Concept", Mc Graw Hill.
2. Ramakrishna and Gehrke, "Database Management System", Mc Graw Hill.
3. Garcia-Molina, Ullman, Widom, "Database System Implementation" Pearson Education.
4. Ceei and Pelagatti, "Distributed Database", TMH.
5. Singhal and Shivratri, "Advance Concepts in Operating System" MC Graw Hill.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Explain in detail DBMS architecture.
CO2	Explain in detail query processing and techniques involved in query optimization.
CO3	Explain the principles of concurrency control.
CO4	Explain the principles of recovery management.
CO5	Know recent developments and active research topics in database.

MCS-214	Machine Learning	L T P 3 1 0	4 Credits
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Pre-requisites: None

Course Objectives:

CO1	To introduce students to the basic concepts and techniques of Machine Learning.
CO2	To become familiar with regression methods, classification methods, clustering methods.
CO3	To become familiar with Dimensionality reduction Techniques.
CO4	To learn about Dimensionality reduction techniques.
CO5	To learn how to develop application using machine learning

Detailed Syllabus

MODULE I

Algorithmic models of learning. Learning classifiers, functions, relations, grammars, probabilistic models, value functions, behaviors and programs from experience. Bayesian, maximum a posteriori, and minimum description length frameworks. Parameter estimation, sufficient statistics, decision trees, neural networks, support vector machines, Bayesian networks, bag of words classifiers,

MODULE II

N-gram models; Markov and Hidden Markov models, probabilistic relational models, association rules, nearest neighbor classifiers, locally weighted regression, ensemble classifiers. Computational learning theory, mistake bound analysis, sample complexity analysis, VC dimension, Occam learning, accuracy and confidence boosting. Dimensionality reduction, feature selection and visualization.

MODULE III

Clustering, mixture models, k-means clustering, hierarchical clustering, distributional clustering. Reinforcement learning; Learning from heterogeneous, distributed, data and knowledge. Selected applications in data mining, automated knowledge acquisition, pattern recognition, program synthesis, text and language processing, internet-based information systems, human-computer interaction, semantic web, and bioinformatics and computational biology.

References

1. Bishop, C. (2006). "Pattern Recognition and Machine Learning". Berlin: Springer-

Verlag.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Gain knowledge about basic concepts of Machine Learning
CO2	Identify machine learning techniques suitable for a given problem
CO3	Solve the problems using various machine learning techniques
CO4	Apply Dimensionality reduction techniques.
CO5	Design application using machine learning techniques

MODULE I

Introduction: Nature and Scope of Managerial Economics. Salient features of Science and Technology. Managerial Economics and its scope for engineers. Specific functions and responsibilities of a Managerial Economist.

MODULE II

Micro Economic Concepts: Law of Demand, Determinants of Demand. Price, Income and Cross Elasticity of Demand. Their uses in managerial decisions. Laws of Returns to Scale and Law of Diminishing Returns. Market structure- Price discrimination under Perfect Competition, Monopoly, Monopolistic Competition, Duopoly and Oligopoly.

MODULE III

Macro Economic Concepts: Concept of National Income. Methods of measurement of National Income and difficulties in measurement. Meaning of Inflation, types, causes and preventive measures. Phases of business cycles.

References.

1. Managerial Economics by Geetika, Piyali Ghosh, Poorba Roy Choudhary. Tata Mcgraw Hill Education. 2008.
2. Managerial Economics 7E, by D N Dwivedi. Vikas Publishing Pvt. Ltd. 2009.

BEC-502 Principles of Communications

L T P
3 1 0

MODULE I

Introduction: Overview of Communication system, Communication channels Need for modulation, Baseband and Pass band signals, Amplitude Modulation Double side band with Carrier (DSB-C), Double side band without Carrier, Single Side Band Modulation, DSB-SC, DSB-C, SSB Modulators and Demodulators, Vestigial Side Band (VSB), Quadrature Amplitude Modulator, Radio Transmitter and Receiver. Noise in Amplitude Modulation: Analysis, Signal to Noise Ratio, Figure of Merit.

MODULE II

Angle Modulation, Tone Modulated FM Signal, Arbitrary Modulated FM Signal, FM Modulators and Demodulators, Approximately Compatible SSB Systems, Stereophonic FM Broadcasting, Examples Based on Mat Lab. pulse Modulation Digital Transmission of Analog Signals: Sampling Theorem and its applications, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation. Their generation and Demodulation, Digital Representation of Analog Signals, Pulse Code Modulation (PCM), PCM System, Issues in digital transmission: Frequency Division Multiplexing, Time Division Multiplexing, Line Coding and their Power Spectral density, T1 Digital System, TDM Hierarchy.

MODULE III

Differential Pulse Code Modulation, Delta Modulation. Adaptive Delta Modulation, Voice Coders, Sources of Noises, Frequency domain representation of Noise, Super position of Noises, Linear filtering of Noises, Mathematical Representation of Noise, Noise in Frequency Modulation: Pre emphasis, De Emphasis and SNR Improvement, Phase Locked Loops Analog and Digital.

Text Book:

1. H. Taube, D L Schilling, GoutomSaha, "Principles of Communication", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

Reference Books:

1. B.P. Lathi, "Modern Digital and Analog communication Systems", 3rd Edition, Oxford University Press, 2009.
2. Simon Haykin, "Communication Systems", 4th Edition, Wiley India.
3. H. P. HSU & D. Mitra, "Analog and Digital Communications", 2nd Edition, Tata McGraw-Hill Publishing Company Ltd.

BHU-601 Industrial Management

L T P
3 2 0

MODULE- I

Introduction: Evolution and development of Management theory, stages of evolution of management- The classical Theory of Management, The Neo Classical Theory and The Modern Management Theories. Application of Industrial Management with regards to men, material and machinery.

MODULE- II

Manpower planning, dynamics of conflict and collaboration, production systems and ownership- Manpower planning process , projecting man power supply and demand at organisational level , recruitment and induction. T – training, management development, retraining, evaluation of training programmes.

Production systems :Job order production, Batch production and Continuous production, features and differences.

Industrial ownership : Private enterprises, Cooperative enterprises and Public sector enterprises, features, advantages and disadvantages.

Dynamics of conflict and collaboration :Process of conflict, types of conflict, interpersonal conflict, managing inter group relations and conflict, industrial conflict resolution, consultation, collective bargaining, types of bargaining.

MODULE- III

Environmental Issues: Environmental pollution – various management techniques to control environmental pollution, control acts for Air, Water, Solid Waste and Noise pollution.

Text books:

1.C. B. Memoria, Personnel Management, Himalaya Publishing Co. Bombay, 1996.2.G.S. Batra. B.S. Bhatia, Industrial Management, Deep and Deep Publications, Delhi. 2000.

Reference book:

1.S. Jayakumar, Industrial Management, Umesh Publications, Delhi. 2011.

BOE-072 QUALITY MANAGEMENT

L T P
3 1 0

MODULE-I

Quality Concepts: Evolution of Quality Control, concept change, TQM Modern concept, Quality concept in design, Review of design, Evolution of proto type.

Manufacturing Quality: Methods and techniques for manufacture, inspection and control of product, quality in sales and services, guarantee, analysis of claims.

Control on Purchased Product: Procurement of various products, evaluation of supplies, capacity verification, Development of sources, procurement procedure.

Human Factor in quality: Attitude of top management, cooperation of groups, operators attitude, responsibility, causes of apparatus error and corrective methods.

MODULE-II

Quality Management: Organization structure and design, quality function, decentralization, designing and fitting, organization for different type products and company, economics of quality value and contribution, quality cost, optimizing quality cost, seduction program.

Control Charts: Theory of control charts, measurement range, construction and analysis of R charts, process capability study, use of control charts.

Attributes of Control Chart: Defects, construction and analysis of charts, improvement by control chart, variable sample size, construction and analysis of C charts.

MODULE-III

Defects diagnosis and prevention defect study, identification and analysis of defects, correcting measure, factors affecting reliability, MTTF, calculation of reliability, building reliability in the product, evaluation of reliability, interpretation of test results, reliability control, maintainability, zero defects, quality circle.

ISO-9000 and its concept of Quality Management, ISO-9000 series, Taguchi method, JIT in some details.

Text book:

1. Lt. Gen. H. Lal, "Total Quality Management", Eastern Limited, 1990.

Reference books:

1. Greg Bounds, "Beyond Total Quality Management", McGraw Hill, 1994.
2. Menon, H.G, "TQM in New Product manufacturing", McGraw Hill 1992.

BHU-101/201	Professional Communication	4 credits	3-1-0
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Personality Enhancement Programme

Profiling (2 Days)

Ice Breaking Games (2 Hrs.)

Grooming Workshop (1 Day)

Self-Awareness and Self Analysis (1 Hr.)

Confidence Building (1 Hr.)

Positive thinking and Motivation (1 hr.)

1. Grammar (12Hrs.)

- Subject verb agreement
- Tenses.
- One word substitution
- Article
- Correct and Incorrect Sentences
- Jumbled sentences
- Translation/Summary
- Direct Indirect
- Active Passive

1. Speaking Skills (18 Hrs.)

- Story building through opening sentences, Pictures, Flash cards, PPTs,
- Narration on given situations, Memories, Scenic, Emotions, Reporting incidents
- Conversation and Dialogues
- Situation (visit to a bank, booking a railway ticket, visit to a doctor, introduction over a social evening, leave during an emergency etc.,)
- Invitation to an Occasion
- Disagreement on a topic
- Conversation etiquettes on a social evening-Do's and Don'ts's

2. Listening skills (8 hrs.)

- Conversations and Dialogues
- Correct pronunciations
- Speeches/ motivation videos
- Comprehensions
- Passages/Stories of Achievers

- English Songs

3. Writing Skills (10 Hrs.)

- Comprehension passages
- Short Speeches. (congratulatory, farewell, welcome, call for a meeting, conduct a random meeting, introduction, minutes of meeting, agenda, 5. Reading Skills (12 hrs.)
- Newspaper Reading
- Corporate, Film/theatre, International news/Sports
- Questionnaire
- Interviews
- Case Study
- Aptitude Tests

4. Learning beyond Classrooms (LBC)

- Workshop on Psychological Analysis
- Workshop on interacting in Social evenings and Dining etiquettes
- Visit to a Bank/ Doctor
- Quiz
- Guest Lectures

BAS-104/204	Environment & Ecology	2credits	2-0-0
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MODULE-I

Environment Definition-Scope & Importance, Need for Public Awareness, Ecosystem-Food chain, Food-web, Ecological pyramids, Energy- photosynthesis, 10% Law, Food, Shelter, Economic & social security. Biogeochemical Cycles- Carbon, nitrogen & sulphur cycle.

MODULE -II

Natural Resources- Forest Resources -Types & Functions, Deforestation- causes & impacts, Chipko Movement , Water Resources, Energy- Conventional & Non- Conventional Energy resources - Solar, water, wind, ocean thermal, fossil fuels (coal, oil & natural gas). Solid Waste Management, Public Health Aspects, Sustainable Development.

MODULE –III

Pollution- Air, water, noise, soil & automobile pollution, Indian Legislation of Air & water Act, Wild Life Act, Environmental Impact Assessment.

Global Warming, Acid Rain, Climate Change, Ozone Layer, Green House Effects, Urbanisation, Population, Animal Husbandry, Environmental Education, Women Education.

Text Books:

1. Benny Joseph – “Environmental Studies” –Tata McgrawHill-2005
2. Dr. D.L. Manjunath, “Environmental Studies” –Pearson Education-2006.
3. R. Rajagopalan –“ Environmental studies” –Oxford Publication – 2005.
4. M. Anji Reddy – “ Text book of Environmental Science & Technology” –BS Publication.

Reference Books:

1. P. Venugoplan Rao, “Principles of Environmental Science and Engineering” – Prentice Hall of India.
2. Meenakshi, “Environmental Science and Engineering” –Prentice Hall India

BHU-401	INDUSTRIAL PSYCHOLOGY	4 Credit	4-0-0
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MODULE -I

Introduction – Objectives and scope of Industrial Psychology, The Industrial Psychologist, Scientific management and Human Relations School – Hawthorne Experiments.

MODULE -II

Individual in Workplace -Motivation and Job satisfaction, stress management, Organizational culture, Leadership & group dynamics.

MODULE -III

Work Environment & Engineering Psychology-fatigue. Boredom, accidents and safety, Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests, Performance Management - Training & Development.

Reference Books:

1. Miner J.B. (1992) *Industrial/Organizational Psychology*. N Y: McGraw Hill.
2. *Industrial psychology*.S.N.chauhan, Sandeep Mittal,R.P.singh, Prateek Jain Pragati prakashan !st Ed

Text Books:

1. Blum & Naylor (1982) *Industrial Psychology. Its Theoretical & Social Foundations* CBS Publication.

BHU-302	Industrial Sociology	4 Credits	2-0-0
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MODULE-I

Industrial Sociology:

Nature and Scope of Industrial Sociology, Development of Industrial Sociology, Rise and Development of Industry, Early Industrialism Types of Productive Systems, The Manorial or Feudal system, The guild system, The domestic or putting-out system and the factory system, Characteristics of the factory system

MODULE_II

Industrialization :

Causes and consequences of industrialization.

Industrialization in India.

Industrial Poling Resolutions – 1956.

MODULE-III

Contemporary Issues :

Grievances and Grievance handling Procedure.

Industrial Disputes : courses, strikes & lockouts,

Industrial Relations Machinery Bi-partite Tri-partite Agreement, Labour courts & Industrial Tribunals, Code of Discipline, Standing order.

Reference Books:

1. Gisbert Pascal, *Fundamentals of Industrial sociology*, Tata McGraw Hill Publishing Co., New Delhi, 1972.
2. Schneider Engno V., *Industrial Sociology 2nd Edition*, McGraw Hill Publishing Co., New Delhi, 1979.
3. Mamiria C.B. And Mamoria S., *Dynamics of Industrial Relations in India*.
4. Sinha G.P. and P.R.N. Sinha *Industrial Relations and Labour Legislations*, New Delhi, Oxford and IBH Publishing Co., 1977.

BEE-351	MATLAB Programming	2 credit	0-0-2
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MATLAB Based Experiments

1. Formation of column, row, diagonal and transpose matrix.
2. Determination of Eigen values and eigenvectors of a square matrix.
3. Determination of roots of a polynomial.
4. Plotting of step, ramp and impulse function.
5. Plotting of exponential function.
6. Determination of time response of an R-L-C circuit.
7. Solution of difference equations.
8. Determination of polynomial fit, analyzing residuals, exponential fit and error bounds from the given data.
9. Determination of polynomial using method of least square curve fitting.
10. Frequency response of LP and HP filters
11. Frequency response of BP and BR filters
12. Evaluation of convolution integral, Discrete Fourier transform for periodic & non-periodic signals and simulation of difference equations using MATLAB.
13. Determination of polynomial using method of least square curve fitting.
14. Solution of differential equations using 4th order Runge-Kutta method.
15. Solution of differential equation using revised Euler method.

Text/Reference Books:

1. AlmosGilat, "MATLAB: An Introduction with Applications" Wiley India Ltd., 2004.

R.P. Singh, "Getting Started with MATLAB" Oxford University Press.

BEC-456	PCB Lab	2 Credit	0-0-2
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MODULE-I

Introduction: Nature and Scope of Managerial Economics. Salient features of Science and Technology. Managerial Economics and its scope for engineers. Specific functions and responsibilities of a Managerial Economist.

MODULE-II

Micro Economic Concepts: Law of Demand, Determinants of Demand. Price, Income and Cross Elasticity of Demand. Their uses in managerial decisions. Laws of Returns to Scale and Law of Diminishing Returns. Market structure- Price discrimination under Perfect Competition, Monopoly, Monopolistic Competition, Duopoly and Oligopoly.

MODULE-III

Macro Economic Concepts: Concept of National Income. Methods of measurement of National Income and difficulties in measurement. Meaning of Inflation, types, causes and preventive measures. Phases of business cycles.

References.

1. *Managerial Economics by Geetika, Piyali Ghosh, Poorba Roy Choudhary. Tata Mcgraw Hill Education.2008.*
2. *Managerial Economics 7E, by D N Dwivedi. Vikas Publishing Pvt. Ltd. 2009.*

BEE-503	Fundamental of Power Electronics	3-1-04	credits
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MODULE-I

Power Semiconductor Devices:

Characteristics of Power Transistors, Thyristor, GTO, Power MOSFET and IGBT. Two-Transistor Model of Thyristor.

Silicon Controlled Rectifiers (SCR):

Construction and characteristics, specification and ratings, pulse transformer, optical isolators, methods of turn on: R, RC, UJT relaxation oscillator, Rating extension by series and parallel connections, string efficiency. Protection of SCR-Protection against over voltage, over current, dv/dt , di/dt , Gate protection.

MODULE-II

Converters-I: Single Phase half & full wave converters with RL load, Single phase dual converters, Three phase half wave converters, Three phase full converters with RL load, Three phase dual converters.

Converters-II: Single and three-phase semi converters with RL load. Power Factor Improvement-Extinction angle control, symmetrical angle control, pulse width modulation control and sinusoidal pulse width modulation control. Inversion operation. Effect of load and source impedances.

BEE 052	SCADA & ENERGY MANAGEMENT SYSTEM	3-1-0	4Credits
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MODULE-I

SCADA: Purpose and necessity, general structure, data acquisition, transmission & monitoring.

general power system hierarchical Structure. Overview of the methods of data acquisition systems, commonly acquired data, transducers, RTUs, data concentrators, various communication channels- cables, telephone lines, power line carrier, microwaves, fiber optical channels and satellites. Supervisory and Control Functions:

Data acquisitions, status indications, majored values, energy values, monitoring alarm and event application processing. Control Function: ON/ OFF control of lines, transformers, capacitors and applications in process in industry - valve, opening, closing etc. Regulatory functions: Set points and feedback loops, time tagged data, disturbance data collection and analysis. Calculation and report preparation.

MODULE-II

MAN- Machine Communication: Operator consoles and VDUs, displays, operator dialogues, alarm and event loggers, mimic diagrams, report and printing facilities.

Data basis- SCADA, EMS and network data basis. SCADA system structure - local system, communication system and central system.

MODULE-III

Data basis (contd.): Configuration- NON-redundant- single processor, redundant dual processor. Multi-control centers, system configuration. Performance considerations: real time operation system requirements, modularization of software programming languages.

Energy Management Center: Functions performed at a centralized management center, production control and load management economic dispatch, distributed centers and power pool management.

Text Books:

1. Torsten Cergrell, " Power System Control Technology", Prentice Hall International.
2. George L Kusic "Computer Aided Power System Analysis", Prentice Hall of India,
3. A. J. Wood and B. Woolenberg, "Power Generation Operation and Control", John Wiley & Sons.
4. Sunil S Rao, "Switchgear Protection & Control System" Khanna Publishers 11th Edition.

PAPER I

LLM 101: RESEARCH METHOD AND LEGAL WRITING	
Teaching Scheme Lectures: 4 Hr/Week Tutorial: 1hr/Week Credit: 5	Examination Scheme: Class test- 12marks Teacher Assessment: 6 marks Attendance: 12 marks End Semester Exam: 70 marks

Course Objectives

1. To understand the concept and importance of research.
2. to equip students with the research skills.
3. To enhance their legal writing skills.
4. To develop awareness regarding unethical means of research

DETAILED SYLLABUS

I. Research

- i. What is Research? Meaning and Objectives
- ii. Research methods *vis a vis* Research Methodology
- iii. Legal Research - Meaning, scope and purpose. Relation between law and society
- iv. Types/kinds: Doctrinal and Non-Doctrinal (empirical); Applied, fundamental;
- v. Library research, field research and laboratory research, analytical, descriptive, conceptual; Participatory and Non-Participatory; Comparative, historical, statistical, critical, socio-legal; Mono disciplinary and trans disciplinary; quasi
- vii. disciplinary, inter-disciplinary (multi- disciplinary) research; Quantitative and
- viii. qualitative, one time and longitudinal, clinical or diagnostic research; Research
- ix. for legal reform
- x.

II. Research Methods

- i. Research Design
- ii. Various Steps in Research: Research Process
- iii. Research Problem: Identification and Formulation
- iv. Hypothesis
- v. Use of Library
- vi. Use of Modern Technology/ Computer Assisted Research
- vii. Tools and Techniques for Collection of Data
 - Primary and Secondary Sources
 - Literature Review
 - Observation Method
 - Questionnaire
 - Interview
 - Case study
 - Sampling
 - Jurimetrics
- viii. Analysis and Interpretation of Data
- ix. Use of Deductive and Inductive Methods in Research
- x. Preparation of Research Report and Writing of Research report
- xi. Budgeting of Research
- xii. Ethical and Legal Issues: Plagiarism and Copyright Violation

III. Legal Writing

- i. Essentials of Good Legal Writing
- ii. Structured Legal Writing: Organization of Legal Materials
- iii. Framing of Write Up: Research Question, Title, Identifying relevant areas of law,
- iv. Identifying Literature and Case Laws, Analysis, Discussion, Recommendations and Conclusion
- v. Sources of Authority
- vi. Kinds: Informative, Persuasive; Writing for Individual Purposes; Writing for
- vii. Academic Purpose; Writing for Court Purposes: Briefs, Plaints etc.; Writing for
- viii. Publication: reviews, articles, books etc.; Judicial writing
- ix. Citation, Reference and Footnoting
- x. Editing and Proofreading
- xi. Writing of Research Proposal
- xii. Dissertation/ Thesis Writing

TEXT AND REFERENCE BOOKS;

1. Bruce L. Berg, *Qualitative Research Methods For The Social Sciences* (London, Allyn and Bacon, 2001).
2. C.R. Kothari, *Research Methodology: Methods and Techniques* (New Delhi: Wiley Eastern Ltd., 1985).
3. Dennis P. Force and Stephen Richer (ed.), *Stages of Social Research – Contemporary Perspectives* (New Jersey : Prentice Hall Inc., Englewood Cliffs, 1970).
4. Frederic Charles Hicks, *Materials and Methods in Legal Research* (Lawyers Cooperative Publishing, New York).
5. Goode and Hall, *Methods in Social Research* (Singapore : MacGraw Hill Book Co., 1985).
6. Harvard Law Review Association, *The Bluebook: Uniform system of Citation* (Harvard Law Review, Harvard).
7. Janathan Anderson, *Thesis and Assignment Writing* (Wiley Eastern Ltd, New Delhi)
8. Johan Galtung, *Theory And Methods of Social Research* (London: George Allen & Unwin Ltd., 1970).
9. Leon Festinger (ed.), *Research Methods in Behavioral Sciences* (Holt, Rinehart and Winston, New York, 1953).
10. Pauline V. Young, *Scientific Social Surveys and Research* (New Delhi : Prentice Hall of India Pvt. Ltd., 1984).
11. S. K. Verma and Afzal Vani, *Legal Research and Methodology*, ILI, New Delhi Selltitz, Jahoda *et.al.*, *Research Methods in Social Relations* (Holt, Rinehart and Winston, New York, 1964).
12. Vijay K. Gupta, *Decision Making In The Supreme Court of India (A Jurimetric Study) – Alternatives in Judicial Research* (Delhi : Kaveri Books, 1995).

Course Outcome

After completing the course students will be able to

1. Understand the importance and detailed process of research
2. Understand the ethical value of original research
3. Become aware of the plagiarism and other unethical means of research
4. Understand the drafting of a research paper or dissertation.

PAPER V

LLB651:PRACTICAL TRAINING I DRAFTING PLEADING AND COVEYANCING	
Teaching Scheme Lectures: 4 Hr/Week Tutorial:1hr/Week Credit: 5	Examination Scheme: Viva- 30 Marks Written- 40 marks File- 30 marks

Course Objectives

1. To make the students understand about the principles of drafting.
2. To make them understand about the basics of civil drafting.
3. To make them understand about the fundamentals of criminal drafting.
4. To make the students understand about the intricacies of conveyancing.

DETAILED SYLLABUS

Drafting, Pleading and Conveyancing

1. Drafting:

General principles of drafting and relevant substantive rules shall be taught.

Marks: 45

2. Pleadings:

i) **Civil:** Complaint, Written Statement, Interlocutory Application, Original Petition, Affidavit, Execution Petition, Memorandum of Appeal and Revision, Petition under Article 226 and 32 of the Constitution of India.

ii) **Criminal:** Complaint, Criminal Miscellaneous petition, Bail Application, Memorandum of Appeal and Revision.

iii) **Conveyancing:** Sale Deed, Mortgage Deed, Lease Deed, Gift Deed, Promissory Note, Power of Attorney, will, Trust Deed.

iv) Drafting of writ petition and Public Interest Litigation petition.

Marks: 45

3. Viva Voce. Marks:10

The course will be taught through class instructions and simulation exercises, preferably with assistance of practicing lawyers/retired judges. Apart from teaching the relevant provisions of Law. The Course may include not less than 15 practical exercises in drafting carrying a total of 45 marks (3 marks for each) and 15 exercises in conveyancing carrying another 45 marks (3 marks for each exercise) remaining 10 marks will be given for viva voice.

Course Outcome:

After the course students will be able to understand:

1. The students understood about the principles of drafting.
2. The students understood about the basics of civil drafting
3. The students understood about the fundamentals of criminal drafting.
4. The students learnt about the intricacies of conveyancing.

PAPER V

LLB 851: PRACTICAL TRAINING-II (PROFESSIONAL ETHICS & PROFESSIONAL ACCOUNTING SYSTEM)	
Teaching Scheme Lectures: 4 Hr/Week Tutorial: 1hr/Week Credit: 5	Examination Scheme: Viva- 30 Marks Written- 40 marks File- 30 marks

Course Objectives

1	To equip the students for professional world
2	To make students aware how to present a case the court.
3	To teach students about their conduct in court.
4	To teach how to behave with colleagues, clients and judges.

DETAILED SYLLABUS

Professional Ethics and Professional Accounting System

1. Professional Ethics.

2. Accountancy for Lawyers.

3. Bar-Bench

Relations.

Marks: 90

This course will be taught in association with practicing lawyers on the basis of the following study materials.

i) Mr. Krishnamuthylyer's – Advocacy.

ii) The Contempt Law and Practice.

iii) The Bar Council Code of Ethics.

iv) 50 selected opinions of the Disciplinary Committees of Bar Councils and 10 major judgments of the Supreme Court on the subjects Viva Voce.

Marks: 10

COURSE OUTCOME

After completion of the course students will be able to

1	Students will be ready to face the professional world
2	feel confident while presenting a case in the court
3	carry themselves well in the court.
4	Deal with colleagues and clients smoothly

PAPER V

LLB 951:PRACTICAL TRAINING III ALTERNATIVE DISPUTE RESOLUTION	
Teaching Scheme Lectures: 4 Hr/Week Tutorial:1hr/Week Credit: 5	Examination Scheme: Viva- 30 Marks Written- 40 marks File- 30 marks

Course Objectives

- | |
|--|
| 1. To understand the meaning, utility and emergence of Alternate Dispute Resolution System. |
| 2. To understand the basic concepts of various mechanisms of alternate dispute resolution. For eg. Arbitration and conciliation, mediation, Lok Adalat etc. |
| 3. To provide students with a theoretical and practical understanding of alternate dispute resolutions. |
| 4. To help the students to acquire through familiarity with various dispute resolution methods that are “alternative” to traditional methods on both practical and theoretical level. |

DETAILED SYLLABUS

Alternate Dispute Resolution

1. Negotiation skills to be learned with simulated programme.

2. Conciliationskills.

3. ArbitrationLawandPracticeincludingInternationalArbitrationandArbitrationrules . Marks: 100

The course is required to be conducted with the help of senior legal practitioners through simulation and case studies. Evaluation may also be conducted in practical exercise at least for a significant part of evaluation.

COURSE OUTCOME

After completing this course the students will be able to-

- | |
|---|
| 1. Understand the meaning, need and history of alternate dispute resolution system. |
| 2. Understand the basic procedure of different methods of alternate dispute resolutions. |
| 3. To acquire skills, procedures, techniques, and characteristics needed to engage in various forms of alternate dispute resolution. |
| 4. Apply practically the different methods of alternate dispute resolution. |

PAPER V

LLB 1051:PRACTICAL TRAINING IV MOOT COURT EXERCISE AND INTERNSHIP	
Teaching Scheme Lectures: 4 Hr/Week Tutorial:1hr/Week Credit: 5	Examination Scheme: Viva- 30 Marks Written- 40 marks File- 30 marks

Course Objectives

1. To understand the concept and importance of moot court.
2. to equip students with the legal research skills.
3. To enhance their legal writing skills.
4. To develop awareness regarding court room discipline.

DETAILED SYLLABUS

Moot court exercise and Internship

This paper may have three components of 30 marks each and viva voce for 10 marks.

1. Mootcourt:

Every student may be required to do at least three moot courts in a year with 10 marks for each. The moot court work will be on assigned problem and it will be evaluated for 5 marks for written submissions and 5 marks for oral advocacy. **Marks:30**

2. Observance of Trial in two cases, one Civil and one Criminal:

Students may be required to attend two trials in the course of the last two or three years of LL.B. studies. They will maintain a record and enter the various steps observed during their attendance on different days in the court assignment. **Marks:30**

3. Interviewing techniques and Pre-trial preparation and Internship diary:

Each student will observe two interviewing sessions of clients at the Lawyer's Office/Legal Aid Office and record the proceedings in a diary, which will carry 15 marks. Each student will further observe the preparation of documents and court papers by the Advocate and the procedure for the filing of the suit/petition. This will be recorded in the diary, which will carry 15 marks. **Marks:30**

4. The fourth component of this paper will be Viva Voce Examination on all the above three aspects. **Marks:10**

Course Outcome

After completing the course students will be able to

1. Understand the importance of moot court.
2. Understand the ethical values of a lawyer.
3. Become aware of the practices in court.
4. Understand the drafting of a case file.

PAPER V

LAW 351: PRACTICAL TRAINING-I (PROFESSIONAL ETHICS & PROFESSIONAL ACCOUNTING SYSTEM)	
Teaching Scheme Lectures: 4 Hr/Week Tutorial: 1hr/Week Credit: 5	Examination Scheme: Viva: 30 marks Written: 30 Marks File: 30 Marks

Course Objectives

1	To equip the students for professional world
2	To make students aware how to present a case the court.
3	To teach students about their conduct in court.
4	To teach how to behave with colleagues, clients and judges.

DETAILED SYLLABUS

Professional Ethics and Professional Accounting System

4. Professional Ethics.

5. Accountancy for Lawyers.

6. Bar-Bench

Relations.

Marks: 90

This course will be taught in association with practicing lawyers on the basis of the following study materials.

v) *Mr. Krishnamuthylyer's – Advocacy.*

vi) The Contempt Law and Practice.

vii) The Bar Council Code of Ethics.

viii) 50 selected opinions of the Disciplinary Committees of Bar Councils and 10 major judgments of the Supreme Court on the subjects Viva Voce.

Marks: 10

COURSE OUTCOME

After completion of the course students will be able to

1	Students will be ready to face the professional world
2	feel confident while presenting a case in the court
3	carry themselves well in the court.
4	Deal with colleagues and clients smoothly

PAPER V

LAW 451:PRACTICAL TRAINING II ALTERNATIVE DISPUTE RESOLUTION	
Teaching Scheme Lectures: 4 Hr/Week Tutorial: 1hr/Week Credit: 5	Examination Scheme: Viva: 30 marks Written: 40 Marks File: 30 Marks

Course Objectives

1. To understand the meaning, utility and emergence of Alternate Dispute Resolution System.
2. To understand the basic concepts of various mechanisms of alternate dispute resolution. For eg. Arbitration and conciliation, mediation, Lok Adalat etc.
3. To provide students with a theoretical and practical understanding of alternate dispute resolutions.
4. To help the students to acquire through familiarity with various dispute resolution methods that are “alternative” to traditional methods on both practical and theoretical level.

DETAILED SYLLABUS

Alternate Dispute Resolution

4. Negotiation skills to be learned with simulated programme.

5. Conciliationskills.

6. ArbitrationLawandPracticeincludingInternationalArbitrationandArbitrationrules . Marks: 100

The course is required to be conducted with the help of senior legal practitioners through simulation and case studies. Evaluation may also be conducted in practical exercise at least for a significant part of evaluation.

COURSE OUTCOME

After completing this course the students will be able to-

1. Understand the meaning, need and history of alternate dispute resolution system.
2. Understand the basic procedure of different methods of alternate dispute resolutions.
3. To acquire skills, procedures, techniques, and characteristics needed to engage in various forms of alternate dispute resolution.
4. Apply practically the different methods of alternate dispute resolution.

PAPER V

LAW 451:PRACTICAL TRAINING III DRAFTING PLEADING AND COVEYANCING	
Teaching Scheme Lectures: 4 Hr/Week Tutorial:1hr/Week Credit: 5	Examination Scheme: Viva: 30 marks Written: 40 Marks File: 30 Marks

Course Objectives

5. To make the students understand about the principles of drafting.
6. To make them understand about the basics of civil drafting.
7. To make them understand about the fundamentals of criminal drafting.
8. To make the students understand about the intricacies of conveyancing.

DETAILED SYLLABUS

Drafting, Pleading and Conveyancing

4. Drafting:

General principles of drafting and relevant substantive rules shall be taught.

Marks: 45

5. Pleadings:

v) Civil

vi) : Complaint
vii) Written Statement
viii) Interlocutory Application
ix) Original Petition
x) Affidavit
xi) Execution Petition
xii) Memorandum of Appeal and Revision
xiii) Petition under Article 226 and 32 of the Constitution of India.

xiv) Criminal:

Complaint
Criminal Miscellaneous petition
Bail Application
Memorandum of Appeal and Revision.

xv) Conveyancing:

Sale Deed
Mortgage Deed
Lease Deed
Gift Deed
Promissory Note
Power of Attorney
will
Trust Deed.

xvi) Drafting of writ petition and Public Interest Litigation petition.

Marks: 45

6. Viva Voce. Marks:10

The course will be taught through class instructions and simulation exercises, preferably with assistance of practicing lawyers/retired judges. Apart from teaching the relevant provisions of Law. The Course may include not less than 15 practical exercises in drafting carrying a total of 45 marks (3 marks for each) and 15 exercises in conveyancing carrying another 45 marks (3 marks for each exercise) remaining 10 marks will be given for viva voice.

Course Outcome:

After the course students will able to understand:

5. The students understood about the principles of drafting.
6. The students understood about the basics of civil drafting
7. The students understood about the fundamentals of criminal drafting.
8. The students learnt about the intricacies of coveyancing.

PAPER V

LAW 651:PRACTICAL TRAINING IV MOOT COURT EXERCISE AND INTERNSHIP	
Teaching Scheme Lectures: 4 Hr/Week Tutorial:1hr/Week Credit: 5	Examination Scheme: Viva: 30 marks Written: 40 Marks File: 30 Marks

Course Objectives

1. To understand the concept and importance of moot court.
2. to equip students with the legal research skills.
3. To enhance their legal writing skills.
4. To develop awareness regarding court room discipline.

DETAILED SYLLABUS

Moot court exercise and Internship

This paper may have three components of 30 marks each and viva voce for 10 marks.

5. Mootcourt:

Every student may be required to do at least three moot courts in a year with 10 marks for each. The moot court work will be on assigned problem and it will be evaluated for 5 marks for written submissions and 5 marks for oral advocacy.

Mar

ks:30

6. Observance of Trial in two cases, one Civil and one Criminal:

Students may be required to attend two trials in the course of the last two or three years of LL.B. studies. They will maintain a record and enter the various steps observed during their attendance on different days in the court assignment.

Mar

ks:30

7. Interviewing techniques and Pre-trial preparation and Internship diary:

Each student will observe two interviewing sessions of clients at the Lawyer's Office/Legal Aid Office and record the proceedings in a diary, which will carry 15 marks. Each student will further observe the preparation of documents and court papers by the Advocate and the procedure for the filing of the suit/petition. This will be recorded in the diary, which will carry 15 marks.

Mar

ks:30

8. The fourth component of this papers will be Viva Voce Examination on all the above three aspects.

Marks:10

Course Outcome

After completing the course students will be able to

1. Understand the importance of moot court.
2. Understand the ethical values of a lawyer.
3. Become aware of the practices in court.
4. Understand the drafting of a case file.

Industrial Management

Course Outcomes: At the end of the course, the student will be able to:

CO1 Understand the basic principles, approaches and functions of management and apply

Concepts to specific situations.

CO2 Understand marketing management process and apply marketing mix in the formulation of marketing strategies during the life cycle of product.

CO3 Identify and utilize various techniques for improving productivity using work study.

CO4 Apply the concepts and tools of quality engineering in the design of products and process controls.

CO5 Understand and use appropriate methods/tools of inventory classification and

control in industry.

CO6 Recognize activities with their interdependency so as to optimize time vs costs utilizing the techniques of project management/CPM.

MODULE-I

Introduction: Evolution and development of Management theory, stages of evolution of management- The classical Theory of Management, The Neo Classical Theory and The Modern Management Theories. Application of Industrial Management with regards to men, material and machinery.

MODULE-II

Manpower planning, dynamics of conflict and collaboration, production systems and ownership- Manpower planning process , projecting man power supply and demand at organisational level , recruitment selection and induction. Training and development – training, management development, retraining, evaluation of training programmes.

Production systems : Job order production, Batch production and Continuous production, features and differences.

Industrial ownership : Private enterprises, Cooperative enterprises and Public sector enterprises, features, advantages and disadvantages.

Dynamics of conflict and collaboration : Process of conflict, types of conflict, interpersonal conflict, managing inter group relations and conflict, industrial conflict resolution, consultation, collective bargaining, types of bargaining.

MODULE-III

Environmental Issues: Environmental pollution – various management techniques to control environmental pollution, control acts for Air, Water, Solid Waste and Noise pollution.

Manufacturing Process

Course Outcomes: At the end of the course, the student will be able to:

CO1 To develop knowledge on the principle and operation of lathe and drilling machine.

CO2 To develop knowledge on the importance of milling grinding and super finishing in metal cutting process.

CO3 To develop knowledge on the various reciprocating machines used in the metal cutting Processes.

CO4 To develop knowledge of appropriate parameters to be used for various machining operations.

MODULE- 1

Introduction to Materials and Manufacturing Introduction to engineering materials such as metals and alloys and their applications. Art of manufacturing Classification of manufacturing processes, selection of a manufacturing, Guide to processing of metals and alloys. Importance of Materials & Manufacturing towards Technological & Socio-Economic developments Plant location Plant layout & its types. Types of Production. Production versus Productivity.

Properties of Materials Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness. Elementary ideas of fracture, fatigue & creep.

Ferrous Materials Carbon steels, its classification based on % carbon as low, mild, medium & high carbon steel, its properties & applications. Pig iron, Wrought iron, Cast iron. Alloy steels: stainless steel, tool steel. Elementary introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching tempering and hardening.

MODULE -2

Non-Ferrous metals & alloys Common uses of various non-ferrous metals & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys such as Duralumin. Casting Pattern & allowances. Molding sands and its desirable properties. Mould making with the use of a core. Gating system. Casting defects & remedies. Cupola Furnace. Die-casting and its uses.

Metal Forming Basic metal forming operations & uses of such as : Forging , Rolling , Wire & Tube drawing/making and Extrusion, and its products/applications. Press-work, & die & punch assembly, cutting and forming, its applications. Hot-working versus cold-working.

Machining Processes and Machine Tools Classification of machining processes and machine tools; Construction and working of lathe, Drilling machine, Shaper, Slotter and Planer, Boring Machine, Milling Machine, Grinding Machine, Brief introduction of Newer Machining Processes such as EDM, ECM, USM, LBM, WJM etc.

MODULE -3

Welding Importance & basic concepts of welding, classification of welding processes. Gas- welding, types of flames. Electric-Arc welding. Resistance welding. Soldering & Brazing and its uses.

Non-Metallic Materials Common types & uses of Wood, Cement-concrete, Ceramics, Rubber, Plastics and Composite-materials.

Misc. Processes Powder-metallurgy process & its applications, Plastic-products manufacturing, Galvanizing and Electroplating.

Modern Trends in Manufacturing Automation, Concept of CAD, CAM and CIM; Concept of Micro manufacturing and nanotechnology.

Engineering Mechanics

Course Outcomes: On completion of this course, students will be able to

CO 1: analyze the problems related to machine structures and friction

CO 2: apply concepts of geometrical properties such as moment of inertia

CO3: Solve problems on dynamics, momentum and impulse.

MODULE -1

Two Dimensional Force Systems Basic concepts, Laws of motion, Principle of Transmissibility of forces, Transfer of a force to parallel position, Resultant of a force system, Simplest Resultant of Two dimensional concurrent and Non-concurrent Force systems, Distributed force system, Free body diagrams, Equilibrium and Equations of Equilibrium, Applications.

Friction Introduction, Laws of Coulomb Friction, Equilibrium of Bodies involving Dry- friction, Belt friction, Application.

MODULE- 2

Beam Introduction, Shear force and Bending Moment, Differential Equations for Equilibrium, Shear force and Bending Moment Diagrams for Statically Determinate Beams.

Trusses Introduction, Simple Truss and Solution of Simple truss, Method of Joints and Method of Sections.

Centroid and Moment of Inertia Centroid of plane, curve, area, volume and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Principal Moment Inertia, Mass Moment of Inertia of Circular Ring, Disc, Cylinder, Sphere and Cone about their Axis of Symmetry.

MODULE -3

Kinematics and Kinetics of Rigid Body Introduction to stress and strain and their types Plane Motion of Rigid Body, Velocity and Acceleration under Translation and Rotational Motion, Relative Velocity. Introduction to Force, Mass and Acceleration, Work and Energy, Impulse and Momentum, D'Alembert's Principles and Dynamic Equilibrium.

Simple Stress and Strain: Introduction, Normal and Shear stresses, Stress- Strain Diagrams for ductile and brittle material, Elastic Constants, One Dimensional Loading of members of varying cross-sections, Strain energy.

Pure Bending of Beams Introduction, Simple Bending Theory, Stress in beams of different cross sections.

Torsion Introduction, Torsion of shafts of circular section, torque and twist, shear stress due to torque.

Thermodynamics

Course Outcomes:

CO1 This course aims to provide a good platform to mechanical engineering students to understand, model and appreciate concept of dynamics involved in thermal energy transformation.

CO2 To prepare them to carry out experimental investigation and analysis at later stages of graduation. To apply the knowledge of mathematics, science and engineering fundamentals to model the energy conversion phenomenon.

CO3 To identify and formulate power production based on the fundamental's laws of thermal engineering.

CO4 To instill upon to envisage appropriate experiments related to heat engines.

CO5 To investigate the effectiveness of energy conversion process in mechanical power generation for the benefit of mankind

Module -1

Fundamental Concepts and Definitions: Introduction and definition of thermodynamics, Dimensions and units, Microscopic and Macroscopic approaches, Systems, surroundings and universe, Concept of continuum, Control system boundary, control volume and control surface, Properties and state, Thermodynamic properties, Thermodynamic path, process and cycle, Thermodynamic equilibrium, Reversibility and irreversibility, Quasi static process, Energy and its forms, Work and heat, Gas laws, Ideal gas, Real gas, Law of corresponding states, Dalton's law, Amagat's law, Property of mixture of gases.

Zeroth law of thermodynamics: Zeroth law of thermodynamics, Temperature and its measurement, Temperature scales.

First law of thermodynamics: Thermodynamic definition of work, Thermodynamic processes, Calculation of work in various processes and sign convention, Non-flow work and flow work, Joule's experiment, First law of thermodynamics, Internal energy and enthalpy, First law of thermodynamics applied to open systems, Steady flow systems and their analysis, Steady flow energy equation, Boilers, Condensers, Turbine, Throttling process, Pumps etc. First law analysis for closed system (non flow processes), Analysis of unsteady processes such as filling and evacuation of vessels with and without heat transfer, Limitations of first law of thermodynamics.

Module-2

Second law: Devices converting heat to work, Thermal reservoir, Heat engines, Efficiency, Devices converting work to heat, Heat pump, refrigerator, Coefficient of Performance, Reversed heat engine, Kelvin Planck statement of second law of thermodynamics, Clausius statement of second law of thermodynamics, Equivalence of two statements of second law of thermodynamics, Reversible and irreversible processes, Carnot cycle and Carnot engine, Carnot theorem and its corollaries, thermodynamic temperature scale.

Entropy : Clausius inequality, Concept of Entropy, Entropy change in different thermodynamic processes, Tds equation, Principle of entropy increase, T-S diagram, Statement of the third law of thermodynamics.

Availability and Irreversibility: Available and unavailable energy, Availability and Irreversibility, Second law efficiency, Helmholtz & Gibbs function.

Module-3

Properties of steam and thermodynamics cycles: Pure substance, Property of steam, Triple point, Critical point, Sub-cooled liquid, Saturation states, Superheated states, Phase transformation process of water, Graphical representation of pressure, volume and temperature, P-T & P-V diagrams, T-S and H-S diagrams, use of property diagram, Steam-Tables & Mollier charts, Dryness factor and its measurement, processes involving steam in closed and open systems. Simple Rankine cycle.

Introduction to working of IC engines: Compression Ignition engines, Spark Ignition engines, 2 stroke and 4 stroke engines, Performance parameters of IC engine, Heat balance sheet.

Material Science Engineering

Course Outcomes:

CO1 To review physics and chemistry in the context of materials science & engineering.

CO2 To describe the different types of bonding in solids, and the physical ramifications of these differences.

CO3 To describe and demonstrate diffraction, including interpretation of basic x-ray data.

CO4 Give an introduction to metals, ceramics, polymers, and electronic materials in the context of a molecular level understanding of bonding.

CO5 Give an introduction to the relation between processing, structure, and physical properties.

CO6 Give the beginning student an appreciation of recent developments in materials science & engineering within the framework of this class.

MODULE- I

Introduction: Historical perspective, importance of materials, Brief review of modern & atomic concepts in Physics and Chemistry, Atomic models, Periodic table, Chemical bonding.

Crystallography and imperfections: Concept of unit cell, space lattice, Bravais lattices, common crystal structures, Atomic packing factor and density, Miller indices, X-ray crystallography techniques, imperfections, Defects & Dislocations in solids. .

Mechanical Properties and Testing: Stress strain diagram, Ductile and brittle materials, stress Vs strength, toughness, hardness, fracture, fatigue and creep. Testing, such as Strength testing, Hardness testing, Impact testing, Fatigue testing Creep testing, Non-destructive testing (NDT)

Phase Diagram and Equilibrium Diagram: Unary and Binary diagrams, Phase rules, Types of equilibrium diagrams: solid solution type, eutectic type and combination type, Iron-carbon equilibrium diagram.

MODULE-II

Ferrous materials: Iron and steel manufacture, furnaces, various types of carbon steels, alloy steels and cast irons, its properties and uses.

Heat Treatment: various types of heat treatment, such as Annealing, Normalizing, Quenching, Tempering and Case hardening, Time Temperature Transformation (TTT) diagrams.

Non-Ferrous metals and alloys: Non-ferrous metals, such as Cu, Al, Zn, Cr, Ni etc. and its applications. Various types of Brass, Bronze bearing materials their properties and uses. Aluminum alloys, such as Duralumin, Other advanced materials/alloys.

MODULE-III

Electric Properties: Energy band, concept of conductor, insulator and semi-conductor. Intrinsic and extrinsic semi-conductors, p-n junction and transistors, Basic devices and their applications, diffusion of solid Super conductivity and its applications, Messier effect. Type I & II superconductors. High temperature superconductors.

Ceramics: Structure, types, properties and applications of ceramics, Mechanical/Electrical behaviour and processing of ceramics.

Plastics: Various types of polymers/plastics and their applications, Mechanical behaviour and processing of plastics, Future of plastics.

Other Materials: Brief description of other materials, such as optical and thermal materials, concrete, composite materials and their uses.

Performance of materials in service: Brief theoretical consideration of fracture, fatigue, and corrosion and its control.

Strength of Material

Course Outcomes:

CO1 To provide basic knowledge in mechanics of materials so that the students can solve real engineering problems and design engineering systems

CO2 Understand the concepts of stress and strain at a point as well as the stress-strain relationships for homogenous, isotropic materials.

CO3 Calculate the stresses and strains in axially-loaded members, circular torsion members, and members subject to flexural loadings.

CO4 Calculate the stresses and strains associated with thin-wall spherical and cylindrical pressure vessels.

CO5 To understand the classical approach of application of forces

CO6 Provide the basis to analyze the natural phenomena of forces mathematically.

MODULE -1

Simple stresses and strains: Concept of stress and strain: principle of stress and strain diagram, Hooke's law, Young's modulus, Poisson ratio, stress at a point, stresses and strains in bars subjected to axial loading, Modulus of elasticity, stress produced in compound bars subjected to axial loading, Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

Compound stresses and strains: Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stress.

Stresses in Beams: Review of pure Bending. Direct and shear stresses in beams due to transverse and axial loads.

Deflection of Beams: Equation of elastic curve, cantilever and simply supported beams, Macaulay method, area moment method.

MODULE -2

Columns and Struts: Combined bending and direct stress, middle third and middle quarter rules. Struts with different end conditions. Euler theory and experimental results, Examples of columns in mechanical equipments and machines.

Thin cylinders & spheres: Hoop and axial stresses and strain. Volumetric strain.

Thick cylinders: Radial, axial and circumferential stresses in thick cylinders subjected to internal or external pressures, Compound cylinders. Stresses in rotating shaft and cylinders. Stresses due to interference fits.

MODULE- 3

Torsion: Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsion rigidity, combined torsion and bending of circular shafts.

Helical and Leaf Springs: deflection of springs by energy method, helical springs under axial load and under axial twist (respectively for circular and square cross sections) axial load and twisting moment acting simultaneously both for open and closed coiled springs, laminated springs.

Curved Beams: Bending of beams with large initial curvature, position of neutral axis for rectangular, trapezoidal and circular cross sections, stress in crane hooks, stress in circular rings subjected to tension or compression.

Fluid Mechanics

Course outcomes: At the end of the course, the student will be able to:

CO1 Review and understand the continuity, momentum and energy equations for viscous, incompressible fluids.

CO2 Understand vorticity and circulation concepts and theorems.

CO3 Understand and utilize approximate solutions of the Navier-Stokes equation.

CO4 Have a fundamental understanding of analytic and numerical methods used to solve fluid dynamics problems

MODULE-1

Introduction: Fluid and continuum, Physical properties of fluids, Rheology of fluids .

Kinematics of Fluid flow: Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, rotational and irrotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows, streamlines, continuity equation for 3D and 1D flows, circulation, stream function and velocity potential, source, sink, doublet and half-body.

Fluid Statics : Pressure-density-height relationship, manometers, pressure transducers, pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, fluid masses subjected to linear acceleration and uniform rotation about an axis.

MODULE-2

Dynamics of Fluid Flow : Euler's Equation of motion along a streamline and its integration, Bernoulli's equation and its applications- Pitot tube, orifice meter, venturi meter and bend meter, Hot-wire anemometer and LDA, notches and weirs, momentum equation and its application to pipe bends.

Dimensional Analysis and Hydraulic Similitude: Dimensional analysis, Buckingham's Pi theorem, important dimensionless numbers and their significance, geometric, kinematics and dynamic similarity, model studies.

MODULE-3

Laminar and Turbulent Flow : Equation of motion for laminar flow through pipes, Stokes law, transition from laminar to turbulent flow, turbulent flow, types of turbulent flow, isotropic, homogenous turbulence, scale and intensity of turbulence, measurement of turbulence, eddy viscosity, mixing length concept and velocity distribution in turbulent flow over smooth and rough surfaces, resistance to flow, minor losses, pipe in series and parallel, power transmission through a pipe, siphon, water hammer, three reservoir problems and networks.

Boundary Layer Analysis : Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, application of momentum equation, turbulent boundary layer, laminar sublayer, separation and its control, Drag and lift, drag on a sphere, a two dimensional cylinder, and an aerofoil, Magnus effect

Refrigeration and Air Conditioning

Course outcomes: At the end of the course, the student will be able to:

CO1. Understand the principles and applications of refrigeration systems.

CO2. Understand vapour compression refrigeration system and identify methods for performance improvement.

CO3. Study the working principles of air, vapour absorption, thermoelectric and steam-jet refrigeration systems.

CO4. Analyze air-conditioning processes using the principles of psychrometry.

CO5. Evaluate cooling and heating loads in an air-conditioning system.

MODULE- I

Refrigeration:

Introduction to refrigeration system, Methods of refrigeration, Carnot refrigeration cycle, Unit of refrigeration, Refrigeration effect & C.O.P.

Air Refrigeration cycle:

Open and closed air refrigeration cycles, Reversed Carnot cycle, Bell Coleman or Reversed Joule air refrigeration cycle, Aircraft refrigeration system, Classification of aircraft refrigeration system. Boot strap refrigeration, Regenerative, Reduced ambient, Dry air rated temperature (DART).

MODULE-2

Vapour Compression System:

Single stage system, Analysis of vapour compression cycle, Use of T-S and P-H charts, Effect of change in suction and discharge pressures on C.O.P, Effect of sub cooling of condensate & superheating of refrigerant vapour on C.O.P of the cycle, Actual vapour compression refrigeration cycle, Multistage vapour compression system requirement, Removal of flash gas, Intercooling, Different configuration of multistage system, Cascade system.

Vapour Absorption system;

Working Principal of vapour absorption refrigeration system, Comparison between absorption & compression systems, Elementary idea of refrigerant absorbent mixtures, Temperature – concentration diagram & Enthalpy – concentration diagram , Adiabatic mixing of two streams, Ammonia – Water vapour absorption system, Lithium-Bromide water vapour absorption system, Comparison.

Refrigerants:

Classification of refrigerants, Nomenclature, Desirable properties of refrigerants, Common refrigerants, Secondary refrigerants and CFC free refrigerants.

MODULE- 3

Air Conditioning:

Introduction to air conditioning, Psychometric properties and their definitions, Psychometric chart, Different Psychometric processes, Thermal analysis of human body, Effective temperature and comfort chart, Cooling and heating load calculations, Selection of inside & outside design conditions, Heat transfer through walls & roofs, Infiltration & ventilation, Internal heat gain, Sensible heat factor (SHF), By pass factor, Grand Sensible heat factor (GSHF), Apparatus dew point (ADP).

Refrigeration Equipment & Application:

Elementary knowledge of refrigeration & air conditioning equipments e.g compressors, condensers, evaporators & expansion devices, Air washers, Cooling, towers & humidifying efficiency, Food preservation, Cold storage, Refrigerates Freezers, Ice plant, Water coolers, Elementary knowledge of transmission and distribution of air through ducts and fans, Basic difference between comfort and industrial air conditioning.

Machine Design

Course outcomes: At the end of the course, the student will be able to:

CO1. Understand the customers' need, formulate the problem and draw the design specifications.

CO2. Analyze the stresses and strains induced in a machine element.

CO3. Ability to evaluate ethical issues that may occur in professional practice.

CO4. Design a machine component using theories of failure.

CO5. Design keys, cotters, couplings and joints including riveted, bolted and welded joints.

MODULE-I

Introduction

Definition, Design requirements of machine elements, Design procedure, Standards in design, Selection of preferred sizes, Indian Standards designation of carbon & alloy steels, Selection of materials for static and fatigue loads

Design against Static Load

Modes of failure, Factor of safety, Principal stresses, Stresses due to bending and torsion, Theory of failure

MODULE-II

Design against Fluctuating Loads

Cyclic stresses, Fatigue and endurance limit, Stress concentration factor, Stress concentration factor for various machine parts, Notch sensitivity, Design for finite and infinite life, Soderberg, Goodman & Gerber criteria

Riveted Joints-Riveting methods, materials, Types of rivet heads, Types of riveted joints, Caulking and Fullering, Failure of riveted joint, Efficiency of riveted joint, Design of boiler joints, Eccentric loaded riveted joint

Shafts

Cause of failure in shafts, Materials for shaft, Stresses in shafts, Design of shafts subjected to twisting moment, bending moment and combined twisting and bending moments, Shafts subjected to fatigue loads, Design for rigidity

MODULE- III

Keys and Couplings

Types of keys, splines, Selection of square & flat keys, Strength of sunk key, Couplings- Design of rigid and flexible couplings

Mechanical Springs

Types, Material for helical springs, End connections for compression and tension helical springs, Stresses and deflection of helical springs of circular wire, Design of helical springs subjected to static and fatigue loading

Power Screws

Forms of threads, multiple threads, Efficiency of square threads, Trapezoidal threads, Stresses in screws, Design of screwjack

Theory of Machine

Course outcomes: At the end of the course, the student will be able to:

CO1. Ability to apply the principles of balancing of masses to various links, mechanisms and engines

CO2. Ability to apply the principles of gyroscopic effects and stabilization on various transport vehicles and applications of various governors

CO3. Ability to analyze the force analysis and power calculations of brakes and dynamometer

CO4. Ability to conduct static and dynamic force analysis and equilibrium of forces for mechanical systems

CO5. Ability to study the various principles of vibrations of different systems

MODULE-1

Introduction

Links-types, kinematics pairs-classification, constraints-types, degrees of freedom of planar mechanism, grubler's equation, linkage mechanisms, inversions of four bar chain, slider crank chain and double slider crankchain.

Velocity in mechanisms

Velocity of point in mechanism, relative velocity method, velocities in four bar mechanism, slider crank mechanism and quick return motion mechanism, rubbing velocity at a pin joint, instantaneous center method, types & location of instantaneous centers, Kennedy's theorem, velocities in four bar mechanism & slider crank mechanism

MODULE-2

Acceleration in mechanism

Acceleration of a point on a link, acceleration diagram, Coriolis component of acceleration, crank and slotted lever mechanism, Klein's construction for slider crank mechanism and four bar mechanism analytical method for slider crank mechanism

Mechanisms with lower pairs

Pantograph, exact straight line motion mechanisms-Peaucellier's, Hart and Scott Russell mechanisms, approximate straight line motion mechanisms—Grashof, Watt and

Chebicheff mechanisms, analysis of Hooke's joint, Davis and Ackermann steering gear mechanisms.

Friction

Laws of friction, friction on inclined plane, efficiency on inclined plane, friction in journal Bearing-friction circle, pivots and collar friction-uniform pressure and uniform wear, belt and pulley drive, length of open and cross belt drive, ratio of driving tensions for flat belt drive, centrifugal tension, condition for maximum power transmission, V belt drive

MODULE 3

Brakes & dynamometers

Shoe brake, band brake, band and block brake, absorption and transmission type dynamometers.

Cams

Cams and followers - classification & terminology, cam profile by graphical methods with knife edge and radial roller follower for uniform velocity, simple harmonic and parabolic motion of followers, analytical methods of cam design – tangent cam with roller follower and circular cams with flat faced follower

Gears & gear trains

Classification & terminology, law of gearing, tooth forms & comparisons, systems of gear teeth, length of path of contact, contact ratio, interference & undercutting in involute gear teeth,

minimum number of teeth on gear and pinion to avoid interference, simple, compound, reverted and planetary gear trains, sun and planet gear.

Internal Combustion Engine and Compressor

Course outcomes: At the end of the course, the student will be able to:

- CO1. Understand working and performance of IC Engines through thermodynamic cycles.
- CO2. Understand combustion phenomena in SI and CI engines and factors influencing combustion chamber design.
- CO3. Outline emission formation mechanism of IC engines, its effects and the legislation standards.
- CO4. Understand working principles of instrumentation used for engine performance and emission parameters.
- CO5. Evaluate methods for improving the IC engine performance.
- CO6. Understand the latest developments in IC Engines and alternate fuels.

MODULE-I

Introduction to I.C. Engines:

Engine classification, Air standard cycles, Otto cycle, Diesel cycle, Dual cycle, Comparison of Otto, Diesel and Dual cycles, Sterling cycle, Ericsson cycles, Actual cycle analysis, Two and four stroke engines, SI and CI engines, Valve timing diagram, Rotary engines, stratified charge engine.

Fuels:

Fuels for SI and CI engine , Important qualities of SI and CI engine fuels, Rating of SI engine and CI engine fuels, Dopes, Additives, Gaseous fuels, LPG, CNG, Biogas, Producer gas, Alternative fuels for IC engines.

Testing and Performance:

Performance parameters, Basic measurements, Blow by measurement, Testing of SI and CI engines.

SI Engines:

Combustion in SI engine, Flame speed, Ignition delay, Abnormal combustion and its control, combustion chamber design for SI engines.

Carburetion, Mixture requirements, Carburetor types, Theory of carburetor, MPFI.

Ignition system requirements, Magneto and battery ignition systems, ignition timing and spark plug, Electronic ignition.

MODULE-II

CI Engine: Combustion in CI engines, Ignition delay, Knock and its control, Combustion chamber design of CI engines. Fuel injection in CI engines, Requirements, Types of injection systems, Fuel pumps, Fuel injectors, Injection timings. Scavenging in 2 Stroke engines, pollution and its control.

Engine Cooling:

Different cooling systems, Radiators and cooling fans.

Lubrication:

Engine friction, Lubrication principle, Type of lubrication, Lubrication oils, Crankcase ventilation.

Supercharging:

Effect of altitude on power output, Types of supercharging

Compressors:

Classification, Reciprocating compressors, Single and Multi stage compressors, Intercooling, Volumetric efficiency. Rotary compressors, Classification, Centrifugal compressor, Axial compressors, Surging and stalling, Roots blower, Vaned compressor.

Computer Aided Design

Course outcomes:

CO1 At the end of the course, the student will be able to:

CO2 Apply basic concepts to develop construction (drawing) techniques

CO3 Ability to manipulate drawings through editing and plotting techniques

CO4 Understand geometric construction

CO5 Produce template drawings

CO6 Produce 2D Orthographic Projections.

MODULE- I

Introduction to CAD/CAED/CAE, Elements of CAD, Essential requirements of CAD, Concepts of integrated CAD/CAM, Necessity & its importance, Engineering Applications Computer Graphics-I

CAD/CAM systems, Graphics Input devices-cursor control Devices, Digitizers, Keyboard terminals, Image scanner, Speech control devices and Touch, panels, Graphics display devices-Cathode Ray Tube, Random & Raster scan display, Colour CRT monitors, Direct View Storage Tubes, Flat Panel display, Hard copy printers and plotters

Computer Graphics-II

Graphics standards, Graphics Software, Software Configuration, Graphics Functions, Output primitives- Bresenham's line drawing algorithm and Bresenham's circle generating algorithm

MODULE-II

Geometric Transformations:

World/device Coordinate Representation, Windowing and clipping, 2 D Geometric transformations-Translation, Scaling, Shearing, Rotation & Reflection Matrix representation, Composite transformation, 3 D transformations, multiple transformation

Curves:

Curves representation, Properties of curve design and representation, Interpolation vs approximation, Parametric representation of analytic curves, Parametric continuity conditions, Parametric representation of synthetic curves-Hermite cubic splines-Blending function formulation and its properties, Bezier curves- Blending function formulation and its properties, Composite Bezier curves, B-spline curves and its properties, Periodic and non-periodic B-spline curves

3D Graphics:

Polygon surfaces-Polygon mesh representations, Quadric and Superquadric surfaces and blobby objects; Solid modeling-Solid entities, Fundamentals of Solid modeling-Set theory, regularized set operations; Half spaces, Boundary representation, Constructive solid geometry, Sweep representation, Color models, Application commands for AutoCAD & ProE software

MODULE-III

Numerical Methods:

Introduction, Errors in numbers, Binary representation of numbers, Root finding- Bisection method, Newton Raphson method, Curve fitting-Least square method, Numerical differentiation-Newton's interpolation, Numerical Integration-Trapezoidal and Simpson method

Finite Element Method:

Introduction, Principles of Finite elements modeling, Stiffness matrix/displacement matrix, Stiffness matrix for spring system, bar & beam elements, bar elements in 2D space (truss element)

Automobile Engineering

Course outcomes:

CO1 The anatomy of the automobile in general

CO2 The location and importance of each part

CO3 The functioning of the engine and its accessories, gear box, clutch, brakes, steering, axles and wheels

CO4 Suspension, frame, springs and other connections

CO5 Emissions, ignition, controls, electrical systems and ventilation.

MODULE- I

Power Unit and Gear Box:

Principles of Design of main components. Valve mechanism. Power and Torque characteristics. Rolling, air and gradient resistance. Tractive effort. Gear Box. Gear ratio determination. Design of Gear box.

Transmission System:

Requirements. Clutches. Torque converters. Over Drive and free wheel, Universal joint. Differential Gear Mechanism of Rear Axle. Automatic transmission, Steering and Front Axle. Castor Angle, wheel camber & Toe-in, Toe-out etc.. Steering geometry. Ackerman mechanism, Understeer and Oversteer.

MODULE-II

Braking System:

General requirements, Road, tyre adhesion, weight transfer, Braking ratio. Mechanical brakes, Hydraulic brakes. Vacuum and air brakes. Thermal aspects. **Chassis and Suspension System:** Loads on the frame. Strength and stiffness. Various suspension systems.

Electrical System :

Types of starting motors, generator & regulators, lighting system, Ignition system, Horn, Battery etc.

MODULE-III

Fuel Supply System:

Diesel & Petrol vehicle system such as Fuel Injection Pump, Injector & Fuel Pump, Carburetor etc. MPFI.

Automobile Air Conditioning:

Requirements, Cooling & heating systems.

Cooling & Lubrication System:

Different type of cooling system and lubrication system.

Maintenance system:

Preventive maintenance, break down maintenance and over hauling.

Operation Research

Course outcomes: On completion of this course you should be able to:

CO1 Define and formulate linear programming problems and appreciate their limitations.

CO2 Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained and translate solutions into directives for action.

CO3 Conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.

CO4 Develop mathematical skills to analyse and solve integer programming and network models arising from a wide range of applications.

CO5 Effectively communicate ideas, explain procedures and interpret results and solutions in written and electronic forms to different audiences.

MODULE-1

Introduction: Basics of Operations Research

Linear Programming

Introduction & Scope, Problem formulation, Graphical Method, Simplex methods, primal & dual problem sensitivity analysis.

Transportation & Assignment problems.

Deterministic Dynamic Programming-

Multistage decision problems & solution, Principle of optimality.

MODULE-2

Decision theory

Decision under various conditions.

Game Theory

Two Person Zero sum game, Solution with / without Saddle point, Dominance Rule, Different Methods like Algebraic, Graphical, Linear Programming

Sequencing

Basic assumption, n Jobs through two / three machines, 2 Jobs on m machines.

Stochastic inventory models

Single & multi period models with continuous & discrete demands, Service level & reorder policy

MODULE-3

Simulations

Use, advantages & limitations, Monte-carlo simulation, Application to queuing, inventory & other problems.

Queuing models

Characteristics of Queuing Model, M/M/1 & M/M/S system, cost consideration

Project Management

Basic concept, Rules for drawing the network diagram, Applications of CPM and PERT techniques in Project planning and control; crashing of operations; resource allocation.

Computer Aided Manufacturing

Course outcomes: At the end of the course, the student will be able to:

CO1 Being able to generate tool paths doing 2D and 3D designs in a CAD/CAM package.

CO2 To send part programmes to CNC machine and being able to machine parts.

Module I

Automation

Introduction to CAM; Automated Manufacturing system; Need of automation, Basic elements of automation, Levels of automation, Automation Strategies, Advantages & disadvantages of automation, Historical development and future trends.

Features of NC Machines-

Fundamental of Numerical Control, elements of NC machine tools, classification of NC machine tools, Advantages, suitability and limitations of NC machine tools, Application of NC system, Methods for improving Accuracy considering the factors such as tool deflection and chatter and Productivity.

NC Part Programming-

Manual (word address format) programming. Examples Drilling, Turning and Milling; Canned cycles, Subroutine, and Macro.

APT programming. Geometry, Motion and Additional statements, Macro- statement.

MODULE-II

System Devices

Introduction to DC motors, stepping motors, feed back devices such as encoder, counting devices, digital to analog converter and vice versa.

Interpolators

Digital differential Integrator-Principle of operation, exponential deceleration; DDA, Hardware Interpolator- Linear, Circular; DDA Software Interpolator.

Control of NC Systems

Open and closed loops. Control of point to point systems- Incremental open loop control, Incremental close loop, Absolute close loop; Control loop in contouring systems; Adaptive control.

MODULE-III

Computer Integrated Manufacturing system

Group Technology, Flexible Manufacturing System, CIM, CAD/CAM, Computer aided process planning-Retrieval and Generative, Concept of Mechatronics, Computer aided Inspection.

Robotics

Types and generations of Robots, Structure and operation of Robot, Robot applications. Economics, Robot programming methods. VAL and AML with examples.

Intelligent Manufacturing

Introduction to Artificial Intelligence for Intelligent manufacturing.

MPE -101 MODERN WELDING TECHNIQUES

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P-3 1 0

MODULE 1

Classification of welding processes; Gas welding; Arc welding; arc physics, power source characteristics, Manual metal arc welding: Concepts, types of electrodes and their

applications, Gas tungsten arc welding: Concepts, processes and applications ; gas metal arc welding, Concepts, processes and applications ,types of metal transfer, CO2 welding.

MODULE 2

Submerged arc welding, advantages and limitations, process variables and their effects, significance of flux-metal combination, modern developments, narrow gap submerged arc welding, applications; electro slag and electro gas welding

MODULE 3

Plasma welding; Concepts, processes and applications, keyhole and puddle-in mode of operation, low current and high current plasma arc welding and their applications; Resistance welding, Concepts, types and applications, Flash butt welding, Stud welding and under water welding

Reference Books:

1. Parmer R. S., 'Welding Engineering and Technology', Khanna Publishers, 1997
2. Cary, Howard, "Modern Welding Technology", prentice Hall, 1998

MPE-102 FOUNDRY TECHNOLOGY

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P-3 1 0

MODULE-1

Critical review of some foundry operations: Various casting processes, mould reinforcements, mould factors in metal Flow, molding factors in casting design, limitations in controlling some molding factors in casting design, Effect of process variables on property of core and mould making sand. Properties of liquid metals: Thermal properties, viscosity, surface tension and density of liquid metals and their role in foundry technology. Gases in liquid metals: Simple gases in metals, complex gases in metals, gas defects and their control.

MODULE-2

Solidification of metals and alloys: Structure of casting as influenced by alloy constituents, thermal conditions, inherent nucleation and growth condition in the liquid like temperature gradient, liquids temperature profile and G/R ratio. Control of structure; principles of gating and rise ring, Directionality in solidification, Characteristics of different alloys, Design of gating system, Wlodawer system of determining the feeder head requirements. Feeder head efficiency, concept of feeding range, use of supplementary techniques and introduction of design modifications.

MODULE-3

Special casting processes: Investment casting, Die casting, centrifugal casting, full mould casting, vacuum shield casting etc. Industrial melting practices: Aim of melting and melting practices as adopted in case of Cast Irons, Steel, Cu, Al and its alloys. Casting defects & their remedies: Shaping faults arising in pouring, Inclusions and sand defects, gas defects, shrinkage defects during solidification in liquid phase. Contraction defects, Dimensional errors, compositional errors and segregation.

Reference Books:

1. Beeley, P.R., Foundry Technology, Butterworth and Co.
2. Webster, P.D., Fundamentals of Foundry Technology,
3. Mukherjee, P.C, Fundamentals of Metal casting Technology

MPE-103 MODERN METHODS OF MANUFACTURING

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

LT P-3 1 0

MODULE 1

Introduction to machining: Classification of machining processes, comparison between conventional and non-conventional machining processes, requirements of tool materials, Developments in tool materials, ISO specifications for inserts and tool holders, Tool life, Optimization of tool lie parameters for machining. Laser beam machining: Introduction to laser beam machining, process parameters, machining applications of laser, advantages and limitations of laser beam machining. Electron beam machining: Introduction to laser beam machining, equipment and process parameters used in machining, advantages and disadvantages of laser beam machining.

MODULE 2

Mechanical machining processes: Abrasive jet machining: Introduction, Equipment, variables in abrasive jet machining: carrier gas, type of abrasive, size of abrasive grain, velocity of abrasive jet, Mean abrasive particles per unit volume of carrier gas, work material stand off distance, nozzle design. Process characteristics – material removal rate, accuracy and surface finish, Advantages, disadvantages and applications of abrasive jet machining.

Ultrasonic machining: Introduction, equipment details, tool material and tool size, abrasive slurry, tool cone (concentrator), exponential concentrator of circular cross section and rectangular cross-section, hollow cylindrical concentrator. Effect of various process parameters, applications, advantages and disadvantages of ultrasonic machining. HERF techniques, Super plastic forming techniques, Principles and Process parameters, Advantages, applications and limitations of HERF techniques, Orbital forging, Isothermal forging

MODULE 3

Electrochemical machining: Introduction to Electro-chemical machining, Study of ECM machine, Elements of ECM process: cathode tool, anode work-piece, source of DC power, electrolyte, process characteristics-Material removal rate, Accuracy, surface finish, Economics of ECM, applications, limitations, advantages and disadvantages of electrochemical machining.

Electric Discharge Machining: Introduction to electric discharge machining, mechanism of metal removal, dielectric fluid, spark generator, tool material (electrodes), electrode feed control, electrode wear, electrode tool design: Choice of matching operation, electrode material selection, under sizing and length of electrode, machining time. Flushing – pressure flushing synchronized with electrode movement, process characteristics: material removal rate, accuracy, surface finish, heat affected zone, travelling wire EDM, applications.

Reference Books:

1. Metal Cutting Principles M.C. Shaw Oxford Clarendon Press
2. Modern Machining Process – Pandey and Shahn, TATA Mc Graw Hill 2000.
3. Fundamentals of Metal Cutting and Machine Tools B.L. Juneja and G.S. Sekhon New Age International
4. Fundamentals of Metal Casting H. Loper and Rosenthal Tata McGraw Hill

MPE-104 METAL FORMING TECHNOLOGY

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P- 3 1 0

Module I

Introduction:

Definitions and classification of Metal forming processes, Brief description of forming operations Bulk forming processes: Rolling Process, Direct extrusion process, backward extrusion or indirect extrusion, Sheet metal operations: Deep drawing, Bending and shearing. Elastic and plastic deformation of material, Elementary stress analysis, Principal stresses, Yield

criteria, Tresca's maximum shear stress criteria, Von Misses maximum distortion energy criteria. Relationship between tensile and shear yield stresses.

Module II

Metal forming Lubrication: - Friction and Lubrication in Metal Forming lubrication mechanisms, boundary and extreme pressure lubricants, mixed lubrication, hydrodynamic lubrication, lubricants used in industrial forming processes

Defects

Causes and remedies of important forming defects

Miscellaneous Forming Processes

Advantages and disadvantages of Hot and Cold Forming

Module III

Mechanics of Forming Processes

Determination of rolling pressure, rolling separating force, forging of strip, forging of disc, Determination of drawing force and power, Determination of maximum allowable reduction, Deep Drawing, bending determination of work load, Extrusion determination of work load and stress analysis

Reference Books:

1. Manufacturing Science by Gosh and Mallik
2. Manufacturing Engineering and Technology by Kalpakjian & Schmid
3. Technology of metal forming processes by Surender Kumar
4. Manufacturing Processes and Technology Dr.B.Kumar

MPE-201 MATHEMATICAL MODELING AND OPTIMIZATION

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P-3 1 0

Module 1

General concepts

Evolution of modern management, functional approach, systems approach, decision making, models and model building, models to solve production problems.

Linear programming

General L. P. Format, formulation of production problems, Methods of Solution: Graphical, Simplex, Modified simplex, Big M and 2 Phase methods, Duality, degeneracy and redundancy in L.P., Sensitivity analysis, Application of L.P. to solve problems of Production systems.

Module 2

Network analysis

CPM and PERT, Shortest path problem, Maximum flow problem, Concept of slack/float and its significance, Project cost analysis, crashing, resource smoothing and leveling, Applications in production systems.

Sequencing problem

Johnson's Rule and its logic, methods of solution, n jobs two machines, n jobs 3 machines, 2 jobs M machines and n jobs M machines problems, Graphical and Heuristic methods, Applications and limitations.

Module 3

Queuing Models

Simple queues, Type of queuing models, multiple service channels, Arrival and service characteristics, Optimization of queuing systems, Application to production problems on queuing theory.

Taguchi method

Trial and error approach, Difference between trial and error approach and taguchi optimization approach, design of experiments, Taguchi method, optimization strategies using taguchi method.

Reference Books:

1. Introduction to optimum design—Jasbir S. Arora, -- Elsevier, 2006.
2. Engineering optimization: Methods and Applications – A Ravindran, K.M. Ragsdell, and G.V. Reklaitis , Wiley India Edition, 2006.

MPE-202 PRODUCTION PLANNING AND CONTROL

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P-3 1 0

MODULE 1

Introduction: Objectives and benefits of planning and control-Functions of production control-Types of production job batch and continuous Product development and design-Marketing aspect, Functional aspects, Operational aspect, Durability and dependability aspect, aesthetic aspect. Profit consideration-Standardization, Simplification & specialization- Break even analysis.

Workstudy: Method study, basic procedure , Selection , Recording of process , Critical analysis, Development Implementation , Micro motion and memo motion study , work measurement , Techniques of work measurement,Time study Production study Work sampling.

MODULE 2

Product planning and process planning: Product planning-Extending the original product information-Value analysis-Problems in lack of product planning-Process planning and routing-Pre requisite information needed for process planning-Steps in process planning, batch production.

Production scheduling : Production Control Systems-Loading and scheduling, Scheduling rules, Gantt charts, Basic scheduling problems Line of balance , Flow production scheduling, Batch production scheduling-Product sequencing - Production Control systems-Periodic batch control-Material requirement planning – Dispatching-Progress reporting and expediting-Manufacturing lead time.

MODULE 3

Inventory control and recent trends in ppc: Inventory control- Purpose of holding stock- Effect of demand on inventories - Ordering procedures. Ordering cycle system - Determination of Economic order quantity and economic lot size-ABC analysis-Recorder procedure-Introduction to computer integrated production planning systems-elements of JUST IN TIME SYSTEMS-Fundamentals of MRP.

Reference Books:

1. Martand Telsang, "Industrial Engineering and Production Management", S. Chand and Company, First edition, 2000.
2. James.B.Dilworth , " Operations management – Design, Planning and Control for manufacturing and services" McGraw Hill International edition 1992.

REFERENCES:

1. Samson Eilon, "Elements of production planning and control", Universal Book Corpn.1984
2. Elwood S.Buffa, and Rakesh K. Sarin , "Modern Production / Operations Management", 8th Ed. John Wiley and Sons, 2000.
3. Kanishka Bedi, "Production and Operations management", Oxford university press, 2nd Edition 2007.
4. Melynk, Denzler, "Operations management – A value driven approach" Irwin McGraw-Hill.
5. Norman Gaither, G. Frazier, "Operations management" Thomson learning 9th edition IE , 2007
6. K.C.Jain & L.N.Aggarwal, "Production Planning Control and Industrial Management", Khanna Publishers, 1990.
7. S.N.Chary, "Theory and Problems in Production & Operations Management", Tata McGraw Hill, 1995.
8. Upendra Kachru, "Production and operations management – Text and cases" Excel books 1st edition 2007

MPE-203 ADVANCED MACHINE TOOL DESIGN

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P- 3 1 0

MODULE 1

Classification of Machine Tools: General purpose, Special purpose, Automatic, Semi-Automatic machine tools, Transfer lines. **Kinematics of Machine Tools:** Shaping of geometrical and real surfaces, Developing and designing of kinematics schemes of machine tools, Kinematic structures of lathe, drilling, milling, relieving lathe, grinding, gear shaping and gear hobbling machining. **Kinematic design and speed and feed boxes.** Productivity loss, stepped and step less regulation.

MODULE 2

General Kinematics – Design of drives and machine tool elements, design of tool changes and turrets. Machine tool dynamics -Thermal aspect in machine tool design machine tool noise and concepts of noise control. Design of slide ways - application of new materials treatment of slide ways. CNC machine tool structures. Static and dynamic testing of machine tools recent trends in machine tool design.

MODULE 3

Automatic machine tools and Transfer machines with control systems: Selection of control systems, Control systems with pre-selection of speeds or feeds, Remote controls, Safety devices in machine tools. Significance of Machine tool automation, working members, Application of CAD/CAM/CIM in Machine tool design, Transfer machines & their controls

Hydraulic & Pneumatic Systems for machine tools: General principles of Hydraulic and Pneumatic drives. Different types control valves for Hydraulic and Pneumatic circuits, Hydraulic & Pneumatic circuit design for machine tools.

Reference Books:

1. M. Weck, "Handbook Of Machine Tools, Vol. 1-4", John Wiley, USA. 1980.
2. Cyril Donaldson, G.H.LeCain & V.C. Goold, "Tool Design", Tata McGraw Hill, 1973.
3. J. Tlustý & F.Koenigsbeger, "Machine Tool Structure, Vol. I", Pergamon press, UK, 1970.
4. Pippenger, John J. and Koff Richard M, "Fluid Power Controls", McGraw Hill, 1959.
5. Pippenger, John J. and Hicks, Tyler G, "Industrial Hydraulics", McGraw Hill, 1979.
6. Leskiewics H.J. and Zarhmba M., "Pneumatic and Hydraulic components and Instrumentations in Automatic Controls", International Federation of Automatic controls, 1980.
7. Acherkan N., "Machine Tool Design", Vol. I – IV , Mir Publications.

8. Mehta, N.K., "Machine Tool Design", Tata McGraw Hill, 1989.

MOE-201 MATERIALS MANAGEMENT

Maximum Sessional Marks: 30

Maximum End Term Examination Marks: 70

L T P-3 1 0

MODULE-1

Materials Management: Definition and function -Importance of materials management. Objective of Materials management – Materials requirement and planning – Inventory control – Fixed order size, P&Q Inventory System – Deterministic probabilistic models, Static inventory models – Spare parts management – Materials requirement planning – Aggregate inventory management – , ABC Analysis, XYZ Analysis, VED Analysis, FSN Analysis, SDE Analysis.

MODULE-2

Inventory Management: Stages; Selective Control; Demand Forecasting; ~~Lead~~ ^{Lead} time; Safety Stock; MRP and JIT systems; Inventory Valuation-Inventory Control: Relevant Costs, P & Q Systems of Inventory, Basic EOQ Model, and Model with Quantity discount, Economic Batch Quantity. Safety Stock, Concept of Quality Management, Quality of Design, supply, Concept of supply chain management, Statistical Quality Control, X Bar, R and P Charts

MODULE-3

Store management: Store keeping and materials handling - Objectives - Function – Standardization- stores layout, storage systems and equipment, stores preservation, stores procedures- store keeping – stores responsibilities - Location of store house - Centralized store room - Equipment – security measures - Protection and prevention of stores

Purchase management: Purchasing - Procedure - Dynamic purchasing - Principles – import - Purchasing function – Purchasing policies and procedures, legal aspects of purchasing, tax considerations in purchasing, selections and sources of supply and make or buy decisions – Vendor evaluation and rating – vendor development.